

Reverb: Notes

No place of publication is given for university press books, and no publisher other than a university press is given for works published before 1965. The original year of publication is provided in [brackets] where chronology is vital to arguments in the text. Many of the published sources I cite have since become available online; I furnish URLs only for those sources available exclusively online and current as of January 31, 2009. Spellings have been silently modernized except in titles and in poetry; English spellings are retained in quotations from British Commonwealth sources. Since there is no bibliography, I have eased the task of assiduous readers by indicating with (→ n.) the endnote number of the original full citation for subsequent short-titled references more than seven notes distant.

Acad	Academy, Académie
Amer	America, American
Anthrop	Anthropology, Anthropological
<i>AORL</i>	<i>Annals of Otology, Rhinology and Laryngology</i>
Assn	Association
Astron	Astronomy, Astronomical
B	Boston
BCE	Before the Common Era
Biog	Biography, Biographical
Brit	British, Britain
Bull, Bulls	Bulletin, Bulletins
Camb	Cambridge
CE	Common Era
CHP	Niels Bohr Library and Archives, Center for the History of Physics, American Institute of Physics, College Park, Maryland
Coll	Collection(s)
comp., comps.	compiler(s), compiled by, compilers
Corresp	Correspondence(s)

DAE	<i>A Dictionary of American English on Historical Principles</i> , eds. William A. Craigie and James H. Hulbert, University of Chicago Press, 1966 [1938]
DC	Washington, D.C.
Dict	Dictionary, Dictionnaire
DSB	<i>Dictionary of Scientific Biography</i> , ed. Charles C. Gillespie, New York: Scribner's, 1971+
EC	Englewoods Cliffs, New Jersey
Educ	Education
Ency	Encyclopedia, Encyclopaedia
Env	Environment, Environmental
ep.	epistle
f.	folder
facs.	facsimile
H	History, Historical
illus.	illustrator, illustrated by
Ind	Industrial
Inst	Institute
J	Journal (of / for)
JAMA	<i>Journal of the American Medical Association</i>
JASA	<i>Journal of the Acoustical Society of America</i>
JLO	<i>Journal of Laryngology and Otology</i> , vols. 1–5 as <i>Journal of Laryngology and Rhinology</i> , vols. 6–35 as <i>Journal of Laryngology, Rhinology, and Otology</i>
John W. Hartman Center	John W. Hartman Center for Sales, Advertising & Marketing, History, Rare Book, Manuscript and Special Collections Library, Duke University, Durham, North Carolina
L	London
l., ll.	line, lines
LA	Los Angeles
Lab	Laboratory
Lib	Library
Med	Medical, Medicine
Mfg	Manufacturing, Manufacturers
Mo	Monthly
→ n.	Refers to a previous full citation within the same Round, employed where the original is more than seven endnotes distant from subsequent, short-title citations
NARA	United States National Archives and Records Administration
n.d.	no publication date
Neurosci	Neuroscience, Neuroscientific
<i>New Grove</i>	Stanley Sadie, ed., <i>New Grove Dictionary of Music and Musicians</i> , 2nd ed., New York: Macmillan, 1980–, 20 vols.

NMAH	Archives Center, National Museum of American History, Smithsonian Institution, Washington, D.C.
n.s.	new series
NY	New York
Occup	Occupational
<i>OED</i>	<i>Oxford English Dictionary</i> , 2nd ed., revised and supplemented, 2000-
P	Paris
par., pars.	paragraph, paragraphs
pass.	<i>et passim</i> , found hither and thither
Persp	Perspectives
Phil	Philosophy / Philosophical
Phila	Philadelphia
Pop	Popular
Proc	Proceedings
Psych	Psychological, Psychology (not Psychiatric, Psychiatry)
q.	quotation on this page (in list of pages used from a single source) = q. 1
Q	Quarterly
R	Review, Reviews, Revue, Rivista
repr.	reprinted
Rept	Report(s)
rev.	revised
Sci	Science(s), Scientific
SIO	Scripps Institution of Oceanography Archives, UC San Diego Libraries, La Jolla, California
Soc	Society
Suppl, suppl.	Supplement(s), supplement(s)
s.v.	sub verbo = under the lexical entry for this word
Tech	Technology, Technological
Trans	Transactions
Trib	Tribune
U	University (of), Universitaire(s)
Warsaw Collection	Warsaw Collection of Business Americana, I. Business Ephemera—Vertical Files, Archives Center, National Museum of American History, Smithsonian Institutions, Washington, D.C.
wr.	written
Z	Zeitschrift

B A N G

1. C. Mackenzie Brown, "Purāna as scripture: from sound to image of the holy word in Hindu tradition," *H of Religions* 26 (1986) 68–86; Guy L. Beck, *Sonic Theology: Hinduism and Sacred Sound* (U South Carolina, 1993) esp. 9–29, and suggesting (pp. 35–38) that the idea of "pure cosmic sound" comes later to Hindu philosophy and theology than sound

as speech, which explains the focus of Indian linguistics on phonemes and proper ritual pronunciation of sacred words, lest (p. 56) they turn into mere tone or noise (*nāda*, “a loud sound, roaring, bellowing, crying”), for more on which, Brahmakanda Bhartrhari, *Vākya-padīyam*, tr. K. Subrahmanyam (Delhi: Sri Satguru, 1992). Contrast Nicky Losseff, “Silent music and the eternal silence,” in *Silence, Music, Silent Music*, eds. N. Losseff and J. Doctor (Burlington: Ashgate, 2007) 205–22, and Sara Maitland, *A Book of Silence* (Berkeley: Counterpoint, 2008) 116–53, arguing from Maori and Australian aboriginal sources that the breaking of silence is not a universal prerequisite of creation myths. For the Babylonian sources: Alexander Heidel, *The Babylonian Genesis* (U Chicago, 1951) 18–26, q. 19 from *Enūma Elish*, Tablet I, ll. 37–40 and 45–46.

2. Stephanie Dalley, ed. and tr., *Myths from Mesopotamia* (Oxford U, 1991) 9–38, q. 23 from *Atrahasis* II, sect. iv, q. 31 from *Atrahasis* III, sect. iii, and cf. her translation of the 8th-century BCE Akkadian tablets of “Erra and Ishum,” in *The Context of Scripture*, eds. W. H. Hallo and K. L. Younger (Leiden: Brill, 1997) I, 404–406. Dalley notes (p. 274) that Tiāmat was also called Mother Hubur (<Akkadian huburu), one possible origin for “hub-bub.” Consider also John H. Choi, “Protecting the silence: exploring noise and tranquility in Babylonian religion,” *J Associated Graduates in Near Eastern Studies* 10 (Fall 2004) 2–22; Norman Cohn, *Cosmos, Chaos, and the World to Come: The Ancient Roots of Apocalyptic Faith* (Yale U, 1993) 50ff.

3. I use here and henceforth *The Jerusalem Bible* (Garden City: Doubleday, 1968), which notes (p. 15n.) that although Babel is derived here from a verb meaning “to confuse,” the name means “gate of the god.” Everett Fox, *In the Beginning: A New English Rendition of the Book of Genesis* (NY: Schocken, 1983) translates Genesis 11.7 as “Come now! Let us go down and there let us baffle their language.” More on Babel to come. Cf. Benjamin D. Sommer, “Revelation at Sinai in the Hebrew Bible and Jewish theology,” *J of Religion* 79 (1999) 422–51, on the “stenographic” theory of revelation, and what was heard at Sinai, asking (with regard to Exodus 19 and parts of Deuteronomy), “Did God speak to Moses in a human voice or in a loud noise?” On *tehom*: Catherine Keller, *The Face of the Deep: A Theology of Becoming* (L: Routledge, 2003) xv–xvi, 213–22, 239 n.4.

4. Georges Lafaye, “Harpocrates,” *Dictionnaire des antiquités grecques et romaines*, eds. C. Daremberg and E. Saglio (Graz, 1962–63) III, 12–13; Thomas A. Brady, “Horus, called Harpocrates,” *Oxford Classical Dictionary* (Oxford: Clarendon, 1949) 441; E. A. Wallis Budge, *The Gods of the Egyptians* (NY: Dover, 1969 [1904]) I, 468–69 and plate 28; Annie Forgeau, “Horus enfant, quel nom, quel champ d’action?” *Bull de la Société française d’Égyptologie* 153 (2002) 6–23; [Pseudo-Aristotle], *The Problems of Aristotle* [L, 1682] sig E1; Leonard H. Lesko, “Literature, literacy, and literati,” *Pharaoh’s Workers: The Villagers of Deir el Medina* (Cornell U, 1994) q. 143 from *Maxims of Ani*; Brian P. Copenhaver, tr. and ed., *Hermetica: The Greek Corpus Hermeticum and the Latin Asclepius in a new English Translation* (Camb U, 1995) xiii–xiv on ibis mummies, q. 58 from the *Corpus Hermeticum*, XVI, Definitions of Asclepius to King Ammon. For classical notions of silence: Paolo Scarpi, “The eloquence of silence,” in *The Regions of Silence: Studies in the Difficulty of Communicating*, ed. Maria Grazia Ciani (Amsterdam: Gieben, 1987) 19–40; for Hellenistic and Gnostic notions: Jean-Pierre Mahé, “A reading of the *Discourse on the Ogdoad and the*

Ennead,” in *Gnosis and Hermeticism from Antiquity to Modern Times*, eds. R. Van den Broek and W. J. Hanegraaff (SUNY Albany, 1998) 79–85.

5. Plato, *Phaedrus*, tr. Alexander Nehamas and Paul Woodruff (Indianapolis: Hackett, 1995); G. R. F. Ferrari, *Listening to the Cicadas: A Study in Plato's Phaedrus* (Camb U, 1987); W. B. Stanford, “The lily voice of the cicadas (ILIAD 3.152),” *Phoenix* 23 (1969) 3–8; idem, *The Sound of Greek* (UC Berkeley, 1967) 9–16; Charles Darwin, *The Expression of the Emotions in Man and Animals* (U Chicago, 1965 [1872]) 370–71; Henry C. Bennet-Clark, “How cicadas make their noise,” *Sci Amer* 278 (May 1998) 58–61; Silvia Montiglio, *Silence in the Land of Logos* (Princeton U, 2000) esp. 87; Maarit Kaimio, *Characterization of Sound in Early Greek Literature* (Helsinki: Societas Scientiarum Fennica, 1977) esp. 48 on Homer, 51 on sirens, 79, 245–47; Copenhaver, *Hermetica*, XVIII, On the Soul Hindered by the Body's Affections, 64. Cf. David Abram, *The Spell of the Sensuous: Perception and Language in a More-than-Human World* (NY: Pantheon, 1996) 109–21. Thoth, as god of writing, appears at length in the *Phaedrus*; Jacques Derrida, ideologue of the grapheme, makes as much of Thoth as of the cicadas in his “Plato's pharmacy,” in *Dissemination*, tr. Barbara Johnson (U Chicago, 1981) 63–94, rebutted by Sean Burke, “Who speaks? Who writes? Dialogue and authorship in the *Phaedrus*,” *H of the Human Sci* 10,3 (1997) 40–55. For the lesser known Heraclitean tradition with regard to noise: Andrew Benjamin, “Raving sibyls, signifying gods: noise and sense in Heraclitus Fragments 92 and 93,” *Culture, Theory & Critique* 46,1 (2005) 75–90. For a rousing discussion of the flux and “polyvocality” of the *Phaedo* in the context of postmodernity: J. Peter Euben, *Platonic Noise* (Princeton U, 2003) 141–74.

6. Delia Goetz and Sylvanus G. Morley, from an original translation by Adrián Recinos, *Popol Vuh: The Sacred Book of the Ancient Quiché Maya* (U Oklahoma, 1950) 82–83; J. P. Mallory and D. Q. Adams, eds., *Encyclopedia of Indo European Culture* (L: Fitzroy Dearborn, 1997) 262, 394–95, 533–34 on the Sanskrit (and onomatopoeitic) roots of words for noise(s) and sound(s); Harris Lenowitz and Charles Doria, eds. and trs., *Origins: Creation Texts from the Ancient Mediterranean* (Garden City: Anchor, 1976) 18–27. Fox, In the Beginning, renders each “Let there be!” as an exclamation. Cf. Rodney Needham, “Percussion and transition,” *Man* (1967) 606–14, asking “Why is noise that is produced by striking or shaking so widely used in order to communicate with the other world?” and answering that reverberation is at once an index and instigator of transition, as does John Luther Adams “Strange and sacred noise,” in *Yearbook of Soundscape Studies Vol. 1: Northern Soundscapes*, eds. H. Järviluoma and R. M. Schafer (U Tampere, 1998). In his *Percussion: Drumming, Beating, Striking* (Duke U, 2002), John Mowitt enlarges on the social, physical, and psychic elements of a “percussive field.” For earliest evidences of (ritual) percussion: Lya Dams, “Paleolithic lithophones,” *Oxford J of Archaeology* 4,1 (1985) 31–46.

7. Edwin Kessler, ed., *The Thunderstorm in Human Affairs* (U Oklahoma, 1988) 3; Timothy Ferris, *The Whole Shebang* (NY: Simon and Schuster, 1997) 12, 32–34, on Cosmic Background Radiation (the noise from the Big Bang). More on the Big Bang in Round Three; in the meantime, consider Ludwig Wittgenstein's musings on the anticipation of a bang: *Zettel*, eds. G. E. M. Anscombe and G. H. von Wright (Oxford: Blackwell, 1981 [wr. 1945–48]) 10–12.

8. Ellen F. Waterman, ed., “Introduction,” *Sonic Geography Imagined and Remembered*

(Manotick: Penumbra, 2002) 12–14 on nostalgia, as also Helmi Järviluoma, “Memory and acoustic environments,” 21–37. Cf. J. Douglas Porteous, *Landscapes of the Mind: Worlds of Sense and Metaphor* (U Toronto, 1990) 47–65 on soundscapes, prefaced (p. xiv) by the declaration, “The way we live now is unhealthy, wasteful, dehumanizing, and, ultimately, absurd.” For Novalis, Rudolph Arnheim, *Radio*, trs. M. Ludwig and H. Read (NY: Arno, 1971 [1936]) q. 31. For recent (neuro-romantic?) reassertions of song: Steven Mithen, *The Singing Neanderthals: The Origins of Music, Language, Mind and Body* (Harvard U, 2006); Edward H. Hagen and Peter Hammerstein, “Did Neanderthals and other early humans sing?” *Musicae Scientiae* 13 (2009) web preprint. On a resurgence of interest in “evolutionary musicology”: Nils L. Wallin et al., eds., *The Origins of Music* (MIT, 2000), esp. the editors’ intro. Vice versa, David L. Burrows, in *Time and the Warm Body* (Leiden: Brill, 2007), proposes that music is the very means by which humans fabricate, experience, and express time.

9. Jérôme Carcopino, *Daily Life in Ancient Rome—The People and the City at the Height of the Empire*, ed. Henry T. Rowell, tr. E. O. Lorimer (Yale U, 1940) 48–51, and citing Juvenal, translated in “The City,” tr. William Gifford, in *The Latin Poets*, ed. Francis R. B. Godolphin (NY, 1961) 542–44, and “On Leaving Town,” *Satires*, tr. Jerome Mazzaro (U Michigan, 1965) Third Satire, ll. 234–38. Also often cited in this regard are Seneca (“Here am I with a babel of noise going on all about me. I have lodgings right over a public bath-house”), Horace (“Surrounded by noise night and day / You expect me to sing...?”) and Martial (“before daybreak, bakers; the hammers of the coppersmiths all day”): Finley Hooper and Matthew Schwartz, *Roman Letters* (Wayne State U, 1991) 57 for Seneca’s letter to Lucilius; Horace, *Satires and Epistles*, tr. Smith P. Bovie (U Chicago, 1959) 263 (= ep. II.2, to Julius Florus); Martial, *Epigrams*, tr. Walter C. A. Ker (L, 1920) 359 (= bk. XII, 57). Cf. J. Donald Hughes, *Pan’s Travail: Environmental Problems of the Ancient Greeks and Romans* (Johns Hopkins U, 1994) esp. 149.

10. With the advent of quiet electric / hybrid vehicles, the demand for more honking and beeping has reappeared. Autos and horns are pursued in Rounds Two and Three.

11. Raymond W. Smilor, “Confronting the Industrial Environment: The Noise Problem in America, 1893–1932,” Ph.D. thesis, U Texas at Austin, 1978; idem, “Cacophony at 34th and 6th: the noise problem in America, 1900–1930,” *Amer Studies* 18 (1977) 23–38; idem, “Personal boundaries in the urban environment: the legal attack on noise, 1865–1930,” *Env R* 3,3 (1979) 24–36; idem, “Toward an environmental perspective: the anti-noise campaign, 1893–1932,” in *Pollution and Reform in American Cities, 1870–1930*, ed. Martin V. Melosi (Austin: U Texas, 1980) 135–51; Lawrence Baron, “Noise and degeneration: Theodor Lessing’s crusade for quiet,” *J of Contemporary H* 17 (1982) 165–78; Mel Horwitch, *Clipped Wings: The American SST Conflict* (MIT, 1982); James H. Winter, *London’s Teeming Streets, 1830–1914* (L: Routledge, 1993) 70–78 on Charles Babbage’s campaign against street musicians; Emily Thompson, “Even long ago, a loud town,” *NY Times* (Sept. 5, 1998) A11; Karin Bijsterveld, *Mechanical Sound: Technology, Culture, and Public Problems of Noise in the Twentieth Century* (MIT, 2008).

12. Anti-noise polemics plunder history for references that demonstrate, with contrary logic, both the hoary persistence of noise and its ever-more egregious encroachment on

daily life. See, e.g., Robert A. Baron, *The Tyranny of Noise* (NY: St. Martin's, 1970); Theodore Berland, *The Fight for Quiet* (EC: Prentice-Hall, 1970); V. Chudnov, *Noise Abatement*, tr. Hilary Hardin (Jerusalem: Keter, 1974 [1971]); Ariel Alexandre and Jean-Philippe Barde, *Le Temps du bruit* (P: Flammarion, 1973); David M. Lipscomb, *Noise: The Unwanted Sounds* (Chicago: Nelson-Hall, 1974); Herbert Wiesner, *Der Lärm: Ein Problem unserer Zeit* (Köln: Bund, 1974); Jean-Pierre Ciattoni, *Le Bruit* (Toulouse: Privat, 1997); Garret Keizer, *The Unwanted Sound of Everything We Want: A Book about Noise* (Public Affairs, 2010); George Prochnik, *In Pursuit of Silence: Listening for Meaning in a World of Noise* (Knopf-Doubleday, 2010).

Pro-noise polemics are typically metaphorical in their historical references as well as in their denotations / detonations of noise: Jacques Attali, *Noise: The Political Economy of Music*, tr. Brian Massumi (U Minnesota, 1985); Katherine N. Hayles, "Information or noise? Economy of explanation in Barthes's *S/Z* and Shannon's information theory," in *One Culture: Essays in Science and Literature*, eds. G. Levine and A. Rauch (U Wisconsin, 1987) 119–42; William R. Paulson, *The Noise of Culture: Literary Texts in a World of Information* (Cornell U, 1988).

As much a tutorial as a polemic, the Canadian composer R. Murray Schafer's *The Tuning of the World* (NY: Knopf, 1977) examines different modes of noise in the course of tracking historical changes in the "soundscape," which term he coined. He had begun his tutorial with *Ear Cleaning: Notes for an Experimental Music Course* (Toronto: Berandol, 1969) and continued it with *Five Village Soundscapes*, ed. Schafer with Bruce Davis and Barry Truax (Vancouver: A. R. C., 1977) and the creation of the World Federation for Acoustic Ecology. His student Barry Truax generally abandoned the polemic in his *Acoustic Communication* (Norwood: Ablex, 1984). For a further tutorial: Jean-François Augoyard and Henry Torgue, eds., *Sonic Experience: A Guide To Everyday Sounds*, trs. A. McCartney and D. Paquette (Montreal: McGill-Queen's U, 2005). For a demurral: Tim Ingold, "Against soundscape," *Autumn Leaves: Sound and the Environment in Artistic Practice*, ed. Angus Carlyle (P: Double Entendre, 2007) 10–13, an essay whose emphasis on the immersiveness of sound recalls Marshall McLuhan and Bruce R. Powers, "Visual and acoustic space," *The Global Village* (Oxford U, 1989) 35–47.

13. Since 1990, listed chronologically by date of publication in English: Constance Classen, *Worlds of Sense: Exploring the Senses in History and Across Culture* (L: Routledge, 1993); Diane Ackerman, *A Natural History of the Senses* (NY: Random House, 1994); Alain Corbin, *Time, Desire and Horror: Toward a History of the Senses*, tr. Jean Birrell (Camb: Polity, 1995); idem, *Village Bells: Sound and Meaning in the 19th-Century French Countryside*, tr. Martin Thom (Columbia U, 1998); C. Nadia Seremataakis, ed., *The Senses Still: Perception and Memory as Material Culture in Modernity* (Boulder: Westview, 1994); James H. Johnson, *Listening in Paris: A Cultural History* (UC, 1995); Peter Bailey, "Breaking the sound barrier," in his *Popular Culture and Performance in the Victorian City* (Camb U, 1998) 194–211; Bruce R. Smith, *The Acoustic World of Early Modern England: Attending to the O-Factor* (U Chicago, 1999); Steven Connor, *Dumbstruck: A Cultural History of Ventriloquism* (Oxford U, 2000); Jean-Pierre Gutton, *Bruits et sons dans notre histoire: essai sur la reconstitution du paysage sonore* (P: PUF, 2000); Leigh Eric Schmidt, *Hearing Things: Religion, Illusion, and*

the American Enlightenment (Harvard U, 2000); Mark M. Smith, *Listening to Nineteenth-Century America* (U North Carolina, 2001); John M. Picker, *Victorian Soundscapes* (Oxford U, 2003); Richard Cullen Rath, *How Early America Sounded* (Cornell U, 2003); Peter Szendy, *Listen: A History of Our Ears*, tr. Charlotte Mandelle (Fordham U, 2008); Brandon LaBelle, *Acoustic Territories: Sound Culture and Everyday Life* (NY: Continuum, 2010); Veit Erlmann, *Reason and Resonance. A History of Modern Aurality* (NY: Zone, 2010).

Numerous anthologies have begun to engage other historians with sound and noise: Patricia Kruth and Henry Stobart, eds., *Sound: The Darwin College Lectures* (Camb U, 2000); Michael Bull and Les Back, eds., *The Auditory Culture Reader* (Oxford: Berg, 2003); Veit Erlmann, ed., *Hearing Cultures: Essays on Sound, Listening and Modernity* (Oxford: Berg, 2004); Mark M. Smith, ed., *Hearing History* (U Georgia, 2004); Robert Jütte, *A History of the Senses: From Antiquity to Cyberspace*, tr. James Lynn (Camb: Polity, 2005); Linda P. Austern and Inna Naroditskaya, eds., *Music of the Sirens* (Indiana U, 2006); Ros Bandt et al., eds., *Hearing Places: Sound, Place, Time and Culture* (Newcastle: Camb Scholars, 2007); Sylvia Mieszkowski et al., *Sonic Interventions* (NY: Rodopi, 2007); Karin Bijsterveld and Jose van Dijck, eds., *Sound Souvenirs: Audio Technologies, Memory, and Cultural Practices* (Amsterdam U, 2009).

For ecological approaches: Yi-Fu Tuan, *Topophilia: A Study of Environmental Perception, Attitudes, and Values* (EC: Prentice-Hall, 1974); Peter A. Coates, “The strange stillness of the past: toward an environmental history of sound and noise,” *Env H* 10 (Oct. 2005) 636–65, and cf. Donald Worster, *Nature’s Economy: A History of Ecological Ideas* (Camb U, 1977) 258: in the TransMississippi West, “the howling wilderness still howls, but the timbre and the message of its voice have changed,” now that the deep bass song of a population of two million wolves has been almost everywhere silenced and yields now to the “high tenor wail and barks and yelps” of coyotes. Melding the ecological, biographical, and cultural is a well-composed study by Zeese Papanikolos, *American Silence* (U Nebraska, 2007), which despite its title deserves to be read aloud.

14. Cf. Stephen Handel, *Listening: An Introduction to the Perception of Auditory Events* (MIT, 1989); William A. Yost, *Fundamentals of Hearing*, 3rd ed. (San Diego: Academic, 1994); C. U. M. Smith, *Biology of Sensory Systems* (Chichester: Wiley, 2000) 93–137. What exactly sound may be, however, remains philosophically contestable: Robert Pasnau, “What is sound?” *Phil Q* 49 (1999) 309–24; Casey O’Callaghan, *Sounds* (Oxford U, 2007). How sound is received, phenomenologically, has been explored most extensively by Don Ihde, *Listening and Voice: Phenomenologies of Sound* (SUNY Albany, 2007); Davide Rocchesso and Federico Fantana, eds., *The Sounding Object* (Firenze: Mondo estremo, 2003)—a more technical approach to “everyday listening.” For sociological reconsiderations: Les Back, *The Art of Listening* (Oxford: Berg, 2007).

15. For approaches to the historical and philosophical relationship between music and noise: Attali, *Noise*; Michel Serres, *The Parasite*, tr. Lawrence R. Schehr (Johns Hopkins U, 1982), esp. 121–35, 185–89; Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music*, tr. Carolyn Abbate (Princeton U, 1990) esp. 45–54; David Burrows, *Sound, Speech and Music* (U Mass., 1990); Ulrich Holbein, *Der belauschte Lärm* (Frankfurt am Main: Suhrkamp, 1991); William Fitzgerald, “The questionability of music,” *Representations* 46

(Spring 1994) 121–47; Jonathan Rée, *I See a Voice: Deafness, Language, and the Senses—a Philosophical History* (NY: Holt, 1995); Vladimir Jankélévitch, *Music and the Ineffable*, tr. Carolyn Abbate (Princeton U, 2003) esp. 37, 148–52; Elizabeth E. Leach, *Sung Birds: Music, Nature, and Poetry in the Later Middle Ages* (Cornell U, 2007); Christoph Cox, “Sound art and the sonic unconscious,” *Organised Sound* 14,1 (2009) 19–26.

On technology and noise: George Bugliarello et al., *The Impact of Noise Pollution: A Socio-Technological Introduction* (NY: Pergamon, 1976); Rupert Taylor, *Noise*, 3rd ed. (Harmondsworth: Penguin, 1979); Avital Ronell, *The Telephone Book: Technology, Schizophrenia, Electric Speech* (U Nebraska, 1989); Robert L. Beyer, *Sounds of Our Times: Two Hundred Years of Acoustics* (NY: Springer, 1999); Adam Lowe and Simon Schaffer, curators, *noise: a series of exhibitions about information and transformation* (L: Wellcome Trust [&] Two 10 Gallery, 2000); Carolyn Birdsall and Anthony Enns, eds., *Sonic Mediations: Body, Soul, Technology* (Newcastle: Camb Scholars, 2008).

On music, technology, and noise: Robert E. McGinn, “Stokowski and the Bell Telephone Laboratories: Collaboration in the development of high-fidelity sound reproduction,” *Technology and Culture* 24 (1983) 38–75; Arthur Kroker, *Spasm: Virtual Reality, Android Music, and Electric Flesh* (NY: St. Martin’s, 1993); Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Duke U, 2003); Bijsterveld, *Mechanical Sound*.

On music, technology, noise, and art: Douglas Kahn and Gregory Whitehead, eds., *Wireless Imagination: Sound, Radio, and the Avant-Garde* (MIT, 1992); Steven Connor, in “The Modern Auditory I,” in *Rewriting the Self: Histories from the Renaissance to the Present*, ed. Roy Porter (L: Routledge, 1997) 203–23; Douglas Kahn, *Noise Water Meat: A History of Sound in the Arts* (MIT, 1999); Jorinde Seidel, ed., *Sound in Art and Culture = special issue of Open* 9 (2005); Brandon LaBelle, *Background Noise: Perspectives on Sound Art* (Continuum Intl, 2006).

16. Claude Levi-Strauss, “Noises in the forest,” in his *From Honey to Ashes*, tr. John Weightman and Doreen Weightman (L: Cape, 1973) 296–333; Steven Feld, *Sound and Sentiment: Birds, Weeping, Poetics, and Song in Kaluli Expression* (U Penn, 1982), followed up by “Orality and consciousness,” in *The Oral and the Literate in Music*, eds. Y. Tokumaru and O. Yamaguti (Tokyo: Academia Music, 1986) 18–28, and “Waterfalls of song: An acoustemology of place resounding in Bosavi, Papua New Guinea,” in *Senses of Place*, eds. Feld and Keith H. Basso (Santa Fe: SAR, 1996) 91–136, complemented by his *Rainforest Soundwalks: Ambiances of Bosavi Papua New Guinea* (Bosavi People’s Fund, EarthEar, 2001); Paul Stoller, “Sound in Songhay possession,” in *The Taste of Ethnographic Things: The Senses in Anthropology* (U Penn, 1989) 101–22, and his *Sensuous Scholarship* (U Penn, 1997) esp. 24–44; Kathleen Buddle, “Sound vibrations: an exploration of the Hopi sensorium,” *J of Religion and Culture* 4,2 (1990) 9–19; Marina Roseman, *Healing Sounds from the Malaysian Rainforest: Temiar Music and Medicine* (UC, 1991); Kenneth M. George, “Violence, solace, vows, noise, and song: ritual headhunting and the community in mourning,” in his *Showing Signs of Violence: The Cultural Politics of a Twentieth-Century Headhunting Ritual* (UC Berkeley, 1996) 101–33; Janis B. Nuckolls, *Sounds Like Life: Sound-Symbolic Grammar, Performance, and Cognition in Pastaza Quechua* (Oxford U, 1996); Daniel K. Avorgbedor, ed., *The Interrelatedness of Music, Religion, and Ritual in African Performance Practice* (Lewiston:

Mellen, 2003); D. J. W. Hatfield, “Heat and noise,” in his *Taiwanese Pilgrimage to China: Ritual, Complicity, Community* (Palgrave Macmillan, 2010) 23–46.

17. E.g., Paul Devereux, *Stone Age Soundtracks: The Acoustic Archaeology of Ancient Sites* (L: Vega, 2001); Robert G. Arns and Bret E. Crawford, “Resonant cavities in the history of architectural acoustics,” *Technology and Culture* 36 (1995) 104–35; Michael Forsyth, *Buildings for Music: The Architect, the Musician, and the Listener from the Seventeenth Century to the Present Day* (MIT, 1985); Dieter Ullmann, “Geschichte der Raumakustik im evangelischen Kirchenbau des 19. Jahrhunderts,” *Berichte zur Wissenschaftsgeschichte* 14,4 (1991) 241–49; Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (MIT, 2002); Pnina Avidar et al., eds., *Immersed: Architectuur en geluid / Sound and Architecture = special issue of OASE Tijdschrift voor Architectuur / Architectural J* 7–8 (2009).

18. Sa’adia Gaon, *The Book of Beliefs and Opinions*, tr. Samuel Rosenblatt (Yale U, 1948) 10–12; Alexander Altmann, tr. and ed., “Saadya Gaon: Book of Doctrines and Beliefs,” in *Three Jewish Philosophers* (NY, 1945) 113–91, esp. “Translator’s Introduction,” 11–22; Louis Finkelstein, ed., *Rab Saadia Gaon: Studies in His Honor* (NY, 1944); Israel Efros, *Studies in Medieval Jewish Philosophy* (Columbia U, 1974) 7–36 on Sa’adia’s theory of knowledge. Sa’adia explains inference itself, and the inference of God’s existence despite his physical absence to our senses, in terms of sound: the fact that we cannot hear a sound that is blocked by a series of walls (p. 131) does not mean that there is no sound. Claiming descent from a famous ascetic (and miracle-worker), Hanina ben Dosa, Sa’adia may also have been sensitized to sound by strains of the early Chasidic tradition. Cf. the role of Hesychasm among Byzantine Christians: Petro B. T. Bilaniuk, *Studies in Eastern Christianity* (Munich: Ukrainian Free U, 1998) 11–19; John Meyendorff, *Byzantine Hesychasm: Historical, Theological and Social Problems* (L: Variorum, 1974).

19. There are three odd exceptions: for centuries, the wealthy at court and then the “lesser sort” at public exhibitions could witness *mechanical* figures in human shape (gear-driven automata) reiterating performances, including the playing of musical instruments; similarly, people in the street could hear barrel organs or hurdy-gurdies exactly repeating tunes, accompanied sometimes by small “jacks” or miniature mechanical figures; finally, physicians, caretakers, and paying audiences at insane asylums might observe patients ritualistically repeating phrases or gestures called “stereotypies” or “automatisms.”

20. Robert Angus, “What’s new in those new low-noise tape cassettes,” *Photo Dealer* 37 (Apr 1971) 77. My reflections on the encore are drawn from the clippings file on “Applause and Encores” at the Theatre Collection, Houghton Lib, Harvard U, and a file on “Audience” in the clipping files of the Music Division, NY Public Library for the Performing Arts. Cf. Lawrence W. Levine, *Highbrow / Lowbrow: The Emergence of Cultural Hierarchy in America* (Harvard U, 1988) 171–200; Robert Philip, *Performing Music in the Age of Recording* (Yale U, 2004) 9–13, 22.

21. Hillel Schwartz, *The Culture of the Copy: Striking Likenesses, Unreasonable Facsimiles* (NY: Zone, 1996). Among the most nuanced cultural analyses of sound and noise is the work of a sound-installation artist, Paul Carter, *The Sound In-Between: Voice, Space, Performance* (Kensington: New South Wales U, 1992); idem, “Repetitions at night: mimicry,

noise, and context,” *Exchanges*, ed. Ross Gibson (Sydney: Historic Houses Trust of New South Wales, 1996) 59–88.

22. This and the following two paragraphs are based on Edward J. Marolda and Oscar P. Fitzgerald, *The United States Navy and the Vietnam Conflict. II, From Military Assistance to Combat, 1959–1965* (DC: Naval Historical Center, 1986); Edwin E. Moise, *Tonkin Gulf and the Escalation of the Vietnam War* (U North Carolina, 1996) 107–108, 127, 140–41, 165–67, 175; “Records about Hostile Fire Against U.S. and Australian Warships during the Vietnam Conflict, 10/25/1966–4/5/1970,” in Record Group 38, Records of the Office of the Chief of Naval Operations, National Archives II, College Park, MD, and online; Tonkin Gulf Collection, Operational Archives Branch, Naval Historical Center, DC, in particular: Box 1, f. 1, “Gulf of Tonkin Incident, Overview,” on history of surveillance and bombing, and chronology; Box 1, f. 3, Action Reports of the *Turner Joy* Sept. 11, 1964–Jan. 11, 1965 on the speeds and the darkness; Box 1, f. 4, Actions Reports of the *Maddox* and self-noise; Box 1, f. 8 Chronology Comdesdiv 192 on “skunks”; Box 1, f. 17, Personal Recollections of LCDR W. S. Buehler, Feb. 20, 1968, on history of *Maddox* and (p. 7) the ruptured eardrums, also rebutting (p. 14) the self-noise theory because “As a destroyer, it is our job to know about built-in noises; we had run tests before as a matter of routine, and after, to reproduce that noise, or any noise, and could not.” It is Buehler who also notes the “84 full rudder course changes in two hours.” Intriguing is Box 1, f. 21, “Possible questions that might be raised in books to be published on the Tonkin Gulf incident,” referring to I. F. Stone’s use of an excerpt from a NVN White Paper that suggests that the P. T. boats actually belonged to the South Vietnamese Navy, which was conducting secret missions. Finally, Box 7, Series V, Logs 1962–1965, f. 4, Logs of the *USS Maddox*—Sonar / Maintenance, includes a rhymed log from John H. Burns entitled “August 3, 1964,” concerning the first incident on August 2 when “The day it was sunny. The sun, it was bright.”

23. Margaret Wise Brown, pictures by Leonard Weisgard, *The Quiet Noisy Book* (NY: HarperTrophy, 1978 [1950]); Hillel Schwartz, “1952/53,” *Brick* 49 (Summer 1994) 4–9. Brown returns in Round Three.

24. W. John Richardson et al., *Marine Mammals and Noise* (San Diego: Academic, 1995) 205–40; Pierre Bonfils, “Spontaneous otoacoustic emissions,” *Laryngoscope* 99 (July 1989) 752–56; G. W. Pierce, *The Songs of Insects* (Harvard U, 1948); Vincent G. Dethier, *Crickets and Katydid, Concerts and Solos* (Harvard U, 1992).

25. George F. Boyd, “Auditory irritants and impalpable pain,” *J General Psych* 60 (1959) 149–54; D. Lynn Halpern et al., “Psychoacoustics of a chilling sound,” *Perception and Psychophysics* 39,2 (1986) 77–80. Here one might do well with the meditations of David Toop, *Sinister Resonance: The Mediumship of the Listener* (L: Continuum, 2010).

26. On various interpretations of sounds heard through stethoscopes: A. Calò, *Les Bruits du coeur et des vaisseaux* (P, 1950); Robert J. Dobrow et al., “A study of physician variation in heart-sound interpretation,” *Med Annals of the District of Columbia* 33 (July 1964) 305–308; P. J. Hollins, “The stethoscope: some facts and fallacies,” *British J of Hospital Med* 5 (1971) 509–16.

27. On universal language schemes, an interesting place to start is Umberto Eco, *The Search for a Perfect Language* (Oxford: Blackwell, 1995). For ur-syllables and notes, see

Howard Gardner, “Do babies sing a universal song?” *Psych Today* 15 (Dec. 1981) 71–74; Peter F. MacNeilage and Barbara L. Davis, “On the origin of internal structure of word forms,” *Sci* 288 (April 21, 2000) 527. For a loud entrance into Chinese philosophies of language: Wai-yee Li, “On making noise in *Qi Wu Lun*,” in *Ways with Words: Writing About Reading Texts from Early China*, eds. Pauline Yu et al. (UC, 2000) 93–102.

28. Samuel Rosen, Moe Bergman, Dietrich Plester, Aly El-Mofty, and Mohamed Hamad Satti, “Presbycusis study of a relatively noise-free population in the Sudan,” *AORL* 71 (1962) 727–43; Samuel Rosen, Dietrich Plester, Aly El-Mofty, and Helen V. Rosen, “High frequency audiometry in presbycusis,” *Archives of Otolaryngology* 79 (1964) 18–32, q. 31, with comparative data reported in Samuel Rosen and Helen V. Rosen, “High frequency studies in school children in nine countries,” *Laryngoscope* 81,7 (1971) 1007–13.

29. But consider H. Hilke et al., “Haematological investigation in the Mabaan tribe of the southeastern Sudan,” *J Tropical Med and Hygiene* 59 (Aug. 1956) 180–83; N. A. Barnicot, “Concluding discussion: a survey of some genetical characters in Ethiopian tribes,” *Amer J Physical Anthropology* 20,2 (1962) 208; G. C. Ezeilo and D. Wacha, “Pregnancy-induced leucocytosis in Africans, Asians, and Europeans,” *Brit J Obstetrics and Gynecology* 84 (Dec. 1977) 944–47, which discuss some of the worrisome implications of a diet deficient in vitamins B and C and characterized by neutropenia. If severe (and as a group the Mabaan in 1956 had the lowest recorded leucocyte level in the annals of hematology), neutropenia can produce sensorineural hearing loss in the higher frequencies, a fact unknown to Rosen but adduced in S. A. Counter, “Audiological screening of Amerindians of the Suriname rainforest,” *Scandinavian Audiology* 15,1 (1986) 57–64, finding both shotguns and diet the culprits in an audiological profile not much different from that published for modern industrial nations in terms of general hearing thresholds and decline with ageing. The association between neutropenia and hearing loss became clearer with the widespread use of platinum-based cancer drugs in the 1990s.

30. Rachel Carson, *Silent Spring* (B, 1962) 12, 13; Mark H. Lytle, *The Gentle Subversive: Rachel Carson, Silent Spring, and the Rise of the Environmental Movement* (Oxford U, 2007); Stu Beitler, “Parnassus, PA Valley Camp Coal Company Mine Explosion, March 1929,” (posted March 20, 2008) at www3.gendisasters.com/pennsylvania/5685/parnassus-pa-valley-camp-coal-company-mine-explosion-mar-1929 (with clips from 1929 newspapers); Raymond A. Washlaski, comp. and ed., “Coal Miners Memorial . . . to the Coal Miners that mined the Bituminous Coal seams of the Harwick Mine . . .” (updated Jan. 26, 2009) at <http://patheoldminer.rootsweb.ancestry.com/allharwick1.html>.

31. Torben Andersen, “Aspects of Mabaan tonology,” *J African Languages and Linguistics* 12 (1992) 183–204, and for larger context, Anne Storch, “Grammatical change and emblematic features in Western Nilotic,” *Selected Proc 37th Annual Conference on African Linguistics*, eds. D. L. Payne and J. Peña (Somerville: Cascadilla Proceedings, 2007) 1–15.

32. Peter Woodward, *Sudan, 1898–1989: The Unstable State* (Boulder: Rienner, 1990), and Edgar O’Ballance, *The Secret War in the Sudan: 1955–1972* (L: Faber and Faber, 1977), both detailing such violence for so long in southern Sudan (north-east Upper Nile) that the Mabaan could not have escaped it all, although Rosen et al. made no mention of it. M. W. Daly, *Imperial Sudan: The Anglo-Egyptian Condominium, 1934–1956* (Camb U, 1991) 43, 465,

does refer to the Mabaan as “atomised” and “remote”; it was likely this reputation that led Rosen to them as a tribe barely mentioned in the only authoritative English source, E. E. Evans-Pritchard’s *The Nuer* (1940). On the death and displacement of millions in south Sudan: J. Millard Burr and Robert O. Collins, *Requiem for the Sudan: War, Drought, and Disaster Relief on the Nile* (Boulder: Westview, 1995); Sharon E. Hutchinson, *Nuer Dilemmas: Coping with Money, War and the State* (UC 1996) 1–8, 338–41. On the diaspora of the Mabaan: Wendy James, *War and Survival in Sudan’s Frontierlands* (Oxford U, 2007) 21, 23, 49–50, 64, 66–67 pass.

33. Dr. Aram Glorig, interviewed by author, Aug. 8, 1995, House Ear Institute, Los Angeles; idem, “Noise—is it a health problem?” *JAMA* 168 (Sept. 27, 1958) 370–76; idem, *Noise and Your Ear* (NY, 1958); idem, with James Nixon and Wallace S. High, “Changes in air and bone conduction thresholds as a function of age,” *JLO* 76 (1962) 288–98; idem, with James Nixon, “Hearing loss as a function of age,” *Laryngoscope* 72 (1962) 1596–1610, defining presbycusis as “changes in cell structure that are primarily a degenerative process” associated with physiological ageing and the atrophy of the organ of Corti. On atavism and misperception: Johannes Fabian, *Time and the Other: How Anthropology Makes Its Object* (Columbia U, 1983).

34. Samuel Rosen, *The Autobiography of Dr. Samuel Rosen* (NY: Knopf, 1973) epigraphs, 31, 208–10, book jacket; Samuel Rosen et al., “Relation of hearing loss to cardiovascular disease,” *Trans Amer Acad of Ophthalmology and Otolaryngology* 14 (May–June 1964) 433–44; E. K. McLean and A. Tarnopolsky, “Noise, discomfort and mental health: a review of the socio-medical implications of disturbance by noise,” *Psych Med* 7,1 (1977) 19–62, with a review of Rosen’s work on Finns, hearing, arteriosclerosis, diet, and noise. A more recent study contradicts Rosen’s suspicions of a link between hearing loss and high blood fats: N. S. Jones and A. Davis, “A retrospective case-controlled study of 1490 consecutive patients presenting to a neuro-otology clinic to examine the relationship between blood lipid levels and sensorineural hearing loss,” *Clinical Otolaryngology and Allied Sci* 25 (Dec. 2000) 511–17, q. 516: “hypercholesterolaemia may not only not be associated with poorer hearing but it may have a beneficial effect on hearing.” A political liberal and outspoken critic of racism and antisemitism, Rosen died in Beijing: Glenn Fowler, “Dr. Samuel Rosen, ear-surgery pioneer, dies at 84,” *NY Times* (Nov. 6, 1981) B6.

35. Y. P. Kapur and A. J. Patt, “Hearing in Todas of South India,” *Archives of Otolaryngology* 85 (1967) 74–80.

36. J. F. Jarvis and H. G. van Heerden, “The acuity of hearing in the Kalahari Bushmen,” *JLO* 81 (1967) 63–68; R. C. Dickson, “The normal hearing of Bantu and Bushmen,” *JLO* 82 (1968) 505–22; H. Reuning and Wendy Wortley, *Psychological Studies of the Bushmen* (Johannesburg: Natl Inst for Personnel Research, 1973) 17, 40, 43, 53–55, 68, 80; J. David Lewis-Williams and T. Dowson, “Through the veil: San rock paintings and the rock face,” *South African Archaeological Bull* 45 (1990) 5–16. Again, the click consonants of the Khoisan language group likely demand of the San (“Bushmen”) a greater and lifelong attentiveness to higher frequencies. Cf. the West African (Anlo-land) ontology of hearing as the ground of all sensation: Kathryn L. Geurtz, *Culture of the Senses: Bodily Ways of Knowing in an African Community* (UC, 2002) esp. 48–50.

37. Al Ahumada, Jr., and Duane Metzger, *Hearing Thresholds in a Quiet Mexican Village*, Social Sciences working papers, 52a (Irvine: UC, 1974). As for another, and related, population presumed to have extraordinary hearing, some Native American and Australian aboriginal populations have eustachian tube structures that allow for greater ventilation than among European populations but lead to recurrent otitis media, affecting ear health and auditory acuity: Q. C. Beery et al., “Eustachian tube function in an American Indian population,” *AORL Suppl* 89,3, pt. 2 (1980) 28–33; J. B. Gregg et al., “Otolaryngic osteopathy in 14th century mid-America. The Crow Creek massacre,” *AORL* 90,3, pt. 1 (1981) 288–93; N. W. Todd, Jr., and C. A. Bowman, “Otitis media at Canyon Day, Ariz. A 16-year follow-up in Apache Indians,” *Archives of Otolaryngology* 111 (Sept. 1985) 606–608; Charles D. Bluestone, “Epidemiology and pathogenesis of chronic suppurative otitis media,” in *Otitis Media Today*, eds. M. Tos et al. (The Hague: Kugler, 1999) 27–36.

38. Marcos V. Goycoolea et al., “Effect of life in industrialized societies on hearing in natives of Easter Island,” *Laryngoscope* 96, 12 (1986) 1391–96, with follow up by Hortensia G. Goycoolea et al., “Racial and familial factors in otitis media: a point prevalence study on Easter Island,” *Archives of Otolaryngology* 114 (Feb. 1988) 147–49, and cf. Richard J. Wiet, “Patterns of ear disease in the Southwestern American Indian,” *ibid.* 105,7 (1979) 381–85; William J. Thomson, “Te Pito te Henua, or Easter Island,” *U.S. National Museum Annual Report for 1889* (DC, 1891) 446–552, at 448, 452, 460, 463, 466, 492; Sandra Stencel, “The Women’s Movement: agenda for the 80s,” *Congressional Q*(181) 41–60. Contrast Counter, “Audiological screening of Amerindians of the Suriname rainforest” (→n.29); A. Arpini, “The hearing of Bedouin living in the Jordan desert,” *JASA* 88 (Nov. 1990) S180.

39. Carl H. Delacato, *The Ultimate Stranger: The Autistic Child* (Novato: Arena, 1974) ch. 6; Annabel Stehli, *The Sound of a Miracle: A Child’s Triumph over Autism* (NY: Doubleday, 1991) 151–72. It may also be, following this logic, that autistic children do not experience the same chronic degeneration of the hair cells of the organ of Corti that has been used to explain data showing that sensitivity to higher frequencies begins to decline from the very first years of life: Shintaro Takeda, “Age variation in the upper limit of hearing,” *European J Applied Physiology* 65 (1992) 403–408.

40. Cf. Kahn, *Noise Water Meat* (→n.15) 161–99 on Cage, whom I consider at greater length in Round Three.

ROUND ONE

1. Even in “Stone-Age” Boing, thunder registered lower on the decibel scale than chanting during harvest rituals: Samuel Rosen et al., “Presbycusis study of a relatively noise-free population in the Sudan,” *AORL* 72 (1962) 727–43.

2. Gertrude Stein, *How To Write* (Barton: Something Else, 1973 [1931]) 32.

3. Like the design of libraries, public librarianship has been given a radical rehearing over the last decades. Consider the children’s book by Susan M. Chapman, *Too Much Noise in the Library* (Janesville, Wis.: Upstart, 2010), which is actually a celebration of certain kinds of noise in libraries, and see Jefferson Graham, “Here’s America’s unquietest library,” *USA Today* (Oct. 14, 2003) 10D, on the Salt Lake City library designed by Moshe Safdie. On historical and modern experiences of reading in libraries, and of reading aloud

(to the blind fabulist and librarian, Jorge Luis Borges), see Alberto Manguel, *A History of Reading* (NY: Viking, 1996) 16-19, 41-47.

4. Joseph Balogh, "Voces Paginarum," *Philologus* 82 (1927) 84-109, 202-40, made the early claim that silent reading was almost unknown in the ancient world, which was refuted by B. M. W. Knox, "Silent reading in Antiquity," *Greek, Roman and Byzantine Studies* 9 (1968) 421-35, and then by Jesper Svenbro, who dated silent reading as an idea to the 6th-century BCE in *Phrasikleia: An Anthropology of Reading in Ancient Greece*, tr. Janet Lloyd (Cornell U, 1993), and who tracked the subsequent "internalization of the voice of the reader" in "Archaic and Classical Greece: the invention of silent reading," in *A History of Reading in the West*, eds. G. Cavallo and R. Chartier, tr. Lydia G. Cochrane (Camb: Polity, 1999) 37-63, where see also Cavallo, "Between *Volumen* and *Codex*: reading in the Roman world" (esp. 73-76). On the religious context, consider Frank D. Gilliard, "More silent reading in Antiquity: *Non Omne Verbum Sonabat*," *J Biblical Literature* 112 (Winter 1993) 689-94. A. K. Gavrilov, in "Reading techniques in classical antiquity," *Classical Q* n.s. 47 (1997) 56-73, reassesses the oft-cited case of Augustine's surprise at Jerome's silent reading, and cites the passage from Quintilian (p.60). For the repudiation of hard-and-fast distinctions between reading aloud and reading silently: William A. Johnson, "Toward a sociology of reading in classical antiquity," *Amer J of Philology* 121 (2000) 593-627; Holt N. Parker, "Books and reading Latin poetry," in *Ancient Literacies: The Culture of Reading in Greece and Rome*, eds. W. A. Johnson and H. N. Parker (Oxford U, 2009) 186-232.

5. On the origins of punctuation, cf. Manguel, *History of Reading*, 48-50; Elisabeth Okasha, "Spaces between words: word separation in Anglo-Saxon inscriptions," in *The Cross Goes North: Processes of Conversion in Northern Europe, AD 300-1300*, ed. M. Carver (York Medieval, 2003) 339-50, delayed use of "aeration" in stone texts. On rumination, Michael Camille, "Seeing and reading: some implications of medieval literacy and illiteracy," *Art H* 8 (1985) 26-49; M. T. Clanchy, *From Memory to Written Word, England 1066-1307*, 2nd ed. (Oxford: Blackwell, 1992).

Around the 9th century, the writing of Hebrew was also transformed: points were added below the consonantal line to indicate vowel sounds. These *nekudot* have been credited to the need to clarify pronunciation and meaning for readers struggling to make sense of texts in a mix of biblical Hebrew, Masoretic Hebrew, and Aramaic—all "dead languages" still read aloud for worship or study and all written in one set of characters. The process of clarifying texts (and, to critics, of narrowing the range of interpretation) had begun with the introduction of cantillation symbols, diacritical marks, and vocalization placeholders (the *alef* and *yod*) in the 2nd-5th centuries CE: Edward Y. Kutscher, *A History of the Hebrew Language*, ed. Raphael Kutscher (Jerusalem: Magnes, 1982) 151. Whether Jews could read in easy silence by virtue of these points seems to be moot, since they used Hebrew texts primarily for public (oral) study and worship: Robert Bonfil, "Reading in the Jewish Communities of Western Europe in the Middle Ages," in *History of Reading in the West*, 149-78. The vagaries of Jewish oral composition and aural reception are considered by Elizabeth S. Alexander, *Transmitting Mishnah: The Shaping Influence of Oral Tradition* (Camb U, 2006) 18-24.

As for Arabic, which had spread widely by the 9th century along the paths of an

expansive Islam, the written language was used for both secular and sacred purposes, with emphasis on calligraphy, so the context for development of punctuation and spacing was different, especially given the high value placed by both Sunni and Shi'ite teachers on the value of *listening* to the Qu'ran and commentaries. See Mohamed Aziza, *La Calligraphie arabe* (Tunis: STD, 1973) 20, 53 on spacing and vowel signs; Jean During, "Hearing and understanding in the Islamic gnosis," *World of Music* 29,2 (1997) 127-37; Charles Hirschkind, "Ethics of listening: cassette-sermon audition in contemporary Cairo," *Amer Ethnologist* 28 (2001) 623-49. A similar oral emphasis in Hindu culture may help explain why spacing between words in another alphabetic script, Sanskrit, has been a function of the alternation of vowels and consonants: Robert P. Goldman, *An Introduction to the Sanskrit Language* (Berkeley: Center for South and Southeast Asia Studies, 1974). Consider also the history and complex status of silent reading in Chinese as reviewed by Li Yu, "A History of Reading in Late Imperial China, 1000-1800," Ph.D. thesis, Ohio State U, 2003.

By this excursus I am hedging the other side of the argument, that graphic clarity and diacritical specificity necessarily result in habits of silent reading. Indeed, even as vowel points were gaining currency in written Hebrew, spaces between words, customary for centuries, were being *reduced* by Jewish calligraphers using the elegant book hand of the 10th century, so that the entire line appeared to be "a single graphic unit": Ada Yardeni, *The Book of Hebrew Script* (Jerusalem: Carta, 1997) 216.

6. Paul Saenger, *Space Between Words: The Origin of Silent Reading* (Stanford U, 1998), building upon M. B. Parkes, *Pause and Effect: An Introduction to the History of Punctuation in the West* (UC, 1993). Cf. Garrett Stewart, *Reading Voices: Literature and the Phonotext* (UC, 1990) esp. 21, 28, and contrast Jacqueline Hamesse, "The scholastic model of reading" in Cavallo and Chartier, eds., *A History of Reading in the West*, 104-106, who, reversing one of Saenger's causal arrows, argues that scholasticism encouraged silent reading. For later concerns about textual uniformity, see Henri-Jean Martin et al., *La Naissance du livre moderne (XIVe-XVIIe siècles)* (P: Cercle de la librairie, 2000) 119ff.

7. The seminal references on oral/written culture operate by way of binary distinctions between sound and sight that rarely consider cross-modal experiences such as kinaesthesia: I. A. Richards, "Literature, oral-aural and optical" (1947) in his *Complementaries*, ed. J. P. Russo (Manchester: Carcaret, 1976) 201-208; Walter J. Ong, *Orality and Literacy: The Technologizing of the Word* (L: Routledge, 1982); Jack P. Goody, *The Interface Between the Written and the Oral* (Camb U, 1987). Cf. Elizabeth Eisenstein, *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early Modern Europe* (Camb U, 1979). The campaign for a new, true orality is carried to McLuhanesque extremes by Barry Sanders, *A Is for Ox: Violence, Electronic Media, and the Silencing of the Written Word* (NY: Pantheon, 1994). Scholars of medieval music and literature have begun to address the cross-modal, esp. Bruce W. Holsinger, *Music, Body, and Desire in Medieval Culture: Hildegard of Bingen to Chaucer* (Stanford U, 2001) and Michael Uebel, "Acoustical alterity," *Exemplaria* 16,2 (2004) 349-65. On hierarchies of the senses: Louise Vinge, *The Five Senses: Studies in a Literary Tradition* (Lund: Kungl. Humanistiska, 1975) esp. 68-89; David Summers, *The Judgment of Sense: Renaissance Naturalism and the Rise of Aesthetics* (Camb U, 1987); Rainer Warning, "Seeing and hearing in ancient and medieval epiphany," in

Rethinking the Medieval Senses: Heritage, Fascinations, Frames, eds. Stephen J. Nichols et al. (Johns Hopkins U, 2008) 102–16; Waltraud Naumann-Beyer, *Anatomie der Sinne im Spiegel von Philosophie, Ästhetik, Literatur* (Köln: Böhlau, 2003); Martin Jay, *Downcast Eyes: The Denigration of Vision in Twentieth-Century Thought* (UC Berkeley, 1993).

8. Suzanne W. Hull, *Chaste, Silent, and Obedient: English Books for Women, 1475–1640* (San Marino, CA: Huntington Lib, 1982) 73; Pierre Dumonceaux, “La lecture à haute voix des oeuvres littéraires au XVIIIe siècle,” in *La Voix au XVIIIe siècle*, ed. Patrick Dandrey (P: Aux amateurs de livres, 1990) 117–25; Roger French, *Dissection and Vivisection in the European Renaissance* (Aldershot: Ashgate, 1999) 41, 43, 166; Ambrose G. Wathen, *Silence: The Meaning of Silence in the Rule of St. Benedict* (DC: Cistercian, 1973) 46; Heidi B. Hackel, “‘Boasting of silence’: women readers in a patriarchal state,” *Reading, Society and Politics in Early Modern England*, eds. K. Sharpe and S. N. Zwicker (Camb U, 2003) 102–103; Ulrich Bach, “From private writing to public oration: the case of Puritan wills,” in *Co-operating with Written Texts* (→ n.4) 417–36, and cf. Adam Fox, *Oral and Literate Culture in England 1500–1700* (Oxford: Clarendon, 2000) 36–39, 313–15 pass. One might counter by demonstrating the decline of prescriptions to “read aloud” as a cure for ailments affecting the throat or stomach, starting with Celsus’s *De Medicina*, tr. W. G. Spencer (Harvard U, 1960) I,75, 389 and moving through medieval into modern texts. This argument was broached by Francesco Di Capua, “Osservazioni sulla lettura e sulla preghiera ad alta voce presso gli antichi,” *Rendiconti della Accademia di Archeologia, Lettere e Belle Arti di Napoli*, n.s. 28 (1953) 59–99, at 59–62, noting how intimately the Greco-Roman world associated reading aloud with exercise of the lungs and with gestures that exercised the torso; the quieter the reading, the closer the association with cabale.

9. Francis Darwin, “Reminiscences of my father’s everyday life,” in *Life and Letters of Charles Darwin*, ed. F. Darwin (NY: Johnson Reprint, 1969 [1888]) I,112–13, 122–24; Eleanor Marx-Aveling, “A few stray notes,” in *Reminiscences of Marx and Engels*, ed. Institut Marksa-Engelsa-Lenina (Moscow, 1956?) 251–52; Sigmund Freud, *Psychopathology of Everyday Life*, tr. A. A. Brill (L, 1914) 131; Peter Gay, *Freud* (NY: Norton, 1998) esp. 31; John Malcolm Brinnin, *The Third Rose: Gertrude Stein and Her World* (B, 1959), 282–83, q. 191 from Carl Van Vechten; Lynn C. Miller, “Gertrude Stein never enough,” *Voices Made Flesh*, eds. Miller et al. (U Wisconsin, 2003) 47–65. Cf. Philip Collins, *Reading Aloud: A Victorian Métier* (Lincoln: Tennyson Soc., 1972); Martha Hanna, “A republic of letters: the epistolary tradition in France during World War I,” *Amer H R* 108 (2003) 1338–61, at 1348–49, on the conversational epistolary model and reading private letters aloud in order to restore the conversational tone or make sense of hastily punctuated sentences.

10. Gertrude Stein, *The World Is Round*, illus. Clement Hurd (NY, 1939) 1, 2, 5—a book solicited by Margaret Wise Brown in her capacity as a children’s book editor: Leonard S. Marcus, *Margaret Wise Brown: Awakened by the Moon* (B: Beacon, 1992) 105. A year after its publication, Stein’s text was used by John Cage in the second movement of his *Living Room Music* (1940): William Brooks, “Pragmatics of silence,” in *Silence, Music, Silent Music*, eds. N. Losseff and J. Doctor (Burlington: Ashgate, 2007) 97–126, at 120.

11. The pigeons flap in Stein’s *Four Saints in 3 Acts* (1933) III.ii. And as for the continuity of “reading noises” in libraries: Ari Kilman, “The sound of the civic: reading noise at the

New York Public Library,” *Amer Studies* 42,3 (2001) 23–41.

12. An early intimation of the soundbite has been located in the dialogues on music in Galileo Galilei’s *Mathematical Discourse on Two New Sciences* (1638), where certain tones seem “at one and the same time to kiss and bite”: Leigh Eric Schmidt, *Hearing Things: Religion, Illusion, and the American Enlightenment* (Harvard U, 2000) 25, and ch. 1 for a guide to historical debates over the power of sound.

13. Baldesar Castiglione, *The Book of the Courtier*, tr. George Bull (Harmondsworth: Penguin, 1976) 10–11, 27, q. 69, q. 163–65. On a courtier’s social-psychological positioning: Stephen Goldblatt, *Renaissance Self-Fashioning* (U Chicago, 1980). Sixteenth-century musicians understood three categories of interval: the perfect consonances (unison, fifth, octave), the imperfect consonances (thirds and sixths) and the dissonances (seconds, fourths, sevenths), which had to resolve first to imperfect consonances and finally die down to perfect consonances. I thank Anthony Burr, a close reader of these Rounds, for his suggestions here.

14. John’s index finger led the eyes to the Word of God, whose voice was shown as a pointing hand emerging from clouds: Camille, “Seeing and reading,” 28; Jean-Claude Schmitt, *La Raison des gestes dans l’Occident médiéval* (P: Gallimard, 1990) ch. 3.

15. Creighton F. Gilbert was the first to note the absent pupils: “Texts and contexts of the Medici Chapel,” *Art Q* 34 (1971) 391–410. Edith Balas, *Michelangelo’s Medici Chapel* (Phila: Amer Phil Soc, 1995) argues that the figures of “Night” and “Day” represent the wedding of Mother Earth and Father Heaven. Descending from the celestial to the ped/antic: Eunice Wilson, *A History of Shoe Fashions* (L: Pitman, 1969) 94, footwear.

16. Castiglione, *Book of the Courtier*, III, 208–16, q. 215.

17. Bruce R. Smith, *The Acoustic World of Early Modern Europe: Attending to the O-Factor* (U Chicago, 1999) q. 283 from p. 618 of Crooke, spelling modernized, and throughout for a literary analysis. On Shakespeare’s use of sound, esp. of “damaging words” that “fissure meaning”: Kenneth Gross, *Shakespeare’s Noise* (U Chicago, 2001). Cf. Wes Folkerth, *The Sound of Shakespeare* (L: Routledge, 2002); Harry Berger, Jr., *Imaginary Audition: Shakespeare on Stage and Play* (UC, 1989); Joel Fineman, “Shakespeare’s ear,” in *The New Historicism Reader*, ed. H. Aram Veveser (NY: Routledge, 1994) 116–23, on his sonnets and (p. 122) the ear as an instrument of delay and deferral. On inner lives, consider David Aers, “A whisper in the ear of early modernism,” *Culture and History, 1350–1600*, ed. Aers (Wayne State U, 1992) 177–202; Jennifer Bryan, *Looking Inward: Devotional Reading and the Private Self in Late Medieval England* (U Penn, 2008) esp. 35–74.

18. Thelma Fenster and Daniel L. Smail, eds., *Fama: The Politics of Talk and Reputation in Medieval Europe* (Cornell U, 2003), esp. editors’ intro. and essays by Thomas Kuehn, Chris Wickham, and Sandy Bardsley; Horst Wenzel, *Hören und Sehen, Schrift und Bild: Kultur und Gedächtnis im Mittelalter* (München: Beck, 1995) 154–58; Jean-Pierre Gutton, *Bruits et sons dans notre histoire* (P: PUF, 2000) 26–27; Gross, *Shakespeare’s Noise*, 33–67.

19. Castiglione, *Book of the Courtier*, II, 136–39; Niccolò Machiavelli, *The Prince and Selected Discourses*, ed. and tr. Daniel Donno (NY: Bantam, 1966) 76–77 (ch. 21), 84–85 (ch. 25); Gilbert, “Texts and contexts of the Medici Chapel,” 392ff.; Jesse D. Hurlbut, “The sound of civic spectacles: noise in Burgundian ceremonial entries,” in *Material Culture and*

Medieval Drama, ed. Clifford Davidson (Kalamazoo: Medieval Inst, 1999) 127-40.

20. Cf. Francis Yates, *The Art of Memory* (U Chicago, 1966).

21. Mitford M. Mathews, *Teaching to Read, Historically Considered* (U Chicago, 1966) 32-34; Paul Zumthor, *Daily Life in Rembrandt's Holland* (L, 1962) 106-107. Centuries later, an English pedagogue would still attribute the bad habit of speaking too loudly, with an "unnatural pitch of the voice, and disagreeable monotony," to "persons who are taught to read in large rooms," or to instructors "very imperfect in their hearing": Lindley Murray, *The English Reader*, 2nd ed. (L, 1799) x.

22. Hubert Bost, *Babel: du texte au symbole* (Geneva: Labor et Fides, 1985); Paul Zumthor, *Babel ou l'inachèvement* (P: Seuil, 1997) esp. 85-99; Myriam Jacquemier, "Le mythe de Babel et la kabbale chrétienne au XVIIe siècle," *Nouvelle revue du seizième siècle* 10 (1992) 51-67, and "Babel dans la tradition scientifique," *ibid.* 14 (1996) 63-76; Thomas Dekker, *The Belman of London*, pt. 2 (1608) 175, modernized. On the artistic tradition, see Zumthor, ch. 6; André Parrot, *The Tower of Babel*, tr. E. Hudson (NY, 1955); Bob Claessens and Jeanne Rousseau, *Bruegel* (NY: Alpine, 1981); Philippe and Françoise Roberts-Jones, *Pierre Bruegel l'Ancien* (P: Flammarion, 1997) 243ff. For philosophical divagations: Jacques Derrida, "Des Tours de Babel," in *Difference in Translation*, ed. and tr. Joseph F. Graham (Cornell U, 1985) 165-207. In countermotion to Babel were the harmonies of divine music and the "New Song" of Christ, which according to Clement of Alexandria and subsequent commentators held the body, and the world, together: Holsinger, *Music, Body and Desire*, 14-15, 31, 34-39. Noise (Babel or bad music) was in this context a moral, and possibly mortal, wound. Karin Littau has put forward another countermyth to that of Babel: "Pandora's tongues," *TTR: traduction, terminologie, rédaction* 13,1 (2000) 21-35, online at www.erudit.org/revue/TTR/2000/v13/n1/037391ar.pdf.

23. James Axtell, "Babel of tongues: communicating with the Indians in Eastern North America," in *The Language Encounter in the Americas, 1492-1800*, eds. Edward G. Gray and Norman Fiering (NY: Berghahn, 2000) 15-60; Edward G. Gray, *New World Babel: Languages and Nations in Early America* (Princeton U, 1999) esp. 8-15.

24. On the hissing: Thomas Dekker, *The Non-Dramatic Works*, ed. Alexander B. Grosart (NY, 1963) II, 201-202, as quoted by Laura F. Brown, "'The Isle Is Full of Noises': Representations of Hearing in Early Modern England," Ph.D. thesis, U North Carolina, 1997, 101. My method might also be characterized historically as blending the synchronic and diachronic, or as moving between "type specimens," particularly paratypes, epitypes, and neotypes, on which: Intl Assoc for Plant Taxonomy, Intl Code of Botanical Nomenclature, Division II. Rules and Recommendations. Chapter II. Status, Typification, and Priority of Names. Section 2. Typification, online at <http://ibot.sav.sk/icbn/no%20frames/0013Ch2Sec2a009.htm>.

25. Karl J. Höltgen, "Clever dogs and nimble spaniels: on the iconography of logic, invention, and imagination," *Explorations in Renaissance Culture* 24 (1998) 1-36; Lisa Jardine, *Francis Bacon: Discovery and the Art of Discourse* (Camb U, 1974) 31-32, 42, 69-70 on distinctions drawn between "invention" as a rhetorical mode and as a mode of discovery; Jean-Claude Margolin, "L'idée de nouveauté et ses points d'application dans le *Novum Organum* de Bacon," in *Francis Bacon, science et méthode*, eds. M. Malherbe and J.-M.

Pousseur (P: Vrin, 1985) 11–36; Pedro de Navarra Labrit, *Diálogos de la diferencia del hablar al escribir* (1565), cited in Fernando Bouza, *Communication, Knowledge, and Memory in Early Modern Spain*, trs. S. López and M. Agnew (U Penn, 2004) 8.

26. Here all scholars stand indebted to the suggestions and intentions of R. Murray Schafer, *The Tuning of the World* (NY: Knopf, 1977), and to Don Ihde, *Listening and Voice: Phenomenologies of Sound*, rev. ed. (SUNY Albany, 2007 [1976]).

27. For bk. 3, ll. 356–58 of Ovid's *Metamorphoses*, I use the translation by Brookes More (B, 1922) 104 stressing Echo's initial noisiness. The rest is my paraphrase, based upon the Latin edition in William S. Anderson, ed., *Ovid's Metamorphoses Books 1–5* (U Oklahoma, 1996) 97–99, the free translation by David R. Slavitt (Johns Hopkins U, 1994), the more literal work of Michael Simpson (U Mass, 2001), the 1567 version by Arthur Golding, and the 1717 joint translation coordinated by Samuel Garth.

Gayatri C. Spivak, "Echo," *New Literary H* (1993) 17–43, excellently glossed by John D. Zuern at <http://maven.english.hawaii.edu/criticalink/spivak/index.html>, focuses on a tricky part of the exchange (ll. 383–85) that I have skipped over. Narcissus shouts, *Quid me fugis*—"Why do you fly from me?" In English, Echo can reply with apparently personal vehemence, "Fly from me? [don't you dare]," at once pleading and foreboding, a "warning-in-longing"; in Latin the poet cannot switch from the second person interrogative (*fugis*) to the imperative (*fugi*) without violating the acoustic premise of the echo. Ovid resorts therefore to paraphrase: *quot dixit, verba recepit*—"What he says, that's what he gets back," and once again Echo loses her intentional voice. In this can be heard, writes Spivak, how Echo is staged "as the instrument of the possibility of a truth not dependent upon intention," evidence also of an inequality of punishments and rewards integral to the framing violence of the fable, the rape of the nymph Liriope by the river-god Cephisus that drives Liriope to consult Tiresias concerning the future of the rape-child, Narcissus. He will have a long life, says the blind seer, so long as he fails to recognize himself. Much more proceeds from Spivak's analysis; what feeds back into my text is the figure of Echo as a voice displaced and disorienting. Cf. Luce Irigaray, *Speculum of the Other Woman*, tr. Gillian C. Gill (Toronto U, 1985) 256–57, 263–64, echo (and Echo) in the context of Plato's Cave and Dialogues; Frances Gray, "Carry on, Echo: The dissident sound body," *Sound J* (April 23, 2000) at www.ukc.ac.uk/sdfva/sound-journal/gray001.html. Finally, consider Pleshette DeArmitt's analytic review of Jacques Derrida's obsessive iterations of Echo as gambits for deconstructing and yet affirming the self: "Resonances of Echo: a Derridean allegory," *Mosaic* 42,2 (2009) 89–100.

28. Danielle Clarke, "In sort as she is sung': Spenser's 'Doleful Lay' and the construction of female authorship," *Criticism* (Fall 2000) 451–68. Quotation is from the poet Ausonius, tr. George Turberville, *Epitaphs, Epigrams, Songs and Sonnets* (L, 1567), sigs. O2v–O3, as cited (p. 25) in Joseph Loewenstein, *Responsive Readings: Versions of Echo in Pastoral, Epic, and the Jonsonian Masque* (Yale U, 1984), on which I rely for the European mythopoetic traditions of Echo, as also John Hollander, *The Figure of Echo* (UC, 1981). For other traditions: Peter Doyle, *Echo and Reverb: Fabricating Space in Popular Music Recording, 1900–1960* (Wesleyan U, 2005) 38–48.

29. I use Alan H. Sommerstein's well-annotated and raucous translation of

Aristophanes, *Thesmophoriazusae* (Warminster: Aris and Phillips, 1994), ll. 1092–94. On this parody of a lost play by Euripides (*Andromeda*, with the first known echo-scene): Anton Bierl, “[Review of] Frank Babel, *Euripides, Andromeda*,” *Bryn Mawr Classical R* (2001) at <http://ccat.sas.upenn.edu/bmcr/1992/03.06.01.html>. For Erasmus: “Echo” (1526), in his *Colloquies*, tr. Craig R. Thompson (U Chicago, 1965) I,373–77, amended. For Guarini: *The Faithful Shepherd*, tr. Thomas Sheridan, eds. R. Hogan and E. A. Nickerson (U Delaware, 1989 [1753]) IV.viii, pp. 137–39; Loewenstein, *Responsive Readings*, 106–10 and 165.

30. Stochastic resonance, an effect identified in 1981, refers to random pulses that, instead of disrupting a process, further enable it or calm it down. More on this in Round Three. As for redounding: Friedrich Kittler, “Echoes. Ein Prolog,” in *Hörsturze. Akustik und Gewalt im 20. Jahrhundert*, eds. Nicola Gess et al. (Würzburg: Königshausen und Neumann, 2005) 13–27, following the acoustics as well as the mythopoetics of echoes from the Greeks onward.

31. George Herbert, “Heaven” [before 1633], in *The Temple and A Priest to the Temple*, ed. A. R. Waller (L, 1902) 198, blisse; Barnabe Barnes, “Parthenophil and Parthenope” (1593) Sestine 4, cited by Elbridge Colby, *The Echo-Device in Literature* (NY Public Lib, 1920) 24, “behold her / hold her”; [Guarini], *Faithful Shepherd*, 139 “all over / lover.” The Babel example is mine. Classical rhetoric calls echo-effects *metaplasms*, orthographic changes in words by omission, inversion, substitution, or addition. The following terms could be overlaid upon mine for a taxonomy of verbal noise: with interference / muffling, *metathesis*, transposition of letters within a word, and *antisthecon*, substitution of a letter or sound for another (“a pun is its own reword”); with feedback / amplifying, *antanaclasis*, repetition of a word whose meaning thereby changes; with compression / truncating, *aphaeresis*, the omission of a syllable or letter, *apocope*, omission of the final letter, and *syncope*, omission of the middle letter or sound; with stochastic resonance, *diastole*, lengthening a vowel beyond its usual length, and *diaeresis*, dividing a syllable into two. Those scornful of such effects lump them together as *paronamasia*, punning: Gideon O. Burton, “Silva Rhetoricae,” at <http://humanities.byu.edu/rhetoric/Figures>. On the Renaissance reception of Ovid in all arts: <http://etext.lib.virginia.edu/latin/ovid>.

32. *OED*, s.v. “echo”, dating the verb-form to 1556. My allusion to Bob Dylan’s 1969 song, “Lay Lady Lay,” is more than playful; the last lines of his first stanza draw directly from the Echo / Narcissus tradition: “Whatever colors you have in your mind / I’ll show them to you and you’ll see them shine.” On Milton’s *Masque of Comus*: Loewenstein, *Responsive Readings*, 134–46, who fails to emphasize the centrality of noise to the plot (ll. 170–72):

This way the noise was, if mine ear be true,
My best guide now, methought it was the sound
Of riot, and ill-managed merriment . . .

Trying to follow her two younger brothers by their “ill-managed merriment” and praise of “bounteous Pan,” the Lady gets lost in the “tangled wood,” only then to appeal to Echo. The “noise” here may be Michaelmas Eve festivity: see “Comus” (1634) in *The Riverside Milton*, ed. Roy Flannagan (B: Houghton Mifflin, 1998) 131–33 and editor’s notes.

33. Hollander, *Figure of Echo*, 53. Although the world is full of echoes independent of us, Echo's ability to reclaim an intelligible voice is ever in the context of her relationship to humanity, her ability to speak *through* us and impersonate us.

34. Loewenstein, *Responsive Readings*, 26, translating from the Greek of Longus, *Daphnis and Chloë*, III.23, on which cf. Lia R. Cresci, "The novel of Longus the Sophist and the pastoral tradition," in *Oxford Readings in the Greek Novel*, ed. S. Swain (Oxford U, 1999) 210–42, and Suzanne Saïd, "Rural society in the Greek novel, or the country seen from the town," *ibid.*, 83–107. On Macrobius: Loewenstein, 142. On Echo's early and later history: Maurizio Bettini and Ezio Pellizer, *Il mito di Narciso: Immagini e racconti dalla Grecia a oggi* (Torino: Einaudi, 2003) 56–64, 83–84, 92–96, 109–10. On the historical transformations of Pan: John Boardman, *The Great God Pan: The Survival of an Image* (L: Thames and Hudson, 1997).

35. Plutarch, "The obsolescence of oracles," *Moralia*, tr. Frank C. Babbitt (Harvard U, 1969) V,419; Marsilio Ficino, "*De Vita Coelitus Comparanda* [On Obtaining Life from the Heavens (1489)]," in *Three Books on Life*, eds. and trs. C. V. Kaske and J. R. Clark (Binghamton: Renaissance Soc Amer, 1989) 359 (= ch. XXI); Loewenstein, *Responsive Readings*, 23–24 on Macrobius, 143–44 on the *bat kol* and Ficino; Hollander, *Figure of Echo*, 16. Cf. Brenno Boccadoro, "Marsilio Ficino: the soul and the body of counterpoint," *Number to Sound: The Musical Way to Scientific Revolution*, ed. Paolo Gozza (Dordrecht: Kluwer, 2000) 99–134, esp. 110–16; Michael Dickreiter, "The structure of harmony in Johannes Kepler's *Harmonice Mundi* (1619)," in *ibid.*, 173–88, q. 185 Kepler: "the movements of the heavens are nothing but a certain everlasting polyphony (intelligible, not audible) with dissonant tunings, like certain syncopations or cadences (wherewith men imitate these natural dissonances)." I am indebted to Anthony Burr for an explanation of Kepler's *glissandi*. Cf. Gary Tomlinson, *Music in Renaissance Magic* (U Chicago, 1993).

36. Francis Bacon, *Sylva Sylvarum*, ed. William Rawley (L, 1669 [1626]) Century II, 32; Loewenstein, *Responsive Readings*, 6, 11, 24 on Bacon, 57–59 on Kircher; on the idols, Bacon, *The New Organon*, eds. L. Jardine and M. Silverthorne (Camb U, 2000) 40–42; Marin Mersenne, "On the velocity of sound in air," from *Cogitata Physico Mathematica* (1644) repr. in *Acoustics: Historical and Philosophical Development*, ed. and tr. R. Bruce Lindsay (Stroudsburg: Dowden, Hutchinson & Ross, 1973) 64–66. For Bacon's use of Pan: Don C. Allen, *Mysteriously Meant: The Rediscovery of Pagan Symbolism and Allegorical Interpretation in the Renaissance* (Johns Hopkins U, 1970) 244–47. For more on Bacon, Kircher, and Mersenne: Penelope Gouk, "Music in Francis Bacon's natural philosophy," in *Number to Sound*, 135–52; eadem, "Making music, making knowledge: the harmonious universe of Athanasius Kircher," in *The Great Art of Knowing: The Baroque Encyclopedia of Athanasius Kircher*, ed. Daniel Stolzenberg (Stanford U Lib, 2001) 71–83; Paula Findlen, ed., *Athanasius Kircher: The Last Man Who Knew Everything* (NY: Routledge, 2003) esp. her intro., 1–48; Peter Dear, *Mersenne and the Learning of the Schools* (Cornell U, 1988).

37. Aristotle, *De Audibilibus, or, Of Sound and Hearing*, tr. T. Loveday and E. S. Forster, in *The Works*, ed. W. D. Ross (Oxford, 1913) VI,800–804, analyzed with regard to content and authorship by H. B. Gottschalk, "The *De Audibilibus* and Peripatetic acoustics," *Hermes* 96,3 (1968) 435–60; Loewenstein, *Responsive Readings*, 6, 11, 24–25, 155–56; Erik Borg et

al., “Theories of middle-ear muscle function,” in *The Acoustic Reflex*, ed. Shlomo Silman (Orlando: Academic, 1984) 63–66; Dennis G. Pappas, Sr., “Otology—the unfolding of a specialty,” in *The Ear: Comprehensive Otology*, eds. R. F. Canalis and P. R. Lambert (Phila: Lippincott Williams & Wilkins, 2002) 3–5; Jon K. Shallop, “The historical development of the study of middle ear function,” in *Acoustic Impedance and Admittance*, eds. A. S. Feldman and L. A. Wilber (Phila: Williams & Wilkins, 1976) 8–10; Veit Erlmann, *Reason and Resonance: A History of Modern Aurality* (Zone, 2010) 47–64. See Erlmann and also Georg von Békésy and Walter A. Rosenblith, “The early history of hearing—observations and theories,” *JASA* 20 (Nov. 1948) 727–48 for illustrations and chronology.

38. For “Acoustica”: Francis Bacon, *De dignitate et augmentis scientiarum* (1623) bk. 3, ch. 1, in his *Works*, eds. James Spedding et al. (L, 1857) I, 542, which reference I owe to Penelope Gouk. The analogies have classical roots, Lucretius for particles, Chrysippus (and Aristotle) for waves: Lucretius, *On the Nature of Things (De Rerum Naturae)*, IV, 549–94, tr. William E. Leonard (1916) at http://classics.mit.edu/Carus/nature_things.4.iv.html; Allan D. Pierce, “The wave theory of sound,” *Acoustics: An Introduction to Its Physical Principles and Applications* (Woodbury: ASA, 1989) at <http://asa.aip.org/pierce.html>. Bacon was struggling between sound as philosophy and sound as practice, for which consider Michael Chanan, *Musica Practica: The Social Practice of Western Music from Gregorian Chant to Postmodernism* (L: Verso, 1994); Daniel K. Avorgbedor, ed., *The Interrelatedness of Music, Religion, and Ritual in African Performance Practice* (Lewiston: Mellen, 2003).

39. Loewenstein, *Responsive Readings*, 16; J. A. W. Bennett, *Chaucer’s Book of Fame* (Oxford: Clarendon, 1968) 70–80; Sheila Delany, *Chaucer’s House of Fame: The Poetics of Skeptical Fideism* (U Chicago, 1972) esp. 110–11 on Rumor vis-à-vis Fame, as also Helen Cooper, “Chaucer and Ovid: a question of authority,” in *Ovid Renewed*, ed. Charles Martindale (Camb U, 1988) 71–82; John M. Ganim, “Chaucer and the noise of the people,” *Exemplaria* 2 (Spring 1990) 71–88; Beverly Boyd, “Chaucer’s decibels,” *Florilegium* 10 (1988–1991) 99–105; Holsinger, *Music, Body and Desire*, 259–92 on Chaucer and music, and esp. 290 on noise and sacrifice. On the two analogies, cf. Frederick V. Hunt, *Origins in Acoustics: The Science of Sound from Antiquity to the Age of Newton* (Woodbury: ASA, 1992) ch. 1.

40. Chaucer, *House of Fame*, bk. 2, ll. 765–68, 793–812, which I have modernized from the version at <http://sunsite.berkeley.edu/OMA>, eds. D. B. Killing and D. M. Brendan (1994) based on W. W. Skeat, ed., *Complete Works of Geoffrey Chaucer* (Oxford, 1899). On the understanding of the physiology of hearing in Chaucer’s time: C. M. Woolgar, *The Senses in Late Medieval England* (Yale U, 2006) 63–64. Cf. Brigitte Cazelles, *Soundscape in Early French Literature* (Tempe: Arizona Center for Medieval and Renaissance Studies, 2005), who notes, p. 19, that noise in works of the Chaucerian era “evokes a synesthetic type of perturbation which tends to have a noxious effect, consistent with the origin of a word whose possible roots include the Latin *nausea* . . . *nocere* (to harm . . .), and *noxia* (nuisance),” but she also discerns in the literature a knightly “white noise of perfection” and/or blinding intransitivity.

41. Lisa Jardine and Alan Stewart, *Hostage to Fortune: The Troubled Life of Francis Bacon* (NY: Hill and Wang, 1999), esp. 59, 99, 152, 433, and contrast Nieves Mathews, *Francis*

Bacon: *The History of a Character Assassination* (Yale U, 1996); Charles Webster, *The Great Instauration: Science, Medicine and Reform, 1626–1660* (NY: Holmes & Meier, 1975); Jamie C. Kassler, *Inner Music: Hobbes, Hooke and North on Internal Character* (Fairleigh Dickinson U, 1995); Smith, *Acoustic World of Early Modern England*, 104–106ff.; Bacon, “Formularies,” in *Works*, eds. Spedding et al., VII, q. 209, Jan. 27, 1595, “Upon Impatience of Audience”; Loewenstein, *Responsive Readings*, 77ff., q. 79 from Ben Jonson’s *Cynthia’s Revels* (1600) I.ii.11. On the schoolyard: Thomas B. Macaulay’s 1837 review of *The Works of Francis Bacon*, ed. Basil Montagu (1825–1834) in his *Critical and Historical Essays* (L, 1890) I,774: “We are told that, while still a mere child, he stole away from his playfellows to a vault in St. James’s Fields, for the purpose of investigating the cause of a singular echo . . .”

42. Loewenstein, *Responsive Readings*, 116–17 on Jonson’s *Masque of Queenes* (1609). By the third edition of his *Essays* (1625), in which appears “Of Masques and Triumphs,” Bacon regards masques as toys that, if princes must have them, should be elegant, their songs “loud and cheerful, and not chirpings or pulings,” their scene changes done “quietly and without noise” (from edition by Clark S. Northup [B, 1936] 119–20). For Jonson’s *Epicoe*, I use L. A. Beaurline’s edition (U Nebraska, 1966), I.i.i.135ff. for the turban, I,76–80 for the room, IV.i.7–10 for the snorting fury, and cf. Karen Newman, *Fashioning Femininity and English Renaissance Drama* (U Chicago, 1991) 135–36 on Jonson’s gendering of noise. Heather C. Easterling, *Parsing the City: Jonson, Middleton, Dekker and the City Comedy’s London as Language* (NY: Routledge, 2007) discusses the tradition of city noise in drama; Emily Cockayne, *Hubbub: Filth, Noise, and Stench in England, 1600–1770* (Yale U, 2007) ch. 5 (and parts of ch. 7) evokes that noise—from the cries of dog catchers, their strays in tow, at five in the morning, through the pounding of coppersmiths at midday, to (p. 114) Rule 30 of *Lawes of the Market* (1595) against any man after nine at night “beating his Wife, or servant, or singing, or reveling in his house, to the Disturbance of his neighbours.”

43. Bacon, *Sylva Sylvarum*, Century III, 49.

44. John Pound, *Poverty and Vagrancy in Tudor England* (L: Longman, 1971) 92–108; Paul Slack, *The English Poor Law 1531–1782* (Camb U, 1995); Jardine and Stewart, *Hostage to Fortune*, 422; Bacon, “Answers to questions propounded by Sir Alexander Hay, knt, touching the office of constables [1608]” in *Works*, VII, q. 753; idem, *The Translation of Certain Psalmes into English Verse* (L, 1625) in *Poems of Francis Bacon*, ed. Alexander B. Grosart (L, 1870) and repr. in *Miscellanies of the Fuller Worthies’ Library, I* (NY: AMS, 1970 [1871]) 34–36, Psalm 12, modernized. At his death, Bacon willed large sums to the poor: *Works*, XIV,540. Linda Woodbridge situates beggars within Bacon’s world in *Vagrancy, Homelessness, and English Renaissance Literature* (U Illinois, 2001) esp. 254–65. The noisiness of those not only unwashed but “unredeemed” would provoke questions for such as John Donne about the irresistibility of God’s grace: Brian Cummings, “The noise of the Holy Sonnets (1609–10),” in his *The Literary Culture of the Reformation: Grammar and Grace* (Oxford U, 2002) 385–95.

45. *OED* for all except “choir/quire birds” and “cant,” for which consult Eric Partridge, *Dict of the Underworld* (NY, 1961) 103, 550; Bacon, *Sylva Sylvarum*, Century II, 35, 45–46; Thomas Dekker, *The Guls Hornbook and the Belman of London in Two Parts* (L, 1905 [1608]) 17, 42, 81, 87, and 110 on the bellman; Stephen Egerton, *The Boring of the Ear* (L, 1623)

sig. A4–A5. Cf. Smith, *Acoustic World of Early Modern England*; Folkherth, *The Sound of Shakespeare* (→ n.17) esp. 16–20, 23–26, 34–67; Bryan Crockett, “‘Holy Cozenage’ and the Renaissance cult of the ear,” *Sixteenth-Century J* 24,1 (1993) 47–66. The problem of differentiating human music from animal noise was complicated by later medieval and early modern discussions of birdsong, excellently treated by Elizabeth Eva Leach, *Sung Birds: Music, Nature, and Poetry in the Later Middle Ages* (Cornell U, 2007).

46. Bacon, *Sylva Sylvarum*, Century III, 49–50. The Reverend Thomas Richard Brown, using 17th-century methods, would later identify the root of “rabble” in the Sanskrit (*rawa* and *raba*) as “to make a noise,” akin to Gaelic *rabal*, a noise: *A Grammar of the Hebrew Hieroglyphs Applied to the Sacred Scriptures* (Southwick, 1840).

47. Bacon, letter to James I, March 25, 1621 (Lady’s Day, and English New Year’s) in *The Letters and Life, VII* in Works, XIV,225; “Of Truth,” *The Essayes or Counsels Civill and Morall* (1612) in Works, VI,378, referring to the proem to bk. II of Lucretius, *De Rerum Natura* (*On the Nature of Things*); *New Atlantis* in Works, III,162–63; Bacon, *Translation of Certain Psalmes*, 35, Psalm 12, ll. 13–14; Bacon, *The Advancement of Learning and New Atlantis*, ed. Arthur Johnston (Oxford: Clarendon, 1974) 244.

48. Untitled poem beginning, “The man of life upright,” in *Poems of Francis Bacon*, ed. Grossart, 53; Jardine and Stewart, *Hostage to Fortune*, 36, 292, 417.

49. Paul Devereux, *Stone Age Soundtracks: The Acoustic Archeology of Ancient Sites* (L: Vega, 2001); David Lubman, “An archeological study of chirped echo from the Mayan pyramid of Kukulcan at Chichen Itza,” presented at ASA Meeting, Oct. 12–16, 1998, online at www.ocasa.org/MayanPyramid.htm; Steven J. Waller, “Rock Art Acoustics,” online at <http://sites.google.com/site/rockartacoustics>. This material has been controversial but is gathering force: Nicole Boivin, “Rock art and rock music: petroglyphs of the south Indian Neolithic,” *Antiquity* 78 (2004) 38–53. On acoustics in open amphitheatres, the classic source is Vitruvius Pollio, *Vitruvius: Ten Books on Architecture*, tr. Ingrid D. Rowland (Camb U, 1999) bk. V, chs. 5–8, but cf. Benjamin Hunnigher, *Acoustics and Acting in the Theatre of Dionysus Eleutherus* (Amsterdam, 1956) 303–38, on maximum distances from which Greek audiences could understand the players. Renaissance scholars did not know that many open theaters had been remodeled by Romans into roofed theaters, a process described by George C. Izenour, *Roofed Theaters of Classical Antiquity* (Yale U, 1992).

50. Emerging gradually: Timothy J. Reiss, *Mirages of the Self: Patterns of Personhood in Ancient and Early Modern Europe* (Stanford U, 2003), claiming that a self defined in terms of independent internal agency was barely in place by the late 1600s. Contrast John D. Peters, *Speaking into the Air: A History of the Idea of Communication* (U Chicago, 1999), who argues for a potent, problematic interiority from the time of the Socratic dialogues.

51. Leon Battista Alberti, *On the Art of Building in Ten Books* (*De Re Aedificatoria*), trs. Joseph Rykwert et al. (MIT, 1988) bk. V, ch. 17, q. 145, q. 149. Cf. Pierre Caye, “Alberti et Vitruve: édifier ou architecturer,” in *Leon Battista Alberti*, ed. Francesco Furlan (P: Vrin, 2000) II,773–86; Anthony Grafton, *Leon Battista Alberti: Master Builder of the Renaissance* (NY: Hill and Wang, 2000) 151–88, 261–92. On the development of notions of privacy: Philippe Braunstein, “Toward intimacy: the fourteenth and fifteenth centuries,” *Revelations of the Medieval World*, ed. Georges Duby, tr. Arthur Goldhammer (Camb, Mass:

Belknap, 1988) 535–630; Nicole Castan, “The public and the private,” *Passions of the Renaissance*, ed. Roger Chartier, tr. Arthur Goldhammer (Camb, Mass: Belknap, 1989) 403–45. For the earlier Roman domestic architecture of private bedrooms for the elite: Pliny the Younger, *The Letters*, tr. Betty Radice (L, 1963) bk II, Letter 17, to Gallus, and consider the Christian substitution of *sollicitudo* for *solitudo* in late medieval and Renaissance thought: Robert Kirkbride, *Architecture and Memory: The Renaissance Studioli of Federico da Montefeltro* (Columbia U, 2008, e-book) ch. 6, ¶150–52. On monastics, privacy, sex, and silence: Ann K. Warren, *Anchorites and Their Patrons in Medieval England* (UC, 1985) esp. 106–10; Dyan Elliott, *Fallen Bodies: Pollution, Sexuality, and Demonology in the Middle Ages* (U Penn, 1999).

52. Consult Christine Helliwell, “Space and sociality in a Dayak longhouse,” *Things As They Are: New Directions in Phenomenological Anthropology*, ed. Michael Jackson (Indiana U, 1996) 128–48 for an aural analysis of such a dormitory world, as also James F. Weiner, *The Empty Place: Poetry, Space and Being among the Foi of Papua New Guinea* (Indiana U, 1991) 64–69. On medieval houses: Jane Grenville, *Medieval Housing* (Leicester U, 1997); Sherban Cantacuzino, *European Domestic Architecture* (L: Studio Vista, 1969); and esp. Woolgar, *The Senses in Late Medieval England*, 66–67, on the acoustics of walls, hangings, carpets, and fields. Dormitory conditions prevailed into the 1800s for commonfolk: Richard L. Bushman, *The Refinement of America: Persons, Houses, Cities* (NY: Knopf, 1992) 104–10. For Bacon, his *Sylva Sylvarum*, Century II, 38; Jardine and Stewart, *Hostage to Fortune*, 37, 506–508. On solitude: Steven Shapin, “The mind is its own place: science and solitude in seventeenth-century England,” *Science in Context* 4 (1991) 191–218; Kassler, *Inner Music*; David Flaherty, *Privacy in Colonial New England* (U Press of Virginia, 1972) esp. 14 on Puritan religious introspection, and contrast Amanda Vickery on new Anglo-American modes of sociability during the 18th century, with the redesign of domestic interiors to accommodate the din of “visiting”: *Behind Closed Doors: At Home in Georgian England* (Yale U, 2009) 14–16, 194–96, 274ff. I have truncated the sentence, “‘Space astonishes,’ but it did not terrify Theocles as it had terrified Pascal,” from Marjorie Hope Nicolson, *Mountain Gloom and Mountain Glory: The Development of the Aesthetics of the Infinite* (NY, 1963) 290, discussing the “hoarse echoings” heard in 1686 by Anthony Ashley Cooper, third Earl of Shaftesbury, in *The Moralists* (1709).

53. Istituto e Museo di Storia della Scienza, Florence, “Brunelleschi and the dome of Florence Cathedral,” at <http://galileo.imess.firenze.it/news/mostra/4>, consulted Dec. 2003; Ross King, *Brunelleschi’s Dome* (NY: Penguin, 2001), relying upon Rowland J. Mainstone, “Brunelleschi’s dome,” *Architectural R* 162 (1977) 157–66; Wayne E. Begley and Ziyad-Din Ahmed Desai, comps. and trs., *Taj Mahal—The Illumined Tomb* (U Washington, 1989); Bruel and Kjaer Co., “Acoustical heritage of Hagia Sophia revived with ODEON,” *Bruel and Kjaer Mag* 2 (2002) at www.bksv.com/2639.htm.

54. Alberti, *On the Art of Building*, q. 149; idem, *The Family in Renaissance Florence* (*I Libri della Famiglia*), tr. Renée Neu Watkins (U South Carolina, 1969) 4–5, q. 175. On the acoustic force of the “raw blast of Just Intonation tuned drone [organ] music” that Alberti would have experienced in Florence’s cathedral: Marcus Boon, “The Eternal Drone: good vibrations, ancient to future,” in *Undercurrents: The Hidden Wiring of Modern Music*, ed. Rob

Young (L: Continuum, 2002) 59–69, q. 59.

55. Alberti, *I Libri della Famiglia*, 4–5, q. 175; Joan Gadol, *Leon Battista Alberti: Universal Man of the Early Renaissance* (U Chicago, 1969) 215–19, 229–30; Robert Tavernor, *On Alberti and the Art of Building* (Yale U, 1998) ch. 4 on self-portraiture; Grafton, *Leon Battista Alberti*, 154–68; Reiss, *Mirages of the Selfe*, 394–97; Nella B. Bensimon, “Voix et images de la femme dans l’oeuvre de Leon Battista Alberti,” in Furlan, ed., *Leon Battista Alberti*, II, 773–86; Robin Evans, “Figures, doors, and passages,” *Architectural Design* 48 (1978) 267–78, q. 270 referring to Raphael and Cellini but applicable to Alberti.

56. Roger Pratt, *The Architecture of Sir Roger Pratt*, ed. R. T. Gunther (NY: Blom, 1972) q. 62, partly cited in Evans, “Figures, doors, and passages,” 271–72, who notes that the first domestic corridor in England appeared ca. 1597, influenced by Italian models, for which consult Patricia F. Brown, *Private Lives in Renaissance Venice: Art, Architecture, and the Family* (Yale U, 2004) 63ff. on the echoic “reflections and hard surfaces” of the *portego*. “Long sounds, distinct or seemingly in bundles,” wrote the 20th-century art critic Adrian Stokes in an essay on Venice, “appease the orifices of palaces that lean back gradually from canal or pavement. A long sound with its echo brings consummation to the stone.” *The Critical Writings* (L: Thames and Hudson, 1978) II, 245.

57. Willi Apel, “Echo,” *Harvard Dict of Music* (Harvard U, 1962) 224–25; Murray Campbell and Mary Terey-Smith, “Echo,” *New Grove Dict of Music and Musicians*, ed. Stanley Sadie (L: Macmillan, 1980) VII, 860–62; David Schulenberg, *The Keyboard Music of J. S. Bach* (NY: Schirmer, 1992) 53–54. On Gabrielli: Liana Cheney’s cyber-ed Renaissance Music course (Dec. 5, 2003) at www.uml.edu/Dept/History/ArtHistory/compart/5ren3.html. See Alain Corneau (dir.), *Tous les matins du monde* (Paravision Intl, 1991) on the life of viol player Marin Marais (1656–1728) and baroque conducting.

58. Hillel Schwartz, *The Culture of the Copy* (NY: Zone, 1996) 146–49 on the New World and its macaws; Shalom L. Goldman, *God’s Sacred Tongue: Hebrew and the American Imagination* (U North Carolina, 2004) 15–31, 46; Peter C. Hoffer, *Sensory Worlds in Early America* (Johns Hopkins U, 2003) 22–106, how “Indians” and Europeans heard each other, as also Richard Cullen Rath, *How Early America Sounded* (Cornell U, 2003) ch. 5, and James Axtell, *Beyond 1492: Encounters in Colonial North America* (Oxford U, 1992) 55, 71, 76–80, 159; Walter Briggs, *Without Noise of Arms: The 1776 Domínguez-Escalante Search for a Route from Santa Fe to Monterey* (Flagstaff: Northland, 1976) 21, 29, 33, 139. The Incas developed an equally loud technology: Patricia Kruth and Henry Stobart, eds., *Sound: The Darwin College Lectures* (Camb U, 2000) 1–2 on “sounding boulders.”

59. On the Royal Exchange, Thomas Nashe, *The Returne of the Renowned Cavaliere Pasquill of England from the Other Side of the Seas* (L, 1589) sig. Biii. For the sonic reach of explosives: George I. Brown, *The Big Bang: A History of Explosives* (Stroud: Sutton, 1998) 48, Marco Polo on Chinese fireworks heard “ten miles at night”; Bert S. Hall, *Weapons and Warfare in Renaissance Europe* (Johns Hopkins U, 1997) esp. 62–63. By 1644, Marin Mersenne took it for granted that cannon could be heard many leagues away and in his *Ballistica* (Prop. 35) measured the speed of sound by cannonballs (Lindsay, *Acoustics*, 65). Cf. Tomaso Moretti, *A Treatise of Artillery*, tr. Jonas Moore, Jr. (L, 1673).

60. François Rabelais, *Gargantua and Pantagruel*, tr. J. M. Cohen (Harmondsworth,

1955 [1533–1535]) 566–69 (= bk. 4, chs. 55–56), but preferring Burton Raffel's translation (NY: Norton, 1990) 497 for the last line. Cf. Judith Anderson, "Frozen words," in her *Words That Matter: Linguistic Perceptions in Renaissance English* (Stanford U, 1996) 7–42; Kimberlee Campbell, "Of horse-fish and frozen words," *Renaissance and Reformation*, ser. 2, 14 (1990) 183–92. Rabelais was expanding upon a classical image credited in Plutarch's *Moralia* (I, 421) to the playwright Antiphanes: "in a certain city words congealed with the cold the moment they were spoken, and later, as they thawed out, people heard in the summer what they had said to one another in the winter; it was the same way, he asserted, with what was said by Plato to men still in their youth; not until long afterwards, if ever, did most of them come to perceive the meaning, when they had become old men." I thank Aline Hornaday for helping me to appreciate the ambiguities of Plutarch's Latin syntax, through which Antiphanes may be poking fun at the denseness of Plato or of his Greek audience. Either way, the trope of the frozen word was commonplace by Plutarch's time if not also in the time of Antiphanes (4th cent. BCE), as suggested by Adrian Room, ed., *Brewer's Dict Phrase and Fable*, 16th ed. (NY: HarperCollins, 1999) 471, whose translation allows for "ripened judgment of mature age" to thaw out Plato's wisdom, an interpretation appearing also in a sermon of 1648: "Till the Holy Ghost came to thaw their memories, that the words of Christ, like the voice in Plutarch that had become frozen, might at length become audible": Henry Hammond, *Sermons* (L, 1664) xvii, quoted by E. H. in *Notes and Queries*, ser. 1, 3 (Mar. 8, 1851) 182.

61. Hans Binneveld, *From Shellshock to Combat Stress*, tr. John O'Kane (Amsterdam U, 1997) 3; Anthony Babington, *Shell Shock: A History of the Changing Attitudes to War Neuroses* (L: Lee Cooper, 1997) 7–8; Lucan, *Civil War*, tr. S.H. Braund (Oxford: Clarendon, 1992) VII, 480–84; Kenneth W. Chase, *Firearms: A Global History* (Camb U, 2003) 23–25, early cannon and muskets; Charles Carlton, *Going to the Wars: The Experience of the British Civil Wars, 1638–1651* (L: Routledge, 1992) 131–32. On expansions of "ricochet" from its 13th-century origins as a *chanson*: Paul Robert, *Le Grand Robert de la langue française*, ed. Alain Rey, 2nd ed. (P: Le Robert, 2001) VIII, 407. Surprisingly, the trajectory of European fireworks does not follow quite the same acoustic course as that of cannon or military explosives; pyrotechnicians who early on had been happy with loud or penetrating noises began to focus rather on the optics of elaborate displays of light and color: Simon Werrett, *Fireworks: Pyrotechnic Arts and Sciences in European History* (U Chicago, 2010).

62. Samuel Butler, *Hudibras*, ed. John Wilders (Oxford: Clarendon, 1967) pt. I, Canto 3, ll. 199–220 (pp. 67–68); Joseph Addison, "False Wit," *The Spectator* (L, 1852) 70–71 (no. 59, May 8, 1711); Ovid, *Metamorphoses*, ed. Samuel Garth, trs. Joseph Addison et al. (L, 1818 [1717]) bk. III, ll. 471 and 498–99.

63. John Dryden, bk. IX, ll. 994–99, Garth edition; Joseph Addison and Richard Steele, *The Spectator*, ed. Gregory Smith (L: Dent, 1963), no. 110 ("The Coverly Ghost," July 6, 1711), no. 251 ("The Cries of London," Dec. 18, 1711), and no. 335 ("Sir Roger at the Play," March 25, 1712), all by Addison, as also his "Frozen Voices," no. 254 (Nov. 23, 1710) of *The Tatler*, ed. Donald F. Bond (Oxford: Clarendon, 1987) III, 288–92, which drew upon Dutch accounts of Russian cold in Gerrit de Veer's *A True and Perfect Description of Three Voyages* (L, 1609) and an English account by Giles Fletcher, *Of the Russe Commonwealth* (L,

1591), both quoted by Robert Boyle in his *New Experiments and Observations Touching Cold* (L, 1665) 482, 487, 493, 522–23, 526–27. On the suppression and compression of women's voices: Anne Carson, "Sound and gender," *Glass Irony & God* (NY: New Directions, 1995) 119–42, classical Greek women; Leslie C. Dunn and Nancy A. Jones, eds., *Embodied Voices: Representing Female Vocality in Western Culture* (Camb U, 1994) pt. 1, late medieval and early modern European women.

64. Jardine and Stewart, *Hostage to Fortune*, 502–505, suggesting that Bacon more likely died of experiments with, and medical use of, the toxic vapors of potassium nitrate and sodium nitrate; Francis Bacon, *Sylva Sylvarum*, Century III, p. 54; idem, "History of Dense and Rare," *The Instauratio Magna: Last Writings*, tr. and ed. Graham Rees (Oxford: Clarendon, 2000) 145–53; Mordechai Feingold and Penelope M. Gouk, "An early critique of Bacon's *Sylva Sylvarum*: Edmund Chilmead's treatise on sound," *Annals of Sci* 40 (1983) 139–57, esp. 147. On sound and air temperature, the relationships of which would not be accurately defined until the 1800s: Cyril M. Harris, "Absorption of sound in air versus humidity and temperature," *JASA* 40 (1966) 148–59, expanded by Dennis A. Bohn, "Environmental effects on the speed of sound," *J Audio Eng Soc* 38,4 (1988) 223–31. For a good brief explanation of the impact of temperature inversions on sound: Ned Rozell, "Jets in the living room? Blame inversions," *Alaska Sci Forum* (Jan. 17, 1996) online at www.gi.alaska.edu/ScienceForum/ASF12/1268.html. On the Little Ice Age: Hubert H. Lamb, *Weather, Climate, and Human Affairs* (L: Routledge, 1988) 104–63; Jean M. Grove, "The onset of the Little Ice Age," in *History and Climate: Memories of the Future?*, eds. P.D.D. Jones et al. (NY: Kluwer, 2001) 153–85; Brian M. Fagan, *The Little Ice Age: How Climate Made History, 1300–1850* (NY: Basic, 2001) esp. 86–104. The cooling trend was little noted before 1600, and regular measurements using improved versions of Galileo's mercury thermometer would not be made until the late 1600s, but frequent temperature inversions would have produced notable aural phenomena that may have prompted many of the "frozen word" anecdotes. On classical sources: Peter Heylyn, *Microcosmos* (Oxford, 1621) 184, referring to Castilian's *Aulicus*, from J. S. entry in *Notes & Queries* 2 (Sept. 21, 1850) 262–63, and also in the Appendix to Richmond P. Bond, *The Tatler: The Making of a Literary Journal* (Harvard U, 1971) 228.

65. Ned Ward, *London Spy* (L, 1698) ii.15.

66. Sarah I. Johnston, *Restless Dead: Encounters between the Living and the Dead in Ancient Greece* (UC, 1999) esp. chs. 6–7; Alan E. Bernstein, *The Formation of Hell: Death and Retribution in the Ancient and Early Christian Worlds* (Cornell U, 1993) esp. 287–89; Loewenstein, *Responsive Readings* (→ n.28), 152 n.24 on ancient echo porticos and hell portals; Theodore J. Lewis, "...Evaluating textual sources for reconstructing ancient Israelite beliefs about the dead," in *Sacred Time, Sacred Place: Archaeology and the Religion of Israel*, ed. Barry M. Gittlen (Winona Lake: Eisenbrauns, 2002) 183–85 on "Sheol," 192–93 on ghosts; Virgil, *Aeneid*, VI, 557–59, in Matthew Steggle's translation, "Paradise Lost and the acoustics of Hell," *Early Modern Lit Studies* 7,1 (Special Issue 8, May 2001) 9.1; Eileen Gardiner, ed., *Visions of Heaven and Hell before Dante* (NY: Italica, 1989) 1–12 for *Apocalypse of Peter*, 13–46 for *Apocalypse of Paul*, though I am preferring the translations at www.newadvent.org/fathers/1003.htm and [/0830.htm](http://www.newadvent.org/fathers/0830.htm), and 57–64 for Drythelm's vision in

Bede's *Ecclesiastical History of the English Nation*, bk. V, ch. 12, q. 59. For the rest, Pamela Sheingorn, "'Who can open the doors of his face?' The iconography of Hell mouth," in *The Iconography of Hell*, eds. C. Davidson and T. H. Seiler (Kalamazoo: Medieval Inst, 1992) 1–19; Gary D. Schmidt, *The Iconography of the Mouth of Hell* (Susquehanna U, 1995), dating to 10th-century British monks the first animalistic and anthropomorphic figures, in keeping with *Isaiah* 5.14 and a Scandinavian underworld of serpents and dragons. As a roaring lion with large teeth, the entry mouth itself became one of Hell's torments. For a similarly noisy trajectory of conceptions of Hell in Islam: Nerina Rustomji, *The Garden and the Fire: Heaven and Hell in Islamic Culture* (Columbia U, 2009), which begins (p.3) with an account of the pre-Islamic Arabian "myth of the prophet Salih of the tribe of Thamud and the she-camel whose piercing screech brought about the end of their world," drawn from Jan I. Smith and Yvonne Y. Haddad, *The Islamic Understanding of Death and Resurrection* (SUNY Albany, 1981) 5, 28–29.

67. Jérôme Baschet, *Les Justices de l'au-delà: les représentations de l'enfer en France et en Italie (XIIIe–XVe siècles)* (Rome: École française de Rome, 1993) esp. 60–62; Kathi Meyer-Baer, *Music of the Spheres and the Dance of Death* (Princeton U, 1970) 87–96, 151; Richard Rastall, "The sounds of hell," in *Iconography of Hell*, 102–31, q. 108 mock-Latin; Jacques Le Goff and Jean-Claude Schmitt, eds., *Le Charivari* (P: Mouton, 1981); Leo Spitzer, "Anglo-French etymologies," *Modern Language Notes* 60 (1945) 504–506, on "caterwaul" (a "hideous, discordant howling noise"), derivative from Old French "chalivali."

68. Gerald Messadié, *A History of the Devil*, tr. Marc Romano (NY: Kodansha Intl, 1996) chs. 14–15; Jeffrey B. Russell, *Satan: The Early Christian Tradition* (Cornell U, 1981) and *Lucifer, the Devil in the Middle Ages* (Cornell U, 1984); Robert Muchembled, *A History of the Devil from the Middle Ages to the Present*, tr. Jean Birrell (L: Polity, 2003) 10–20, number of demons; Luther Link, *The Devil: The Archfiend in Art from the Sixth to the Sixteenth Century* (NY: Abrams, 1995); Nathalie Nabert, ed., *Le Mal et le diable: leurs figures à la fin du Moyen Age* (P: Beauchesne, 1996), and most recently, Alain Boureau, *Satan the Heretic: The Birth of Demonology in the Medieval West*, tr. Teresa L. Fagan (U Chicago, 2006).

69. Marek Tamm, tr. Kait Tamm, "Saints and the demoniacs: exorcistic rites in medieval Europe (11th–13th century)," *Folklore* 23 (2003) 7–24, at 16; Nancy Caciola, "Mystics, demoniacs, and the physiology of spirit possession in Medieval Europe," *Comparative Studies in Soc and H* 42 (2000) 268–306, p. 293 for her translation and analysis of Johannes Nider, *Formicarius* (Douai, 1602) 185–87, a discussion expanded in her *Discerning Spirits: Divine and Demonic Possession in the Middle Ages* (Cornell U, 2003). As Lester K. Little explains in *Benedictine Maledictions: Liturgical Cursing in Romanesque France* (Cornell U, 1996) 17–28, 50–51, the notion of "clamor" had itself been shifting: in Late Antiquity the commotion necessary for a (poor) claimant to attract the attention of a king or present a petition before a magistrate seated on a throne, then a High Medieval liturgical petition from churchmen and monks ("How to Make a Clamor, in Case of Trouble, to the People or to God"—Book of Customs of the Abbey of Cluny, ca. 1075) or a prayerful crying from the people en masse (*parvus clamor*) to the Lord as the last resort, "clamor" by 1400 could be either an understandable plaint funneled through pious throats and proper authorities or an unruly uproar. For more detail: Richard E. Barton, "Making a clamor to the Lord:

noise, justice, and power in eleventh- and twelfth-century France,” in *Feud, Violence, and Practice*, eds. B. S. Tuten and T. L. Billado (Burlington: Ashgate, 2010) 213–37.

70. Steven Connor, *Dumbstruck: A Cultural History of Ventriloquism* (Oxford U, 2000) pt. III; Caciola, “Mystics, demoniacs, and the physiology of spirit possession in Medieval Europe”; Zacharias Vicecomes [fl. late 1500s], *Complementum Artis Exorcistae* (1643), excerpted in *The Occult in Early Modern Europe*, ed. and tr. P. G. Maxwell-Stuart (NY: St. Martin’s, 1999) 46–48; Franco Mormando, *The Preacher’s Demons: Bernardino of Siena and the Social Underworld of Early Renaissance Italy* (U Chicago, 1999) q. 1, 10, 69, 79, 88, q. 107. On exorcism and 15th-century clerical uncertainty about the line between holy blessings and demonic curses: Michael Bailey, *Battling Demons: Witchcraft, Heresy and Reform in the Late Middle Ages* (Penn State U, 2003) 133–36. The uncertainty was strengthened by a long history of ecclesiastical anathema, on which Little, *Benedictine Maledictions*, as just above.

71. Nicolas Remy, *Demonolatriy*, tr. E. A. Ashwin (Secaucus: U Books, 1974 [1595]) 30–31 (= bk. I, ch. 8) on the Devil’s “hoarse, muffled Murrur,” and pp. 76–78 on churchbells; James Sharpe, *Instruments of Darkness: Witchcraft in Early Modern England* (U Penn, 1996) 198 for Nyndge (1573), and 195 for Harrison (1602); Girolamo Menghi, *Flagellum Daemonum* (1586), an exorcism manual excerpted in Maxwell-Stuart, ed., *Occult in Early Modern Europe*, 51–52. For larger contexts: H. C. Erik Midelfort, “The Devil and the German people: reflections on the popularity of demon possession in sixteenth-century Germany” in *Religion and Culture in the Renaissance and Reformation*, ed. Steven Ozment (Kirkville: Sixteenth Century J Pubs, 1989) 99–119; Sarah Ferber, *Demonic Possession and Exorcism in Early Modern France* (NY: Routledge, 2004).

72. Richard Kieckhefer, *European Witch Trials: Their Foundations in Popular and Learned Culture, 1300–1500* (UC, 1976), tracking the increasing legal concern with diabolism after 1375, esp. in Italy and Switzerland; Heinrich Krämer and James [Jacob] Sprenger, *The Malleus Maleficarum*, ed. and tr. Montague Summers (NY: Dover, 1971 [1928]) vii–viii on number of editions, probably accurate, though Summers’s scholarship is elsewhere impeachable, as with authorship; Peter Segl makes a strong case that Krämer (Henricus Institoris) was the sole author, despite early title pages, so henceforth I refer only to him as the author, relying upon Segl’s “Heinrich Institoris: Persönlichkeit und literarisches Werk” in *Der Hexenhammer: Entstehung und Umfeld des Malleus maleficarum von 1487*, ed. Segl (Cologne and Vienna: Böhlau, 1988) 103–26. On exorcists spreading the witchhunts: Brian P. Levack, “The decline and end of witchcraft prosecutions,” in *Witchcraft and Magic in Europe: The Eighteenth and Nineteenth Centuries*, eds. Bengt Ankarloo and Stuart Clark (U Penn, 1999) 7–13; Christopher Baxter, “Jean Bodin’s *De la démonomanie des sorciers*: the logic of persecution,” in *The Damned Art*, ed. Sydney Anglo (L: Routledge & Kegan Paul, 1977) 97. On Krämer’s reasoning, Anglo, “Evident authority and authoritative evidence: the *Malleus Maleficarum*,” in *ibid.*, 1–31. On early doubts about Krämer’s methods and the stature of the *Hammer*: Sharpe, *Instruments of Darkness*, 21–22, who also provides an historical overview of the theological construction of the witch as a conspiratorial heretic.

73. Constance Classen, *The Color of Angels: Cosmology, Gender and the Aesthetic Imagination* (NY: Routledge, 1998) 74–80, links fears of women’s orality with witchcraft accusations, and cf. Jane Kamensky, *Governing the Tongue: The Politics of Speech in Early New*

England (Oxford U, 1997). On folk notions: Carlo Ginzburg, *The Night Battles: Witchcraft and Agrarian Cults in the Sixteenth and Seventeenth Centuries*, trs. J. Tedeschi and A. Tedeschi (Johns Hopkins U, 1983) esp. 33–68 on nocturnal processions of the dead; Sharpe, *Instruments of Darkness*, 58–80. The image of the witches' Sabbath, drawn up in the late 1400s, strengthened the identification of witches with women, but men were frequently prosecuted as witches and under torture would name male accomplices: Midelfort, "The Devil and the German people," 99–119; Martine Ostorero et al., *L'Imaginaire du sabbat* (Firenze: SISMEL, 1999); Michael Bailey, "The medieval concept of the witches' Sabbath," *Exemplaria* 8 (1996) 419–39. Mr. Brown appears in W. W., *A True and Just Recorde...* (L, 1582), excerpted in Marion Gibson, ed., *Witchcraft and Society in England and America, 1550–1750* (Cornell U, 2003) q. 56.

74. On "loud-mouthed" women, André Le Chapelain, *The Art of Courtly Love* (1174–1186), quoted by Classen, *Color of Angels*, 74; Krämer, *Malleus Maleficarum*, 102 (= pt. I, q. 1, ch. 2), 223, 228–29 (= pt. III, qs. 13 and 15). On methodology, Stuart Clark, *Thinking with Demons: The Idea of Witchcraft in Early Modern Europe* (Oxford U, 1997) ch. 8. As for those barking dogs, Mark Feinstein and Raymond Coppinger claim that dogs can bark for no reason for seven hours straight, ninety times a minute: "Hark! Hark! The dogs do bark... and bark and bark," *Smithsonian Mag* (Jan. 1991) 119–29.

75. Krämer, *Malleus Maleficarum*, 228, bewitching voices.

76. *Ibid.*, 104–12, q. 109, q. 111 (= pt. I, q. 1, ch. 3–4). Cf. Connor, *Dumbstruck*, 105–22. For more on how the Devil might insinuate himself into human bodies: Dyan Elliot, *Fallen Bodies: Pollution, Sexuality, and Demonology in the Middle Ages* (U Penn, 1998). Walter Stephens, in *Demon Lovers: Witchcraft, Sex, and the Crisis of Belief* (U Chicago, 2002), argues that the question of exactly how spirits consorted with humans was at the center of a larger anxiety about the reality and strength of the connection between divine and earthly realms, an anxiety exacerbated by a new demonology that made evil spirits hideously animalistic (thus difficult to relate to things human) or remarkably humanoid (and difficult to distinguish from the faithful). Details of intercourse between woman and demon, however lubricious the interests of the male authors, were complementary to the case that had to be made in favor of a real connection between the divine, the angelic, and the human. Sound was used as both model and mediator of this problematic relationship.

77. Limbo, which involved no contrition, I treat below. Prooftexts for "sleeping in Jesus" included Matthew 27.52, John 11.11–14, and Acts 13.36, on which cf. Anna Harrison, "Community among the dead: Bernard of Clairvaux's *Sermons for the Feast of All Saints*," in *Last Things: Death and the Apocalypse in the Middle Ages*, eds. C. W. Bynum and P. Freedman (U Penn, 2000) 191–204. On purgatory: Peter Brown, "The decline of the empire of God: amnesty, penance, and the afterlife from late Antiquity to the Middle Ages," in *ibid.*, 41–59; Jacques Le Goff, *The Birth of Purgatory*, tr. Arthur Goldhammer (U Chicago, 1986); C. S. Watkins, "Sin, penance, and purgatory in the Anglo-Norman realm: the evidence of visions and ghost stories," *Past & Present* 175 (2002) 3–33. The "not-very-good" appear in the Vision of Tundale [Tondal] in Gardiner, *Visions of Heaven and Hell*, 181. St. Elizabeth appears in Elizabeth A. Petroff, ed., *Medieval Women's Visionary Literature* (Oxford U, 1986) q. 165–66. On ghosts seeking help: Andrew Joynes, ed. and tr., *Medieval Ghost Stories*

(Woodbridge: Boydell, 2001) pt. 3, esp. 97–102, 120–25. On connections heard between the restless dead (“wild” hordes), necromancy and witchcraft: Wolfgang Behringer, *Shaman of Oberstdorf: Chonrad Stoeckhlin and the Phantoms of the Night*, tr. H. C. Erik Midelfort (U Virginia, 1998). For the nexus between images of Purgatory and of bodily resurrection: Caroline W. Bynum, *The Resurrection of the Body in Western Christianity, 200–1336* (Columbia U, 1995). Cf. Nicholas Conostas, “‘To sleep, perchance to dream’: the middle state of souls in patristic and Byzantine literature,” *Dumbarton Oaks Papers* 55 (2001) 91–124.

78. Cf. Steggle, “*Paradise Lost* and the acoustics of Hell,” (→ n.66); Edoardo Sanguineti, “Infernal acoustics: sacred song and earthly song,” *Lectura Dantis* 6 (1990) 69–79.

79. *Inferno* III.22–30, Dante Alighieri, *Purgatorio*, trs. Jean and Robert Hollander (NY: Doubleday, 2003) XIX.13–18, 28–31, and (next paragraph) XXVIII.103–108. Cf. Nancy A. Jones, “Music and the maternal voice in *Purgatorio* XIX,” in Dunn and Jones, *Embodied Voices*, 35–49. On the Christian transformation of the oft-beneficent classical siren into a voluptuous, diabolical figure who, like the Devil, uses music to seduce: Meyer-Baer, *Music of the Spheres*, 238, 243–50, 283–87.

80. Nancy Caciola, “Wraiths, revenants, and ritual in medieval culture,” *Past & Present* 152 (1996) 3–45. I am preferring Madeleine McDermott and Roger S. Wieck, trs., “Visions of Tondal,” in *The Visions of Tondal from the Library of Margaret of York*, eds. T. Kren and R. S. Wieck (Malibu: J. Paul Getty Museum, 1990) 50, to the Visions of “Tundale” in Gardiner, *Visions of Heaven and Hell*, 172–73, but I use her translation of Brendan at 115. A parallel iconography of the anvil linked it to the tonal system of Pythagoras (which he supposedly derived from hearing the intervals pounded out by blacksmith’s hammers of different weights) and the invention of musical scales by Jubal while listening to Tubalcain at his ironwork, as elaborated from *Genesis* 4.21–22 by Petrus Comestor, *Historia Scholastica: Historia Libri Genesis* (ca. 1160) ch. 28: “De generationibus Cain,” subsection on “De Musice primo inventore.” For images, see www.leidenuniv.nl/fsw/verduin/ghio/speculum.htm (June 22, 2002), Kees Verduin’s website with reproductions from Franchino Gaffurio’s *Theorica Musice, Liber Primus* of 1492 (NY: Broude, 1967) and earlier sources, contextualized by Paolo Gozza, “Introduction,” *Number to Sound* (°n.35) 15–21. Lindsay, *Acoustics* (°n.36) 38–39, critiquing the Pythagoras story as reported by Boethius, *De Institutione Musicae*, sects. 10–11, notes that “the weight of the vibrator by itself has nothing to do with its frequency.”

81. On Limbo: Bp. Auguste Gaudel, “Limbes,” *Dict de théologie catholique*, eds. Alfred Vacant et al. (P, 1926) IX,759–72; Sanguineti, “Infernal acoustics,” on “anti-music.”

82. *Disputation of Doctor Martin Luther . . . in Works*, trs. and eds. Adolph Spaeth et al. (Phila, 1915) I,29–38; Kurt Aland, ed., *Martin Luther’s 95 Theses* (St. Louis: Concordia, 1967). Lyman A. Baker provides a snappy translation for Tetzels jingle at www-personal.ksu.edu/~lyman/english233/sg-95ths.htm. For the rest: Robert Scribner, “Oral culture and the diffusion of Reformation ideas,” *H European Ideas* 5 (1984) 237–56, q. 240; Christopher B. Brown, *Singing the Gospels: Lutheran Hymns and the Success of the Reformation* (Harvard U, 2005); Martin Luther, *Table Talk (1531–44)*, in *Luther’s Works*, vol. 54, ed. and tr. Theodore G. Tappert (Phila: Fortress, 1967) 129 on prayer (no. 1254) and on music (no. 1258), p. 189 on tinnitus (no. 3006a), pp. 216–17 on devils and thunder (no. 3507), p. 271

on church architecture (no. 3781). On prayer and its contrary, the noise of cursing: Faye L. Kelly, *Prayer in Sixteenth-Century England* (U Florida, 1966); Ramie D. Targoff, *Common Prayer: The Language of Public Devotion in Early Modern England* (U Chicago, 2001), esp. on the Puritan push for uniformity of public prayer.

83. Kathryn A. Edwards, ed., *Werewolves, Witches, and Wandering Spirits: Traditional Belief and Folklore in Early Modern Europe* (Truman State U, 2002); Bruce Gordon, “Malevolent ghosts and ministering angels: apparitions and pastoral care in the Swiss Reformation,” in *The Place of the Dead: Death and Remembrance in Late Medieval and Modern Europe*, eds. B. Gordon and P. Marshall (Camb U, 2000) 87–109. For a neat compilation of the folklore of ghostlike noises: Ernest W. Baughman, *Type and Motif-Index of the Folktales of England and North America* (The Hague: Mouton, 1966) E402.

84. Blarer appears in Gordon, “Malevolent ghosts,” 101–105. For debates about the afterlife: Craig M. Koslofsky, *The Reformation of the Dead: Death and Ritual in Early Modern Germany* (NY: St. Martin’s, 2000); Philip C. Almond, *Heaven and Hell in Enlightenment England* (Camb U, 1994) 38–51; Peter Marshall, “Fear, purgatory and polemic in Reformation England,” in *Fear in Early Modern Society*, eds. W. G. Naphy and P. Roberts (Manchester U, 1997) 150–66. On Protestant funerals: Andrew Spicer, “‘Rest of their bones’: fear of death and Reformed burial practices,” in *ibid.*, 167–83.

85. Nancy Caciola, “Spirits seeking bodies: death, possession and communal memory in the Middle Ages,” in *The Place of the Dead*, eds. Gordon and Marshall, 66–86, on strength of belief; Heinrich Bullinger, “Second Helvetic Confession,” in *Ency Amer Religions: Religious Creeds*, ed. J. Gordon Melton (Detroit: Gale, 1988) 184–217 at 214–15 (= ch.26), and cf. Bruce Gordon, “Heinrich Bullinger and Jacob Ruef on the power of the devil,” in Edwards, ed., *Werewolves, Witches, and Wandering Spirits*, 155–79; Gordon, “Malevolent ghosts,” 95–100 on Lavater; Ludovicus Lavater, *De spectris, lemuribus, et magnis atque insolitis fragoribus... (1575)* tr. in Maxwell-Stuart, *Occult in Early Modern Europe*, q. 38.

86. David W. Sabeian, *Power in the Blood: Popular Culture and Village Discourse in Early Modern Germany* (Camb U, 1984) ch. 3 on Keil, q. 62–64, q. 90, and ch. 4 for further ties between noise and witchcraft. On ghosts in the Anglican world and the “poisoning of the Word” via poison in the ear, Stephen Greenblatt, *Hamlet in Purgatory* (Princeton U, 2001); Peter Cummings, “Hearing in *Hamlet*: poisoned ears and the psychopathology of flawed audition,” *Shakespeare Yearbook* 1 (Spring 1990) 81–92.

87. François Perreaud, *Demonologie* (Geneva, 1653), briefly excerpted in *Occult in Early Modern Europe*, 48–49. I follow the Bibliothèque Nationale’s spelling and identification: François Perrault (1577–1657), author of *L’Antidemon de Mascon... [including] La Demonologie ou Discours en général touchant l’existence, puissance et impuissance des demons et des sorciers, et des vrais exorcismes et remedes contre iceux* (2nd ed. in 1656). German folk culture expected poltergeists during Ember Days, as youth imitated the noises of ghosts on Knocking Nights (*Klopfnächte*), banging on doors with padded hammers to drive off evil spirits and get food in return: David Lederer, “Living with the dead: ghosts in early modern Bavaria,” in Edwards, ed., *Werewolves, Witches, and Wandering Spirits*, 43ff.

88. Bengt Ankarloo and Gustav Henningsen, eds., *Early Modern European Witchcraft:*

Centres and Peripheries (Oxford: Clarendon, 1990) esp. essays on Hungary, Sweden, Iceland, and Estonia; Elaine G. Breslaw, ed., *Witches of the Atlantic World: A Historical Reader & Primary Sourcebook* (NYU, 2000), esp. for sources and analyses of the Salem witchcraft case and instances in Central and South America. For statistics: Geoffrey Scarre and John Callow, *Witchcraft and Magic in Sixteenth- and Seventeenth-Century Europe*, 2nd ed. (Basingstoke: Palgrave, 2001) 20, a maximum of 40,000 executions from 1428 to 1782, based on records of official prosecutions, which I have tempered upward in consideration of Richard Kieckhefer, “Recent publications on witchcraft; 2: Gender studies,” *Newsletter of the Societas Magica* 3 (Fall 1996), concerning estimates by Brian P. Levack as challenged by Anne L. Barstow, *Witchcraze* (San Francisco: Harper, 1995) 20–25.

89. Almond, *Heaven and Hell in Enlightenment England*, q. 84 from Christopher Love, *Hell’s Terror* (L, 1653) 43, and q. 85 from John Bunyan, *A Few Sighs from Hell, or, the Groans of a Damned Soul* (L, 1658) as repr. in Roger Sharrock, ed., *Miscellaneous Works of John Bunyan* (Oxford U, 1976) 1,300; Michel Foucault, *Discipline and Punish: The Birth of the Prison*, tr. Alan Sheridan (NY: Vintage, 1995) 34, 45–47; Lodowick Bryskett, *A Discourse of Civill Life*, ed. Thomas E. Wright (Northridge: San Fernando Valley State College, 1970 [1606, wr. 1582]) q. 43, just after explaining how a nurse’s singing can calm a crying baby. On frequency of and audiences to executions: Peter Spierenburg, “The body and the state: early modern Europe,” in *The Oxford History of the Prison*, eds. N. Morris and D. J. Rothman (Oxford U, 1995) 55–60; Mary E. Perry, *Crime and Society in Early Modern Seville* (Hanover: U Press New England, 1980) 138–62; Peter Linebaugh, *The London Hanged: Crime and Civil Society in the Eighteenth Century*, 2nd ed. (L: Verso, 2003); V. A. C. Gatrell, *The Hanging Tree: Execution and the English People 1770–1868* (Oxford U, 1994); J. M. Beattie, *Policing and Punishment in London, 1660–1750* (Oxford U, 2001) 296–301, 346–57, 457; Henry Sanson, ed., *Memoirs of the Sansons* (L, 1876) 1,202, 215, a family of French executioners.

90. Willard’s text was reprinted in Samuel A. Green, ed., *Groton in the Witchcraft Times* (Groton, 1883) 7–21, q. 7–8, 10–11, 20. On Elizabeth’s marriage and children: account by Janis Pahnke at http://bigelowsociety.com/elizabeth_knapp.html. On Knapp as a servant-girl: Lawrence W. Towner, “‘A fondness for freedom’: servant protest in Puritan society,” *William & Mary Q* 3rd ser., 19 (1962) 201–19 at 202.

91. “Laws of Harvard College in 1655,” *Proc Massachusetts H Soc* 14 (1876) 208–209; Charles Morton, *Compendium Physicae* (B, 1940) (used at Harvard and Yale from ca. 1687) 172; Samuel Willard, *A Compleat Body of Divinity* (B, 1726) Quest. LV, Sermon CLXVI, 644, 643, 647 (double pagination from 581–666[–68]; these from first count); Nehemiah Walter, *Unfruitful Hearers Detected & Warned* (B, 1696) with preface (pp. 3–4) by Willard, whose concern with aural indignities suffered by the Lord had been anticipated theologically by such as Thomas Aquinas, whose insistence upon an incarnate Savior meant that Christ on the Cross had “suffered in all His bodily senses,” including being “tormented with the cries of blasphemers and scorners”: *Summa Theologica*, tr. Fathers of the English Dominican Province (NY, 1947) II, 2269–2270 (= bk. III, quaestio 46, article 5).

92. P. E. and J. A. (= Willard), *Some Miscellany Observations on Our Present Debates respecting Witchcrafts, in a Dialogue between S. & B.* repr. (B, 1869 [1692]) 6, 13, 14,

15—more accessible in a reprint edited by David C. Brown for the *Essex Inst H Colls* 122 (1986) 207–36. Cf. Mark A. Peterson, “‘Ordinary’ preaching and the interpretation of the Salem witchcraft cases by the Boston clergy,” *ibid.* 129 (1993) 96–97 on 1692 sermons by Willard; Michael Fass, “The use of transference in seventeenth-century Massachusetts,” *Amer Studies* 36 (1995) 65–72, Willard’s listening; Eve LaPlante, *Salem Witch Judge: The Life and Repentance of Samuel Sewall* (NY: Harper One, 2007) 16, 161–62, 198–200, for Willard’s instrumental friendship with Sewall, who publicly repented of the trials; David Harley, “Explaining Salem: Calvinist psychology and the diagnosis of possession,” *Amer H R* 101 (1996) 307–30 for the social-psychological context. A similar attack was pressed privately by Thomas Brattle, “A multitude of errors” (1798, wr. 1692) reprinted in Breslaw, ed., *Witches of the Atlantic World*, where cf. Jane Kamensky, “Words, witches, and women trouble,” 330–36. Hoffer, *Sensory Worlds in Early America* (→ n.58) 117, calls attention to gaps in the trial transcripts, a result of the difficulties that the clerks at Salem must have had as they tried to listen through the noise of crowds of spectators and the sneezing, coughing, and spitting of the witnesses, many of whom had colds, the ague, or worse that winter of 1692. Hoffer also links the sounds and violences of the Indian Wars to evidences adduced for an invisible (spectral) world during the witch trials, pp. 106–32.

93. Willard, *Compleat Body of Divinity*, 644, and Quest. XXXI, Sermon CXV, 432–33. On Willard himself: Seymour Van Dyken, *Samuel Willard, 1640–1707: Preacher of Orthodoxy in an Era of Change* (Grand Rapids: Eerdmans, 1972); Ernest B. Lowrie, *The Shape of the Puritan Mind: The Thought of Samuel Willard* (Yale U, 1974). “Ear cleaning” I borrow from R. Murray Schafer, *Ear Cleaning: Notes for an Experimental Music Course* (BMI: Don Mills, 1967). On Puritan devotion and diaries: Charles E. Hambrick-Stowe, *The Practice of Piety: Puritan Devotional Disciplines in Seventeenth-Century New England* (U North Carolina, 1982) esp. 186–93; Carol Edkins, “Quest for commuity: spiritual autobiographies of eighteenth-century Quaker and Puritan women,” in *Women’s Autobiography*, ed. Estelle C. Jelinek (Indiana U, 1980) 39–70; Daniel Shea, *Spiritual Autobiography in Early America* (U Wisconsin, 1988); Richard Boyd, “Three Generations of Puritan Spiritual Autobiography: Problems of Self-Definition in a Time of Declension,” Ph.D. thesis, UC San Diego, 1985.

94. Catherine Burton, “The Life of Mrs. Catherine Burton, alias Mother Mary Xaviera of the Angels written by her Self in Obedience to the Orders, she received, from her Directors,” manuscript excerpted in *Personal Disclosures: An Anthology of Self-Writings from the Seventeenth Century*, ed. David Booy (Aldershot: Ashgate, 2002) 285–90, q. 288.

95. Glueckel [= Glikl, in Yiddish] of Hameln, *Memoirs*, tr. Marvin Lowenthal (NY: Harper, 1932) 145, 245, 271–73.

96. Anne Halkett, *Memoirs*, excerpted in *Personal Disclosures*, ed. Booy, 183–87, q. 186.

97. Robert Latham and William Matthews, eds., *The Diary of Samuel Pepys* (UC, 1974) VIII, 437–38. Cf. Paul Filmer, “Songtime: sound culture, rhythm, and sociality,” in *The Auditory Culture Reader*, eds. M. Bull and L. Back (Oxford: Berg, 2003) 91–112.

98. David Woodall, “The relationship between science and Scripture in the thought of Robert Boyle,” *Persp on Sci and Christian Faith* 49 (1997) 32–39; James R. Jacob, *Robert Boyle and the English Revolution* (NY: B. Franklin, 1977) 9; Michael Hunter, ed., *Letters and Papers of Robert Boyle* (Bethesda: U Pubs Amer, 1990) Boyle Papers 37: 181r–v, and Hunter’s

Boyle: *Between God and Science* (Yale U, 2009) 46–48, 78–86.

99. MacIntosh, “Robert Boyle,” quoting Boyle’s prefatory letter in *The Devill of Mascon or, a True Relation of the Chiefe Things which an Uncleane Spirit Did, and Said at Mascon in Burgundy in the House of F. Perreaud*, tr. P. Du Moulin (Oxford, 1658); Michael Hunter, *Robert Boyle 1627–1691: Scrupulosity and Science* (Woodbridge: Boydell, 2000) 101, 126 on “Perraud.” For Sagredo, Kircher, and Gericke (later ennobled as von Guericke): Hunt, *Origins in Acoustics*, 112–21, q. 114 from Kircher’s *Musurgia Universalis sive Ars Magna consoni et dissoni* (Rome, 1650) I, 11–13 (= bk. 1, ch. 6) and q. 116 from Gericke’s *Experimenta Nova (ut vocantur) Magdeburgica de vacuo spatio* (Amsterdam, 1672) 91–92 (= bk. 3, ch. 15) and 138–40.

100. Robert Boyle, *New Experiments Physico-Mechanical, Touching the Spring of the Air, and its Effects (Made, for the most part, with a New Pneumatical Engine)*, 2nd ed. (Oxford, 1662) Expt. XXVII, 105–10, q. 106 “strangers,” and p. 8 on the squeak and whistle, which are discussed by Allan Chapman, “England’s Leonardo: Robert Hooke and the art of experiment in Restoration England,” *Proc Royal Inst* 67 (1996) 239–75 at 247–49. For the stammer: Robert Kahr, “Robert Boyle: a Freudian perspective on an eminent scientist,” *Brit J H of Sci* 32 (1999) 277–84. Renaissance alchemists, for whom the act of flawless replication was at once an ambition (the “philosopher’s stone”), a laboratory practice (though disguised or spiritualized), and a professional disgrace (since so few promises were realized or results replicable by others), may also have confronted the problem of experimental noise; surely, and literally, so had the manufacturers of explosives. Nowhere before, however, had acoustical noise been so clearly at the center of conversation among men theorizing about the very process of experimentation.

101. Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton U, 1985) esp. 225–82 on problems of replication; Boyle, *New Experiments*, 107–108; Chapman, “England’s Leonardo,” 246 on ether; MacIntosh, “Robert Boyle,” on the spirit world. Hunt, *Origins in Acoustics*, 121, cautions that “these experiments do *not* prove the inability of a rarefied medium to *transmit* acoustic energy, but only the extreme difficulty of *imparting* any appreciable amount of vibratory energy to such a medium.” Redoing the bell-in-a-jar experiment in 1705, Francis Hauksbee had no more luck creating a perfect vacuum, but he too, listening through a residual shrillness, accepted the experimental logic: “An experiment made at a meeting of the Royal Society, touching the diminution of sound in air rarefy’d,” *Phil Trans Royal Soc* 24 (1705) 1904.

102. Margaret d’Espinasse, *Robert Hooke* (L, 1956) 51–52; Robert Hooke, *Diary*, eds. H. W. Robinson and W. Adams, repr. (L: Taylor & Francis, 1968) q. 9, q. 19 on noise, q. 26 on singing, 27, 29, 54, 99, and also 211 (Jan. 15, 1675/1676), theory of vibration. On high frequencies: Hooke’s “A Curious Dissertation concerning the Causes of the Power and Effects of Music” (ca. 1676), reproduced by Penelope Gouk, “The role of acoustics and music theory in the scientific work of Robert Hooke,” *Annals of Science* 37 (1980) q. 601, q. 602 and 580, 590 on the otoacousticon. On Pepys and flies: Hooke’s *Micrographia* (L, 1665) Obs. XXXVIII, 177, and Pepys, *Diary*, VII, 239 (Aug. 8, 1666), both cited in Chapman, “England’s Leonardo,” 254, 258–59, and 253 on altitude sickness. Chapman also suggests that Hooke had diabetes, for which see Victoria Stagg Elliott, “Possible

connection between diabetes and hearing loss” (Mar. 15, 2004) at www.ama-assn.org/amednews, reporting on a paper by Nancy Vaughn et al. (Daytona Beach, Feb. 2004). Hooke’s bout with smallpox at thirteen had left him physically scarred, but he had been frail all along, and accounts of his health make me bold with a diagnosis of *osteogenesis imperfecta* (“brittle bone” syndrome) which in its mild form, Type I, produces curvature of the spine in adolescence and hearing loss in late teens or early adulthood. Cf. Elizabeth Hait, “Osteogenesis imperfecta,” *Medline PlusMed Ency*, at www.nlm.nih.gov/medlineplus/ency/article/001573.htm and also <http://ghr.nlm.nih.gov/ghr/disease/osteogenesisimperfectatype1>. On Hooke’s insomnia and self-medication, cf. Lucinda M. Beier, “Experience and experiment: Robert Hooke, illness and medicine,” in *Robert Hooke: New Studies*, eds. M. Hunter and S. Schaffer (Woodbridge: Boydell, 1989) 235–52; Lisa Jardine, “Hooke the man: his diary and his health,” in Jim Bennett et al., *London’s Leonardo—The Life and Work of Robert Hooke* (Oxford U, 2003) 163–204; eadem, *The Curious Life of Robert Hooke* (NY: HarperCollins, 2004). Some had already perceived a link between aging, loss of hearing, and tinnitus, as the Cologne city councillor Hermann Weinsberg (1518–1597), who found at the age of sixty that his hearing had begun to fail and he felt “something buzzing and ringing in my head... Yes, as the body grows old with the years, the five senses of man grow old too.” Quoted by Robert Jütte, *A History of the Senses: From Antiquity to Cyberspace*, tr. James Lynn (Camb: Polity, 2005) 13, 115. Vice versa, has anyone studied how we hear people differently as *they* age, and how certain bodily noises are interpreted as willful at one age, involuntary at another?

103. Hooke, “A Curious Dissertation,” q. 603; David Park, *The Fire within the Eye: A Historical Essay on the Nature and Meaning of Light* (Princeton U, 1997) 194–97, q. 205–206, quoting Newton’s account in *Correspondence*, eds. H. W. Turnbull et al. (Camb U, 1959) I, 110, 171; Simon Schaffer, “Glass works: Newton’s prisms and the uses of experiment,” in *The Uses of Experiment*, eds. David Gooding et al. (Camb U, 1989) 67–104.

104. Park, *Fire within the Eye*, 206 n.7; Penelope Gouk, *Music, Science and Natural Magic in Seventeenth-Century England* (Yale U, 1999) ch. 6, esp. 210; eadem, “The role of acoustics,” esp. 589–90; Dear, *Mersenne and the Learning of the Schools*, q. 139 from Mersenne’s *Harmonie universelle*, “Du son,” 2, and cf. Gouk, “The harmonious universe of Athanasius Kircher” (full cite for both, → n.33); Robert Hooke, “A General Scheme, or Idea of the Present State of Natural Philosophy,” *Posthumous Works*, ed. Richard Waller (NY: Johnson Repr., 1969 [1705]) 390, and also 135, “Lectures of light,” on the ear perceiving vibrations too fast for the eye to catch, vibrations that yield tones so shrill “we only call it screeking, and at length it becomes offensive to the Ear” of human beings, but “there may be yet beyond the reach of our Ears infinite shriller and shriller Notes, which may be distinguished by Ears or Organs of Hearing adapted by their lesser Bulks and finer parts,” and indeed such listeners “may have as great variety in the differences of Sounds wholly imperceptible to us as we have within the reach of our Ears.”

105. *OED*, s.v. “auricle,” “ear-drop,” “eavesdrop.” On eavesdropping as a genre of early modern European painting, see David Toop, *Sinister Resonance: The Mediumship of the Listener* (Continuum, 2010) ch. 7; on eavesdropping as a stepping-off point for a theory of listening-in-place: Brandon LaBelle, “Misplace—dropping eaves on ethics,” in *Hearing*

Places: Sound, Place, Time and Culture, eds. Ros Bandt et al. (Newcastle: Cambridge Scholars, 2007) 8–17.

106. Thomas Willis, *Two Discourses concerning The Soul of Brutes*, tr. Samuel Pordage (Gainesville: Scholars' Facsimiles, 1971 [1683, orig. Latin ed. 1672]) 89 *sic* 69–74; von Békésy and Rosenblith, “The early history of hearing” (→ n.37) 734–35 for Willis’s contributions to the neurology and physiology of hearing. Cf. Michael Hawkins, “‘A great and difficult thing’: understanding and explaining the human machine in Restoration England,” *Bodies/Machines*, ed. Iwan R. Morus (Oxford: Berg, 2002) 15–38, who connects Willis’s depiction of volatile, subtle (animal) spirits to his High Church royalism during the English Civil War. Following this logic, Willis’s observations on the capacity of the hard-of-hearing to hear more clearly in the presence of noise would have been welcome news to someone anxious to make sense of a chaotic series of battles and the off-putting enthusiasms of radical reformers and Ranters.

107. Guichard-Joseph Duverney, *A Treatise of the Organ of Hearing*, tr. John Marshall (NY: AMS, 1973 [L, 1737; original French ed., 1683]) 71, 80 on bone conduction, 105–106 on prescriptions, 111 on leakage, 135–37 on tinnitus, 140–41 on pulsing ear, 142 on brain diseases; Békésy and Walter A. Rosenblith, “The early history of hearing” (→ n.37), 740–42; Anita Guerrini, “Duverney’s Skeletons,” *Isis* 94 (Dec. 2003) 577–603. The first (European) book to be fully devoted to otology, Volcher Coiter’s *De Auditus Instrumento* (1572), notably confused bone conduction with air conduction: Douglas Guthrie, “Early text-books of otology,” *JLO* 55 (1940) 109–12. Otoacoustic emissions return in Round Three. On Egyptian otology, J.F. Nunn, *Ancient Egyptian Medicine* (U Oklahoma, 1996) 45–46, 94.

108. Antoine Picon, *Claude Perrault, 1613–1688* (P: Picard, 1988); Claude Perrault, *Essais de physique* (P, 1680) II, 1–3, 66–72, 76, 92, 94–95, and 211, Planche VI; Sébastien de Brossard, *Dict de musique* (Amsterdam: Antique, 1964 [1703]), s.v, “Dissonante”; Thomas Hobbes, *Elements of Philosophy* (L, 1656) I, 490; Joseph Sauveur, *Collected Writings on Musical Acoustics (Paris 1700–1713)*, ed. Rudolf Rasch (Utrecht: Diapason, 1984) editor’s intro., 25–27, Table V, Figure 1, and text “Mémoires 1701: Système général des intervalles des sons,” 99–167, but Narcissus Marsh used “acousticks” to refer to the study of sound twenty years before in “An introductory essay to the doctrine of sounds, containing some proposals for the improvement of acousticks,” *Phil Trans Royal Soc* 14 (1684) 472–88, and the first to identify acoustics as a “distinct discipline” was a student of Kircher’s, Gaspar Schott, in 1657: Gouk, *Music, Science, and Natural Magic*, 107–109. On Charles Perrault: his *Mémoires de ma vie* (P: Macula, 1993) with Picon’s preface, “Un moderne paradoxal,” 1–107; Marc Soriano, *Les Contes de Perrault, culture savante et traditions populaires* (P: Gallimard, 1968); Joan DeJean, *Ancients against Moderns: Culture Wars and the Making of a Fin de Siècle* (U Chicago, 1997) esp. 42–51. Erlmann, *Reason and Resonance* (n.37) 69–110, interestingly situates Claude’s work at the late-17th-century philosophical nexus between liberty and pleasure, soulfulness and «a whole ethics of titillation» (p. 101).

109. For the originals: Charles Perrault, *Histoires ou contes du temps passé, avec des moralités: Contes de ma mère l’Oye* (1697), at www.pitt.edu/~dash/perrault.html, comp. D. L. Ashliman. Picon, “Un moderne paradoxal,” argues that the two brothers, reclaiming

but then “desacralizing” classical traditions in architecture, literature, and theater, were rationalists who anticipated (perhaps precipitated) a “*crise de la notion de solidité*” (p. 94). Cf. Alberto Pérez-Gómez, “Charles-Etienne Briseux: the musical body and the limits of instrumentality in architecture,” in *Body and Building: Essays on the Changing Relation of Body and Architecture*, eds. G. Dobbs and R. Tavernor (MIT, 2002) 164–89 on 18th-century critiques of Claude Perrault’s architectural premises. On modern “noise”: Andrew Aberdein, www.philosophos.com/knowledge_base/archives_16/philosophy_questions_1602.html. I will show how this definition took shape during the 20th century; meanwhile I continue to operate with sound as the overarching category, noise as a judgment rendered upon certain sounds, so that, for this chapter and the next, a tree falling in a forest would always make a sound, but its fall relies upon another being’s senses to make a noise—perhaps another animal’s senses: Douglas G. Richards and R. Haven Wiley, “Reverberation and amplitude fluctuations in the propagation of sound in a forest: implications for animal communications,” *Amer Naturalist* 115 (1980) 381–99. With regard specifically to trees and the attenuation of noise: Donald E. Aylor, “Noise reduction by vegetation and ground,” *JASA* 51 (1972) 197–205, followed up at 411–14.

110. George Berkeley, *An Essay towards a New Theory of Vision* (1732, 1st ed. 1709) in *Works*, eds. A. A. Luce and T. E. Jessop (L, 1949) I, 188–89; idem, *Three Dialogues between Hylas and Philonous* (1713), in *ibid.* II, 181–83; David Berman, *George Berkeley—Idealism and the Man* (Oxford: Clarendon, 1994) esp. 21–42 on Berkeley’s retorts to Locke. As a student, Berkeley had been impressed by *An Essay Concerning Human Understanding* (1690), where Locke used the variety of sounds human and animal as an example (bk. II, ch. 18) of how “the mind may be furnished with distinct *Ideas*, to almost an infinite Number,” and how a composer may silently keep in mind *Ideas* of all the tones for a tune (p. 224 of edition by Peter H. Nidditch [Oxford: Clarendon, 1975]). Cf. David Hume’s use of the example of “a noise as of a door turning upon its hinge” so as to argue that we presume—and must presume—the continuity and constancy of the basic phenomena of daily life: *A Treatise of Human Nature* (1739), II, ch. 31, “Of scepticism with regard to the senses,” and IV, “Of personal identity,” on interrupting noises. For a philosophical demurrer: Casey O’Callaghan, *Sounds* (Oxford U, 2007).

111. Perez Zagorin, *Francis Bacon* (Princeton U, 1998) 115–18; George Mora and Benjamin Kohl, eds., *Witches, Devils, and Doctors in the Renaissance: Johann Weyer, De praestigiis daemonum* (1563), tr. John Shea (Binghamton: Medieval & Renaissance Texts & Studies, 1991) esp. 350–54 on “feigned possession”; Christopher Baxter, “Johann Weyer’s *De Praestigiis Daemonum*: unsystematic psychopathology,” in *The Damned Art*, 53–75; Sydney Anglo, “Reginald Scot’s *Discoverie of Witchcraft*: Scepticism and Sadduceism,” *ibid.*, 106–39; Michel de Montaigne, “On the lame (1588),” *The Essays*, tr. and ed. M. A. Screech (L: Allen Lane, 1991) 1166–69 (= bk. III, ch. 11); Jerome Cardan (= Girolamo Cardano), *The Book of My Life (De Vita Propria Liber)*, tr. Jean Stoner (NY: Dover, 1962 [wr. 1575, pub. 1643]) 192, q. 204–206, 240–47; idem, *De Rerum Varietate* (1551), excerpted in Maxwell-Stuart, ed., *Occult in Early Modern Europe*, q. 34–35, and, on his astrology, 82–83, 86–89 (Maxwell-Stuart translates “puff of steam” as “an overheated imagination,” p. 33). On the decline of witchcraft / prosecutions, and their survivals: Ankarloo and Clark, eds., *Witchcraft and*

Magic in Europe (→ n.72).

112. Barbara Shapiro, *Probability and Certainty in Seventeenth-Century England* (Princeton U, 1983); eadem, 'Beyond Reasonable Doubt' and 'Probable Cause': *Historical Perspectives on the Anglo-American Law of Evidence* (UC, 1991); eadem, *A Culture of Fact: England 1550–1700* (Cornell U, 2000). On new usages for "buzz," *OED*. On Lilburne, Theodore Verax (= Clement Walker), *The Triall, of Lieut. Collonell John Lilburne By an extraordinary or special Commission, of Oyear and Terminer, at the Guild-hall of London, the 24, 25, 26. of Octob. 1649. Being as exactly pen'd and taken in short hand, as it was possible to be done in such a croud and noise* (Southwark, 1649); Pauline Gregg, *Free Born John: The Biography of John Lilburne* (L: Phoenix, 2001) esp. 293–302, 324–35; John Lilburne, *The Resurrection of John Lilburne, Now a Prisoner in Dover-Castle* (L, 1656) 2–3, 7–8. On the "shriekings, yellings, howlings, and roarings" of early Quakers: Michele L. Tarter, "Quaking in the light: the politics of Quaker women's corporeal prophecy in the 17th-century transatlantic world," in *A Centre of Wonders: The Body in Early America*, eds. J. M. Lindman and M. L. Tarter (Cornell U, 2001) 145–62, q. 150; Kenneth L. Carroll, "Singing in the spirit in early Quakerism," *Quaker H* 73,1 (1984) 1–13.

113. Jonathan Swift, *A Tale of a Tub To which is added The Battle of the Books and the Mechanical Operation of the Spirit*, eds. A. C. Guthkelch and D. N. Smith (Oxford, 1920 [1704 for *Tub*, wr. 1694–1697]) sect. XI, 201–202, and 201 n.3, citing *The Character of a Roundhead* (1641): "What Creature's this with his short hairs, / His little band and huge long ears?" A complete history of ears might begin, as Juan Luis Vives had it in his *Fabula de homine* (1518), with Mercury explaining to Juno the virtue of ears, which could "receive sound from all directions": Anthony J. Cascardi, *The Limits of Illusion: A Critical Study of Calderón* (Camb U, 1984) 1–2, and cf. his analysis of Calderón's masque, *Eco y Narciso*, 130–41. Or one might hunt the stags, moles, and boars with whom hearing was linked in bestiaries and books of emblems: Louise Vinge, *The Five Senses* (→ n.7) 53–55; Carl Nordenfalk, "The five senses in late medieval and Renaissance art," *J Warburg & Courtauld Inst* 48 (1985) 1–22, noting (p. 7) a shift ca. 1500 from male to female in the gendering of the senses; Elizabeth Sears, "Sensory perception and its metaphors in the time of Richard of Fournival," in *Medicine and the Five Senses*, eds. W. Bynum and R. Porter (Camb U, 1993) 17–39.

114. Robert Burton, *The Anatomy of Melancholy* (Phila, 1836 [1621–1638]) I,220, 288, 295, 297, 311, 314 (= pt. I, sect. 2, mem. 4, sub. 3; pt. I, sect. 3, mems. 1–3); Chris Philo, "The 'chaotic spaces' of medieval madness," in *Nature and Society in Historical Context*, eds. Mikulaš Teich et al. (Camb U, 1997) 51–90, q. 62 on Soranus; Carlo Ginzburg, *The Cheese and the Worms: The Cosmos of a Sixteenth-Century Miller*, trs. J. Tedeschi and A. Tedeschi (Harmondsworth: Penguin, 1982) on inquisitorial vacillations between insanity and heresy; Michel Foucault, *Histoire de la folie à l'âge classique* (P: Gallimard, 1972) esp. 106–108, 153–55, 250–56, 369–372 on language and the insane. Cf. H. C. Erik Midelfort, *A History of Madness in Sixteenth-Century Germany* (Stanford U, 1999) ch. 5 on "fools" and 376–77 on the rise of melancholy from the 1590s to the 1630s.

115. Philo, "The 'chaotic spaces,'" 69–70; Andrew Scull, *Most Solitary of Afflictions: Madness and Society in Britain, 1700–1900* (Yale U, 1993); Michael Cooper, *A More Beautiful*

City: Robert Hooke and the Rebuilding of London after the Great Fire (Stroud: Sutton, 2003) 102–105 on the fire, 192–95 on Bedlam; Michael MacDonald, *Mystical Bedlam: Madness, Anxiety, and Healing in Seventeenth-Century England* (Camb U, 1981) 14 for Napier's portrait. In astrological medicine, the right ear lay under the influence of Saturn, planet of melancholy.

116. Donald Lupton, *London and the Countrey Carbonadoed* (L, 1632), quoted in Patricia Allderidge, "Bedlam: fact or fantasy?" in *The Anatomy of Madness, II*, eds. Roy Porter and Michael Shepherd (L: Tavistock, 1985) 17–33, at 30, with much on visitors' numbers and the treatment of the inmates; Thomas Fitzgerald, "Bedlam" (1733) in Roy Porter, ed., *The Faber Book of Madness* (L, 1991) 214; Jonathan Andrews and Andrew Scull, *Undertaker of the Mind: John Monro and Mad-Doctoring in Eighteenth-Century England* (UC, 2001) q. 21 from *The World* (June 1753), q. 35 for Watch House and dictum on quiet, 53 on visitor policies, q. 148 from Eliza Haywood's *The Distress'd Orphan, or Love in a Madhouse* (1726).

117. MacDonald, *Mystical Bedlam*, 117, the suicidal and the "tempted"; idem, "The secularization of suicide in England 1660–1800," *Past & Present* 119 (1988) 158–70; idem, "The medicalization of suicide in England: laymen, physicians and cultural change, 1500–1870," in *Framing Disease*, eds. C. F. Rosenberg and J. Golden (Rutgers U, 1992) 85–103; Henry Summerson, "Suicide and the fear of the gallows," *J Legal H* 21 (2000) 49–56. Beyond England: H. C. Erik Midelfort, "Johann Weyer and the transformation of the insanity defense," in *The German People and the Reformation*, ed. R. Po-Chia Hsia (Cornell U, 1988) 234–61; Jeffrey R. Watt, ed., *From Sin to Insanity: Suicide in Early Modern Europe* (Cornell U, 2004), esp. Machiel Bosman on "The judicial treatment of suicide in Amsterdam," 9–24, and Jeffrey Merrick on "Suicide in Paris, 1775," 158–69.

118. David Buissert, *The Mapmakers' Quest: Depicting New Worlds in Renaissance Europe* (Oxford U, 2003) esp. 152–75; *OED*, s.v. "chimera"; Lorraine Daston and Katharine Park, *Wonders and the Order of Nature, 1150–1750* (NY: Zone, 1998) on monsters, 318–20 for Le Brun, as also Lydia Beauvais et al., *Charles Le Brun 1619–1690* (P: Réunion des musées nationaux, 2000); Michael Hagner, "Enlightened monsters," *The Sciences in Enlightened Europe*, eds. William Clark et al. (U Chicago, 1999) 175–217.

119. Peter Marshall, "'The map of God's word': geographies of the afterlife in Tudor and early Stuart England," in *The Place of the Dead*, eds. Gordon and Marshall, 110–30; Peter Biller, *The Measure of Multitudes: Population in Medieval Thought* (Oxford U, 2000) 415, relating the size of Dante's Hell (twenty-two miles in circumference) to the crowds in Rome during the Jubilee of 1300; D. P. Walker, *The Decline of Hell* (U Chicago, 1964) 39 on Swinden (correcting Marshall); Jacques Dupâquier and Michel Dupâquier, *Histoire de la démographie* (P: Perrin, 1985) esp. chs. 4–5. For much here, I draw upon Piero Camporesi, *Fear of Hell: Images of Damnation and Salvation in Early Modern Europe*, tr. Lucinda Byatt (Camb: Polity, 1991) q. 9 "Mustard," 9–11 on Dante, 31 on Lessio, 54–62 on crowding and ears, q. 59 "martyred," and 100–107 on locating Hell in the sun.

120. Jacques Revel, "The uses of civility," in *Passions of the Renaissance*, ed. Chartier (→n.50) 167–205, esp. 168–73; Norbert Elias, *The Civilizing Process, I: The History of Manners*, tr. Edmund Jephcott (NY: Pantheon, 1978) 54–59; Desiderius Erasmus, *A Lytell Booke of Good Manners for Chyldren*, tr. Robert Whittinton (L, 1534); idem, "On Good Manners

for Boys,” tr. Brian McGregor, in *Literary and Educational Writings, III*, ed. J. K. Sowards (U Toronto, 1978) 269–89, 274 on art, but Erasmus does caution (p. 275) that “The mouth should be neither tightset, which denotes someone afraid of inhaling someone else’s breath, nor gaping open like an idiot’s.” Leonardo da Vinci had already observed that “As to Laughing and Crying, the Motions they produce in the Face, are very much alike, and the Characters they impress on the Mouth, Cheeks, and Eye-lids, not to be distinguished,” though in battle scenes the vanquished must be painted with “teeth unclenched, and in a Posture of shrieking and lamentation”: *A Treatise of Painting* (L, 1721) 56, 107.

121. Helen Adolf, “On medieval laughter,” *Speculum* 22 (1947) 251–53; Irvn M. Resnick, “*Risus monasticus*: laughter and medieval monastic culture,” *R Bénédictine* 97 (1987) 90–100, q. 95 from *Regula coenobialis* (ca. 600) of St. Columban; Jacques Le Goff, “Le Rire dans les règles monastiques du haut moyen âge,” *Haut Moyen Age*, ed. Michel Sot (P: Publidix, 1990) 92–103; Jeannine Horowitz and Sophia Menache, *L’Humour en chaire: le rire dans l’église médiévale* (Geneva: Labor et Fides, 1994) 74; James Dauphiné, “Le Rire de Béatrice,” *Le Rire au moyen âge dans la littérature et dans les arts*, eds. T. Bouché and H. Charpentier (Presses U de Bordeaux, 1990) 137–45; Marjorie O. Boyle, “Gracious laughter: Marsilio Ficino’s anthropology,” *Renaissance Q* 52 (1999) 712–41, and cf. David Heyd, “The place of laughter in Hobbes’s theory of emotions,” *JH Ideas* 43 (1982) 285–95; M. A. Screech and Ruth Calder, “Some Renaissance attitudes to laughter,” *Humanism in France*, ed. A. H. T. Levi (Manchester U, 1970) 216–28; Dominique Bertrand, *Dire le rire à l’âge classique* (U de Provence, 1995); Laurent Joubert, *Treatise on Laughter*, tr. Gregory David de Rocher (U Alabama, 1980 [1560]) q. 39, 50, q. 57, 64, q. 73, q. 87, 98, 126–28; Vera C. Machline, “The contribution of Laurent Joubert’s *Traité du ris* to the sixteenth-century physiology of laughter,” *Reading the Book of Nature*, eds. A. G. Debus and M. T. Walton (Kirksville: Sixteenth-Century J, 1998) 251–64; John Morreal, *Taking Laughter Seriously* (SUNY, 1982) ch. 2 on incongruity; Daniel Ménager, *La Renaissance et le rire* (P: PUF, 1995) esp. 27 on “dying of laughter,” ch. 2 on ambiguity, and cf. Madeleine Lazard, “La thérapeutique par le rire dans le médecine du XVIe siècle,” *Littérature et politique*, ed. Max Milner (Presses U de Vincennes, 1989) 13–28. The Christian derogation of laughter had roots in Clement of Alexandria’s 2nd-century *Pedagogus* (The Instructor), in his *Writings*, tr. William Wilson (Edinburgh, 1884) I, 219–21, laughter reducing humanity to animality, as did hiccupping, snorting, snoring, yawning, whistling, chirruping, and “loudness of utterance” (pp. 222–24, 228–29, 242–43).

122. *OED*, s.v. “ear-pick,” “earwig”; Julie Chao, “Aural sex? It’s just everyday ear cleaning in Chengdu,” *San Francisco Chronicle* (Dec. 8, 2000) C-3; Hooke, *Diary* for Aug. 11, 1673, “Dr. Carew syringed my ears, fetch out a core but removed not the noise”; William F. Lyon, “Earwigs,” Ohio State U Extension Fact Sheet, 1994(?) at www.ferdas.com/assets/attachments/file/earwigs; John D. C. Bennett and John R. Young, *Offbeat Otolaryngology* (NY: Thieme, 2001) 44–46, noting however that cockroaches and sheep ticks may on occasion enter the ear; Thomas Buchanan, *Physiological Illustrations of the Organ of Hearing, More Particularly of the Secretion of Cerumen and Its Effects* (L, 1828).

123. John Angier, *An Help to Better Hearts, for Better Times* (L, 1647) 84–85; John Barnard, *The Nature and Danger of Sinful Mirth*, printed as pp. 89–129 of his *Sin Testify’d*

against by Heaven (B, 1727, i.e. 1728) q. 94. On Puritan ambivalence toward mirth: Bruce C. Daniels, *Puritans at Play: Leisure and Recreation in Colonial New England* (NY: St. Martin's, 1995) chs. 1 and 6. Poorly configured for clear reception of a single (priestly) voice, Catholic cathedrals during services were noisy: worshippers chatted, babies cried, barking dogs wandered the aisles, and pilgrims prayed aloud in side chapels. Etiquettes of religious silence were maintained mostly in monasteries (for which consult John T. McNeill and Helena M. Garner, trs., *Medieval Handbooks of Penance* [NY, 1965] 260–64), not in churches where, prior to the Council of Trent, confession was made without booths.

124. Mikhail Bakhtin, "Rabelais in the history of laughter," in *Rabelais and His World*, tr. Hélène Iswolsky (Indiana U, 1984) ch. 1; Jacques Le Goff, "Rire au moyen âge," *Cahiers du centre de recherches historiques* 3 (1989) 1–14, at 13; Johan Verberckmoes, *Laughter, Jest-books and Society in the Spanish Netherlands* (NY: St. Martin's, 1999); Michael Bristol, *Carnival and Theater: Plebeian Culture and the Structures of Authority in Renaissance England* (NY: Methuen, 1985) 127–28 on Sydney, 138 on laughter as the "refusal" of the plebes; Dominique Bertrand, "Bruit et silence: la voix rieuse au XVIIe siècle," *Littératures classiques* 12 (1990) 101–17; Keith Thomas, "The place of laughter in Tudor and Stuart England," *Times Lit Supplement* (Jan. 21, 1977) 77. Barry Sanders exfoliates Bakhtin in *Sudden Glory: Laughter as Subversive History* (B: Beacon, 1995); contrast Georges Bataille, "Un-knowing: laughter and tears," *October* 36 (Spring 1986) 89–102. On the depiction of sound and noise in European art: Robin Maconie, *The Second Sense: Language, Music and Hearing* (Lanham, MD: Scarecrow Press, 2002) ch. 8; Toop, *Sinister Resonance* (→ n.105) ch. 7.

125. *A Dissertation Upon Laughter* (L, 1741) in *The Repository II* (L, 1783) 10, titter; J.-B. Morvan de Bellegarde, *Reflexions upon Ridicule; or, What it is that makes a Man ridiculous; and the Means to avoid it* (L, 1706 [1696]) 308; Philautus (= Nathaniel Lancaster), *The Pretty Gentleman: or, Softness of Manners Vindicated From the False Ridicule exhibited under the Character of William Fribble, Esq.* (L, 1747) 19, sarcasm about the tempered "half-laugh"; William Whitehead, *An Essay on Ridicule* (L, 1753) 69, and cf. Adolf von Knigge, *Practical Philosophy of Social Life*, tr. Peter Will (Lansingburgh, 1805 [1788]) 14, 18–19, 27; Daniel Wickberg, *The Senses of Humor: Self and Laughter in Modern America* (Cornell U, 1998) 48–59. See Norbert Elias, *The Civilizing Process, II: Power and Civility*, tr. Edmund Jephcott (NY: Pantheon, 1982) 229–99 on self-monitoring as crucial to the new civility. Robert Muchembled, *L'Invention de l'homme moderne: sensibilités, moeurs et comportements collectifs sous l'Ancien Régime* (P: Fayard, 1988) 136–73, uses stronger language—"la criminalisation des moeurs"—to argue that strenuous policing was integral to the new civility. Neither scholar links this monitoring to cultural habits of spiritual scrutiny, and neither attends as closely to the expressiveness of body language as does Anna Bryson, "The rhetoric of status: gesture, demeanour, and the image of the gentleman in 16th- and 17th-century England," in *Renaissance Bodies*, eds. L. Gent and N. Llewellyn (L: Reaktion, 1990) 136–53.

126. *A Dissertation Upon Laughter*, q. 10, horse laugh; *Pasquil's Jests* (L, 1650?), quoted in Margaret Spufford, *Small Books and Pleasant Histories: Popular Fiction and its Readership in Seventeenth-Century England* (L: Methuen, 1981) 53, modernized; Jim Dawson, *Who Cut the Cheese? A Cultural History of the Fart* (Berkeley: Ten Speed, 1999) 1–4, 10 on speed, 40–42 on Greek and Roman sources; Gregory de Rocher, *Rabelais' Laughers and Joubert's*

Traité du ris (U Alabama, 1979) q. 57; Meredith P. Lillich, *Rainbow Like an Emerald: Stained Glass in Lorraine in the Thirteenth and Early Fourteenth Centuries* (Penn State U, 1991) q. 55; Emmanuel Le Roy Ladurie, *Carnival in Romans*, tr. Mary Feevey (NY: Braziller, 1979) 99, 117, 238; Axtell, *Beyond 1492* (→ n.58), 175-76.

127. J. Edward Berk et al., *Gastrointestinal Gas* (NY: NY Acad of Sci, 1968) esp. L. S. Gall, "The role of intestinal flora in gas formation," 27-29, F.R. Steggerda, "Gastrointestinal gas following food consumption," 56-59, and James L.A. Roth, "The symptom patterns of gaseousness," 110-11, but lacking a discussion of gaseousness from lactose intolerance; Alain Corbin, *The Foul and the Fragrant: Odor and the French Social Imagination*, tr. Miriam L. Kochan (Harvard U, 1988); Peter Furze, *Tailwinds: The Lore and Language of Fizzles, Farts and Toots* (L: O'Mara, 1998) 36, 51, 56-57, 81, 89, 164, 166-67; John Harington, tr., *The Englishman's Doctor. Or, The School of Salerne (Regimen Sanitatis Salernitatum)* repr. (NY: Hoeber, 1920 [L, 1608]) 79; Joannes Fienus (= Jean Feyens), *Newe and Needful Treatise of Spirits and Wind Offending Man's Body*, tr. William Rowland (L, 1668 [1592]) 17-29, q. 17 from Cicero on fart and belch—and since *bombus* referred also to rumblings in the ears, Feyens had a similar nosology for tinnital sounds; Dawson, *Who Cut the Cheese?*, q. 1, Suckling's "Loving and Beloved," and 11 on oligosaccharides; Lucas Gracián Dantisco, *Narcissus; or, the Young Man's Entertaining Mirror*, tr. Charles Wiseman (L, 1778) 15—a loose translation of the 1603 *Galateo Español*, based on *Galateo* by Giovanni Della Casa (1503-1556), who in "On Good Manners for Boys" (→ n.120), 277-78, argued that "it is no part of good manners to bring illness upon yourself while striving to appear 'polite,'" so if unable to withdraw from company, one should fart but mask the sound with a cough. For "fizzle": *OED* (1598 a quiet fart, 1739 a verb).

128. Jacob de Gheyn, *The Exercise of Armes*, ed. Bas Kist (Mineola: Dover, 1999 [1607]) 4, 48-49, and cf. William H. McNeill, *Keeping Together in Time: Dance and Drill in Human History* (Harvard U, 1995) 128-32; Elias, *History of Manners*, 130, Erasmus on farts and coughing; Lisa Wilson, *Ye Heart of a Man: the Domestic Life of Men in Colonial New England* (Yale U, 1999) q. 95 modernized from Jacob Eliot diary, 1762-64; C.-F.-X. Mercier de Compiègne, *Éloge du Pet* (P: Livre d'histoire, 1999 [1798]) esp. 7, 27-28, 41, 112; Paul Freedman, *Images of the Medieval Peasant* (Stanford U, 1999) 152-53; Emile Zola, *La Terre* (1887), excerpted in Eric S. Rabkin and Eugene M. Silverman, *It's a Gas: A Study of Flatulence* (Riverside: Xenos, 1991) q. 136. Farting, which continues to play a role in low comedy, was for a while elevated into light opera by the virtuoso Joseph Pujol: Jean Nohain and François Caradec, *Le Pétomane, 1857-1945* (P: Pauvert, 1967). Cf. also Peter Armitage, "Religious ideology among the Innu of Eastern Quebec and Labrador," *Religiologiques* 6 (Autumn 1992) not paginated, on the powers and presence of a "spirit of the anus," Matshishkapeu, who is understood to be both a figure of great hilarity and an imposing "Big Boss."

129. Cf. Elias, *History of Manners*, 51-84; Michael Curtin, "A question of manners: status and gender in etiquette and courtesy," *J Modern H* 57 (1985) 395-423. Elias observed a progression from courtesy to civility to etiquette to mere manners as rules for conduct began to feel more "natural" and less in need of a sustaining aristocratic ethic. Curtin refined this observation in the English context, arguing that Renaissance manners were

supposed to affirm a moral vision about how to live nobly, and that as manners began to be promoted simply as an expedient toward social integration or economic advancement, they lost their moral anchorage and philosophical bearing. Both men imply that this fall from grace put manners into the hands of women, traditional arbiters of minutiae. I do not adhere to their distinctions or the direction of their argument, preferring Muchembled, *L'Invention de l'homme moderne*, 135-290, and taking into account Richard Sennett, *The Fall of Public Man: On the Social Psychology of Capitalism* (NY: Vintage, 1978) pt. II.

130. Samuel Smithson, *The Figure of Nine* (1662), in *Samuel Pepys' Penny Merriments*, ed. Roger Thompson (NY: Columbia U, 1977) I, 185; Herman Pleij, *Dreaming of Cockaigne: Medieval Fantasies of the Perfect Life*, tr. Diane Webb (NY: Columbia, 2001) 42, 204-205; Josiah Dare, *Counsellor Manners: His Last Legacy to his Son* (NY: Coward McCann, 1929 [1672]) 16, 20, 50, 53; Francis Hawkins, tr., *Youths Behavior, or Decency in Conversation amongst Men* (L, 1651) 29, 30, 36, 37; Gracián Dantisco, *Narcissus*, 16.

131. Gracián Dantisco, *Narcissus*, 18 on interruption; Claude-Nicolas Le Cat, *Traité des sensations et des passions en général. III. La théorie de l'ouïe* (P, 1768) 2, on centrality; Jean Baptiste de La Salle, *Les Règles de la bienséance et de la civilité chrétienne* (Rouen, 1729) 35 on nose-blowing, cited in Elias, *History of Manners*, 155; Carolyn J. Pouncy, tr. and ed., *The Domostroi: Rules for Russian Households in the Time of Ivan the Terrible* (Cornell U, 1994 [1550s]) 134-35.

132. D. P. Walker, *The Decline of Hell: Seventeenth-Century Discussions of Eternal Torment* (L: Routledge, 1964) throughout, 224ff. on Jane Lead; St. Ignatius of Loyola, *Spiritual Exercises*, tr. Elder Mullan (NY, 1914 [1548]) 45-46; Steggle, "Paradise Lost and the acoustics of Hell" (→ n.66); Anne Conway, *The Principles of the Most Ancient and Modern Philosophy*, trs. and eds. T. Corse and A. Coudert (Camb U, 1996 [1690]) x-xi, xxvi on headaches, q. 37, q. 43. On "Pandaemonium": *Paradise Lost*, bk. X, 423ff., and contrast Richard Bovet, *Pandaemonium, or the Devil's Cloyster*, ed. Montague Summers (Aldington, 1951 [1684]) 100, thrusting Milton's term back into a world of poltergeists and invoking a Reverend Toogood as "Earwitness of the most dreadful, and accustomed noises" in the house of Peter Pain. Milton's neologism, "pandaemonium," would henceforth be associated with a noisy chaos. Earlier, in his *Psychozoia Platonica* of 1642, the Platonist Henry More used "Pandaemoniothen" to refer to false passions inspired by the devil: Geoffrey Bullough, ed., *Philosophical Poems of Henry More* (Manchester U, 1931) 219 (= canto 3, l. 108).

133. Walker, *Decline of Hell*; Sheila P. Bayne, *Tears and Weeping: An Aspect of Emotional Climate Reflected in Seventeenth-Century French Literature* (Tübingen: Narr, 1981) esp. 56 on the "narcissistic enjoyment of mental images of oneself in tears"; Arlette Farge, *Fragile Lives: Violence, Power, and Solidarity in Eighteenth-Century Paris*, tr. Carol Shelton (Harvard U, 1993) 186, crowds weeping at executions; Margaret Cavendish, *A True Relation of My Birth, Breeding, and Life* (1656), excerpted in Booy, *Personal Disclosures* (→ n.94) 254; Anne Bradstreet, "By Night when Others Soundly Slept," *The Tenth Muse* (1650), in *Complete Works*, eds. J. R. McElrath, Jr., and A. P. Robb (B: Twayne, 1981) 220; Jeffrey A. Kottler, *The Language of Tears* (San Francisco: Jossey-Bass, 1996) 132, limbic system; Donald Greene, "Latitudinarianism and sensibility: the genealogy of the 'Man of Feeling' reconsidered," *Modern Philology* 75 (1977) 159-83; Anne Vincent-Buffault, *The History of Tears*, tr. Teresa

Bridgeman (NY: St. Martin's, 1991) 3–25.

134. Rousseau's "Essai sur l'origine des langues" remained unpublished until his *Oeuvres posthumes* (1781); Daniel Banda presents it online as printed in *Oeuvres*, IV, ed. A. Belin (P, 1817): www.uqac.quebec.ca/zone30/Classiques_des_sciences_sociales/classiques.I also use *Collected Writings of Rousseau: VII: Essay on the Origin of Languages and Writings Related to Music*, tr. and ed. John T. Scott (Hanover: U Press New England, 1998) 291–92. See Vincent-Buffault, *History of Tears*, 39, 46–47 on Rousseau and *Émile*.

135. Frank Harrison, ed., *Time, Place and Music: An Anthology of Ethnomusicological Observation, c. 1550–1800* (Amsterdam: Frits Knuf, 1973) in order: 53, Charles de Rochefort (African slaves, 1658); 65, Adam Olearius (Isfahan, 1631); 90, Lionel Wafer (Darrien, 1681); 38, Juan de Torquemada (Mexico, 1615); 74, John Scheffer (Lapland, 1673); 88, Simon de la Loubère (Thailand, 1687–1688); 56, de Rochefort; 19, Jean de Léry (Brazil, 1556–1559); 63, Olearius; 95, Jerome Merolla da Sorrento (Songo, 1682); 163, Jean-Baptiste Du Halde (China, 1735); 51, reports from João Nunes Barreto and André de Oviedo (Ethiopia, 1615). For the vicar, who quotes equally sour predecessors: Arthur Bedford, *The Great Abuse of Music* (L, 1711) q. 55 Cyril, 184 quavers, q. 206–207 martyrs, q. 209 jargon, q. 203 rattle. On Rousseau: Scott's intro to *Collected Writings: VII*, xxi–xxviii.

136. Rousseau, "Essay on the origin of languages," q. 292, 294, 318, 321, q. 323–324; idem, *Confessions* (L, 1903 [wr. 1766–1770]) bk. VI, §6–7 on hearing loss and tinnitus. Cf. Jacques Derrida's analysis of the essay's problematic contradictions in *Of Grammatology*, tr. Gayatri C. Spivak (Johns Hopkins U, 1998) 165–268.

137. Rousseau, "Essay on the origin of languages," q. 323, and 324 on tarantism, for early episodes of which see Justus F. K. Hecker, *The Dancing Mania in the Middle Ages*, tr. B. G. Babington (NY: Franklin, 1970 [1885]), associated as much with northern Europe and laughter as with the south and dancing; Jean F. Russell, "Tarantism," *Med H* 23 (1979) 404–25; David Gentilcore, "Ritual illness and music therapy: views of tarantism in the Kingdom of Naples," in *Music as Medicine: The History of Music Therapy Since Antiquity*, ed. Peregrine Horden (Aldershot: Ashgate, 2000) 255–72. On the neurotoxic venom of the European black widow spider as a culprit, see "The tarantula—poison spider or a case of mistaken identity?" *Adverse Drug Reactions and Toxicology Rs* 15,4 (1996) 199–202; P. Escoubas and L. Rash, "Tarantulas: eight-legged pharmacists and combinatorial chemists," *Toxicon* 43 (2004) 555–74. Large tarantulas make a hissing or whistling noise by rubbing their leg bristles.

138. Beverly Moon, "Tears," *Ency of Religion* (NY: Macmillan, 1987) XIV, 360–61; Louis Petit de Bachaumont, *Mémoires secrets* (L, 1777) IV, q. 65, 323 for the play, Oct. 22, 1769; Rousseau, *Discourse on the Origins of Inequality*, eds. R. D. Masters and C. Kelly, trs. Judith R. Bush et al., in *Collected Writings* (1990 [1755]) III, q. 31. Rousseau repeated the phrase in *Julie ou la nouvelle Héloïse* (1761): "Je crois déjà sentir le cri de la nature émouvoir mes entrailles," and it soon entered into general circulation, as in an obstetrical work by P. F. Nicolas, *Le Cri de la nature, en faveur des enfants nouveaux nés* (Grenoble, 1775). Cf. Ronald P. Bermingham, "Le Cri de la nature et la nature du cri," in *Études sur les Discours de Rousseau*, ed. Jean Terrasse (Ottawa: Assoc. nord-américaine des études J.-J. Rousseau, 1988) 179–93, who puts Rousseau's notions of noise and *cri* in the context of his

feud with Rameau, on whom cf. Thomas Christensen, *Rameau and Musical Thought in the Enlightenment* (Camb U, 1993). On the earthquake, possibly a magnitude 9: Jan T. Kozak and Charles D. James, “Historical depiction of the 1755 Lisbon earthquake,” Natl Information Service for Earthquake Engineering, at <http://nisee.berkeley.edu/lisbon>; Charles B. Brooks, *Disaster at Lisbon: The Great Earthquake of 1755* (Long Beach: Shantong Langley, 1994) 168–87 for the many aftershocks, literal and figurative.

139. Alexander Hamilton, *Gentleman’s Progress: The Itinerarium of Dr. Alexander Hamilton, 1744*, ed. Carl Bridenbaugh (Westport: Greenwood, 1973) 25, 63–64, 69, 84, 93, 144, 171, 195, and 98, 139 on Capt. Noise; [idem], *Records of the Tuesday Club of Annapolis, 1745–56*, ed. Elaine G. Breslaw (U Illinois, 1988) 385; David S. Shields, “The Tuesday Club writings and the literature of sociability,” *Early Amer Lit* 26 (1991) 276–90. Cf. Brian Cowan, “What was masculine about the public sphere? Gender and the coffeehouse milieu in post-Restoration England,” *H Workshop J* 51 (2000) 127–57 on whether all this noise was men’s noise. For Bradstreet’s “Here follow some verses upon the burning of our house, July 10th, 1666,” see *Complete Poems*, 236, my quote marks.

140. John Evelyn, *Diary* for Sept. 3, 1666, quoted in Adrian Tinniswood, *By Permission of Heaven: The True Story of the Great Fire of London* (NY: Penguin, 2004) 72; Hooke, *Diary*, 393–95, 430, 445; idem, *Posthumous Works*, xxv on Babel. For Dee, see next notes.

141. John Dee, *A True & Faithful Relation of what passed for many Yeers Between Dr. John Dee . . . and Some Spirits* (L, 1659) q. 3, q. 19, q. 27, 64ff. on the tables, 83–86, 176–79; Nicholas H. Clulee, *John Dee’s Natural Philosophy* (L: Routledge, 1988) 88–92, 203–30, refined by Deborah E. Harkness, *John Dee’s Conversations with Angels: Cabala, Alchemy, and the End of Nature* (Camb U, 1999) 39, 41, 76–84, 156–71; Peter J. French, *John Dee: The World of an Elizabethan Magus* (L: Routledge and Kegan Paul, 1972) for context.

142. Hooke, “Of Dr. Dee’s *Book of Spirits*,” *Posthumous Works*, 203–208, (mispaginated) 202, 209; Hooke, *Diary*, 393–95, 430, 445, and cf. Vivian Salmon, *The Study of Language in Seventeenth-Century England* (Amsterdam: Benjamins, 1979) esp. 193–95.

143. Meric Casaubon, “Preface,” *True and Faithful Relation* (sig. G4), had earlier noted Dee’s interest in Trithemius. Benjamin Woolley, *The Queen’s Conjuror: The Life and Magic of Dr. Dee* (NY: HarperCollins, 2001) is among the most recent to claim that Dee was a spy. On communication: Peters, *Speaking into the Air* (→ n.50) 77–89, q. 85 from Locke’s *Essay Concerning Human Understanding* (L, 1690) 3.9.6. Cf. Murray Cohen, *Sensible Words: Linguistic Practice in England, 1640–1785* (Johns Hopkins U, 1977) ch. 2, on the late-1600s shift from assuming that language reflected nature to arguing that language reflected the structure of the mind. On the competing ideals of sincerity and brilliance in language: Matthew Lauzon, *Signs of Light: French and British Theories of Linguistic Communication, 1648–1789* (Cornell U, 2010). On the number of universal language projects: Umberto Eco, *The Search for the Perfect Language*, tr. James Fentress (Oxford: Blackwell, 1995) 1–2, relying on Arno Borst, *Der Turnbau von Babel*, 6 vols. (Stuttgart, 1957–1963).

144. Hand signs: Jonathan Rée, *I See A Voice: Deafness, Language, and the Senses—A Philosophical History* (NY: Holt, 1999) 122–26, 131–37. Lord’s Prayer: John Chamberlayne, *Oratio dominica in diversas omnium fere gentium linguas versa . . .* (Amsterdam, 1715). Dictionaries: Robert L. Collison, *A History of Foreign-Language Dictionaries* (L: Deutsch, 1982)

75-76, 85-88, 93; Sidney I. Landau, *Dictionaries: The Art and Craft of Lexicography* (Camb U, 1984) 43-44, slang. Pre-Babel: Ingrid D. Rowland, *Ecstatic Journey: Athanasius Kircher in Baroque Rome* (U Chicago Lib, 2000) 20, 27, 78, 85ff. Mathematics: Hans Burkhardt, "The Leibnizian *Characteristica Universalis* as link between grammar and logic," in *Speculative Grammar, Universal Grammar, and Philosophical Analysis of Language*, eds. D. Buzzetti and M. Ferriani (Amsterdam: Benjamins, 1987) 43-64; James J. Bono, "Beyond Babel: Mersenne, Descartes, language, and the revolt against magic," *The Word of God and the Languages of Man: Interpreting Nature in Early Modern Science and Medicine* (U Wisconsin, 1995) 1,247-71. Characters: Barbara J. Shapiro, *John Wilkins, 1614-1672* (UC, 1969); Tony Davies, "The Ark in flames: science, language and education in seventeenth-century England," in *The Figural and the Literal: Problems of Language in the History of Science and Philosophy, 1630-1800*, eds. A. E. Benjamin et al. (Manchester U, 1987) 83-102. Comenius: James Knowlson, *Universal Language Schemes in England and France, 1600-1800* (U Toronto, 1975) 10, quoting his *Via Lucis*. Cf. William Wotton, *A Discourse concerning the Confusion of Languages at Babel* (L, 1730 [1715]) 68, arguing in response to Chamberlayne that the "Formation of new Languages" was more miraculous than any misunderstandings resulting from differences among languages. Royal Society: Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (U Chicago, 1994).

145. Georges Bataille, "The history of eroticism," *The Accursed Share: II and III*, tr. Robert Hurley (NY: Zone, 1993) 121-91; Ruth Mazo Karras, "Lecherous Songys: medieval sexuality in word and deed," in *Obscenity: Social Control and Artistic Creation in the European Middle Ages*, ed. Jan M. Ziolkowski (L: Brill, 1998) 233-45; David O. Frantz, *Festum Voluptatis: A Study of Renaissance Erotica* (Ohio State U, 1989); David Foxon, *Libertine Literature in England, 1660-1745* (NYU, 1965) esp. 49-50; Roger Thompson, *Unfit for Modest Ears* (L: Macmillan, 1979) ix; Lynn Hunt, "Introduction," *The Invention of Pornography: Obscenity and the Origins of Modernity, 1500-1800*, ed. Hunt (NY: Zone, 1993) 9-48; Paolo Rossi, *Clavis Universalis: Arti mnemoniche e logica combinatoria da Lullo a Leibniz* (Milan, 1960). On exoticism: Roy Porter, "The exotic as erotic: Captain Cook at Tahiti," in *Exoticism in the Enlightenment*, eds. Roy Porter and G. S. Rousseau (Manchester U, 1990) 117-44; Suzanne R. Pucci, "The discrete charms of the exotic: fictions of the harem in eighteenth-century France," *ibid.*, 145-74; Linda P. Austern, "'Forreine conceits and wandring devises': the exotic, the erotic, and the feminine," in *The Exotic in Western Music*, ed. Jonathan Bellman (Northeastern U, 1998) 26-42.

146. William H. Epstein, *John Cleland* (Columbia U, 1974) esp. ch. 6 on *Fanny Hill*, 162-63 on linguistics; Thompson, *Unfit for Modest Ears*, 3, 201 on Locke's library; Stephen K. Land, *The Philosophy of Language in Britain* (NY: AMS, 1986) 62 on Locke; Mary M. Slaughter, *Universal Languages and Scientific Taxonomy in the Seventeenth Century* (Camb U, 1982); Murray Cohen, *Sensible Words*, xxiv, 44, 60-61, and 56 for Johnson's *Grammatical Commentaries*. On the political, secular definition and prosecution of obscenity as a speech crime, in the context of the rise of a popular press: Joan E. DeJean, "The politics of pornography: *L'Ecole des Filles*," in Hunt, ed., *Invention of Pornography*, 109-23, and DeJean's *The Reinvention of Obscenity: Sex, Lies and Tabloids in Early Modern France* (U Chicago, 2002), as also Wijnand W. Mijnhart, "Politics and pornography in the 17th- and

18th-century Dutch Republic,” 283–300; Iain McCalman, *Radical Underworld: Prophets, Revolutionaries and Pornographers in London, 1795–1840* (Camb U, 1988).

147. Epstein, *John Cleland*, esp. 100–102, 121; John Cleland, *Memoirs of a Woman of Pleasure*, ed. Peter Sabor (Oxford U, 1985 [1748–1749]) q. 1; Margaret C. Jacob, “The materialist world of pornography,” in Hunt, ed., *Invention of Pornography*, 157–202; Jean-François Dreux du Radier, *The Dictionary of Love* (L, 1753) excerpted in *Venus Unmasked*, comps. L. de Vries and P. Fryer (L: Barker, 1967) 79, prudery defined. On the impact of Cleland’s work and debate over whether it subverted patriarchy: Patsy S. Fowler and Alan Jackson, eds., *Launching Fanny Hill: Essays on the Novel and its Influences* (NY: AMS, 2003); Randolph Trumbach, “Modern prostitution and gender in *Fanny Hill*,” in *Sexual Underworlds of the Enlightenment*, eds. G. S. Rousseau and R. Porter (Manchester U, 1987) 69–85. On Aphra Behn’s earlier use of pornography to tell truths from a woman’s perspective: Cecile M. Jagodzinski, *Privacy and Print: Reading and Writing in Seventeenth-Century England* (U Press of Virginia, 1999) 130–62.

148. On the difference between the visible orgasms of men and the audible orgasms of women as played out in pornography: Linda Williams, *Hard Core: Power, Pleasure, and the “Frenzy of the Visible”* (UC, 1989). On the *scientia sexualis*: Thomas Laqueur, *Making Sex: Body and Gender from the Greeks to Freud* (Harvard U, 1990), as also Michel Foucault, *The History of Sexuality I: An Introduction*, tr. Robert Hurley (NY: Pantheon, 1978) 51–74, and Cynthia Eagle Russett, *Sexual Science: The Victorian Construction of Womanhood* (Harvard U, 1989) 16–49. On Courts of Love: Peter Goodrich, “Erotic melancholia: law, literature, and love,” *Law and Lit* 14 (2002) 103–29. On women in, and women readers of, pornography: Manuela Mourão, “The representation of female desire in early modern pornographic texts, 1600–1745,” *Signs* 24 (1999) 573–602; Karen Harvey, *Reading Sex in the Eighteenth Century: Bodies and Gender in English Erotic Culture* (Camb U, 2004) 208–10; Dorelies Kraakman, “Kermis in de Hel: Vrouwen en het pornografisch universum van de Enfer, 1750–1850,” Ph.D. thesis, U Amsterdam, 1997, summarized in her “Pornography in Western European culture,” in *Sexual Cultures in Europe*, eds. Franz Eder et al. (Manchester U, 2000) II, 104–20 and by Gert Hekma at www2.fmg.uva.nl/gl. On plebeian audiences: Lisa Z. Sigel, *Governing Pleasures: Pornography and Social Change in England, 1815–1914* (Rutgers U, 2002) 15–23; Peter Wagner, *Eros Revived: Erotics of the Enlightenment in England and America* (L: Secker and Warburg, 1988) 130. For “erect” ears: Richard Brathwaite, *Essays upon the Five Senses*, 2nd ed. (L, 1625) 13, reproduced in *Archaica*, comp. E. Bridges (L, 1815) II, pt. 6.

149. Pietro Aretino, *Aretino’s Dialogues*, tr. Raymond Rosenthal (NY: Ballantine, 1971 [1524–1527]) 22, 28. Contemporary responses to the dialogues are assessed by Bette Talvacchia, *Taking Positions: On the Erotic in Renaissance Culture* (Princeton U, 1999) and by Ian F. Moulton, *Before Pornography: Erotic Writing in Early Modern England* (Oxford U, 2000), who notes (pp. 54–69) the female readership, and sometime authorship, of erotic poetry circulating primarily in manuscript before 1700. Cf. DeJean, *The Reinvention of Obscenity*, 20, 57, 75–76; Laqueur, *Making Sex*, viii, 5–6. The idea that conception required mutual orgasm, though dropped from most medical texts by 1800, remained part of sexual lore and the acoustics of intercourse: Robert Muchembled, *Orgasm and the West: A History*

of *Pleasure from the Sixteenth Century to the Present*, tr. Jean Birrell (Camb: Polity, 2008) 94–99; Peter Gay, *The Bourgeois Experience: Victoria to Freud. I. Education of the Senses* (Oxford U, 1984) 85.

150. Cleland, *Memoirs of a Woman of Pleasure*, 25, 28, 31, 124, 184, and 134 for the pretense; Peter Cryle, *The Telling of the Act: Sexuality as Narrative in Eighteenth- and Nineteenth-Century France* (U Delaware, 2001) ch. 4 on “Utterance,” esp. women’s sighs.

151. Roy Porter and Lesley Hall, *Facts of Life: The Creation of Sexual Knowledge in Britain, 1650–1950* (Yale U, 1995) 24; Anthony E. Simpson, “‘The mouth of strange women is a deep pit’: male guilt and legal attitudes toward prostitution in Georgian London,” *J Criminal Justice and Popular Culture* 4,3 (1996) 53 for estimates; Elizabeth C. Denlinger, “The garment and the man: masculine desire in *Harris’s List of Covent-Garden Ladies*, 1764–1793,” *J H Sexuality* 11 (2002) 357–94, 361 on the 3,000, q. 390 from *L Times* (Aug. 27, 1795); Robin de Beaumont, “Introduction,” *The Pretty Women of Paris* (Hertfordshire: Wordsworth, 1996 [1883]) 5, guide sales; *List of the Sporting Ladies* (L, ca. 1770), excerpted in de Vries and Fryer, *Venus Unmasked*, 31; A Woman of Fashion, *The Temple of Prostitution* (L, 1779 sic for 1790s) repr. in *Eighteenth-Century British Erotica, IV*, ed. Barbara M. Benedict (L: Pickering and Chatto, 2002) 208 on breaths and sighs; Thomas Harris, *Harris’s List of Covent-Garden Ladies* (L, 1773), in *ibid.*, 81, 110, 118–19, 152, 160.

152. Sandy Bardsley, *Venomous Tongues: Speech and Gender in Late Medieval England* (U Penn, 2006) esp. ch. 3 on “Women’s voices and the law”; Bernard Capp, *When Gossips Meet: Women, Family and Neighbourhood in Early Modern England* (Oxford U, 2003) esp. ch. 5; Laura Gowing, *Domestic Dangers: Women, Words and Sex in Early Modern London* (Oxford U, 1996) ch. 3; Simpson, “‘The mouth of strange women,’” 50–79; Robert B. Shoemaker, “The decline of public insult in London, 1660–1800,” *Past & Present* 169 (2000) 97–131, q. 119 from Bulstrode. On women’s role in outcries: Nicholas Rogers, *Crowds, Culture and Politics in Georgian Britain* (Oxford U, 1998) ch. 7. On the history of watchmen who noisily cried the hours, and from whom came London’s official musicians (or “waits”): Cheryl G. Seitz, “Sounds and sweet airs: city waits of medieval and Renaissance England,” *Essays in Medieval Studies* 4 (1987) 119–42; Alan R. Warwick, *A Noise of Music* (B: Crescendo, 1968); Elaine A. Reynolds, *Before the Bobbies: The Night Watch and Police Reform in Metropolitan London, 1720–1830* (Stanford U, 1998) esp. 29–31, 79–80. Parisian women continued to file formal complaints of sexual insult but had recourse also to informal *tapage* and *bacchanale*, where the aggrieved stood outside an offender’s lodgings and shouted imprecations all night long: David Garrioch, *Neighborhood and Community in Paris, 1740–1790* (Camb U, 1986) 39–45.

153. Edward Philpott, *Crinoline from 1730 to 1864* (L, 1964) unpaginated, and cf. Kimberly Chrisman, “Unhoop the fair sex: the campaign against the hoop petticoat in eighteenth-century England,” *Eighteenth-Century Studies* 30 (1996) 5–23; Denlinger, “The garment and the man,” 391–92 on vulgarity; “The Jolly Waggoner,” *The Fond Mother’s Garland* (L, ca. 1770), excerpted in de Vries and Fryer, *Venus Unmasked*, 18; Hannah Woolley, *The Gentlewoman’s Companion* (L, 1675) 7, 9, 75–76; Eleazar Moody, *School of Good Manners* (NY: Garland, 1977 [1754]) 38, a New England version of a work by John Garretson, in its fourth English edition by 1701; Wagner, *Eros Revived*, 167ff. on songs and riddles, as also

Peter Burke, *Popular Culture in Early Modern Europe* (NYU, 1978) 94–108 and figs. 1–3, 16; Terry Castle, “The culture of travesty: sexuality and masquerade in eighteenth-century England,” in *Sexual Underworlds of the Enlightenment*, eds. Rousseau and Porter, 156–80; Benedict, “Introduction,” *Eighteenth-Century British Erotica, IV*, esp. x–xiv, and 273, 276, 286, 290 for *Nunnery Amusements*.

154. Francine du Plessix Gray, *At Home with the Marquis de Sade: A Life* (NY: Simon and Schuster, 1998) 20–24 pass.; Lucette Finas, *Le Bruit d’Iris* (P: Flammarion, 1978) 15–17, on de Sade’s “*choc de la baguette sur la peau du tambour*”; Marquis de Sade, *Juliette*, tr. Austryn Wainhouse (NY: Grove, 1988) 12, 17 on conscience, 15 on moral effects, 97 for owl. In Nicolas-Edmé Restif de la Bretonne’s *L’Anti-Justine* (1798), stories such as “The Wicked Husband” pivot around sensitivities to noise, either from outcries during sexual violence, fears or desires of being overheard, or the demands of sexual etiquette: “I leapt onto my daughter, who felt it slip painlessly in her and let out . . . not a sound. ‘Scream, will you!’ I said softly. And she shrieked her head off, realizing she was being screwed by a stranger”: Jennifer Birkett, comp. and tr., *The Body and the Dream: French Erotic Fiction 1464–1900* (L: Quartet, 1983) 131. On privacy, doors, and sleeping arrangements: Annik Pardailhé-Galabrun, *The Birth of Intimacy: Privacy and Domestic Life in Early Modern Paris*, tr. Jocelyn Phelps (U Penn, 1991), 58–60, 73–82 and throughout.

155. John D’Emilio and Estelle B. Freedman, *Intimate Matters: A History of Sexuality in America*, 2nd ed. (U Chicago, 1997) ch. 1 on domestic sexual noises, and noting (p. 29) that snoring may be an acoustic residue of intercourse; M. Dorothy George, *London Life in the Eighteenth Century* (NY, 1965) 85ff. on housing for the poor; Jeffry Kaplow, *The Names of Kings: The Parisian Laboring Poor in the Eighteenth Century* (NY: Basic, 1972) esp. 17–22 on density; *The Parliament of Women* (L, 1640), quoted in Thompson, *Unfit for Modest Ears*, 97; *A Dialogue between a Married Lady and a Maid* (1740), in *Eighteenth-Century British Erotica, II*, ed. Kevin L. Cope (L: Pickering and Chatto, 2002) 365, 375, 377, 379, 382, 385, 388.

156. Epstein, *John Cleland*, 5; Erich Schön, *Der Verlust der Sinnlichkeit oder die Verwandlungen des Lesers: Mentalitätswandel um 1800* (Stuttgart: Klett-Cotta, 1993); Jacques Ferrand, *Erotomania, or, A Treatise Discoursing of the Essence, Causes, Symptomes, Prognosticks, and Cure of Love, or Erotique Melancholy*, tr. Edmund Chilmead (Oxford U, 1640) 43–45. On the nexus between reading, privacy, and masturbation: Thomas W. Laqueur, *Solitary Sex: A Cultural History of Masturbation* (NY: Zone, 2003) 302–58, and figs. 5.5–5.10—esp. Baudouin’s *Solitary Pleasure* and Moreau’s *La Dormeuse* (1763). For a depiction of a reader with his mouth open exactly as if saying the words aloud to himself, see Gerhard ter Borch’s *Young Man Reading* (ca. 1680), Detroit Institute of Arts. On the architectonics of privacy in this era: Pardailhé-Galabrun, *The Birth of Intimacy*.

157. “Merry Questions and Answers,” *The Trial of Wit, or, a New Riddle-Book* (Glasgow, 1782) excerpted in de Vries and Fryer, *Venus Unmasked*, 111; G. Berrios and N. Kennedy, “Erotomania: a conceptual history,” *H Psychiatry* 13 (2002) 381–400; Michael Stolberg, “The crime of Onan and the laws of nature: religious and medical discourses on masturbation in the late 17th and early 18th centuries,” *Paedagogica Historica* 39 (2003) 701–17; Patrick Singy, “Friction of the genitals and secularization of morality,” *JH Sexuality* 12 (2003) 345–64 contrasting *Onania* with Tissot’s *Onanism*. Karl Braun, *Die Krankheit Onania*:

Körperangst und die Anfänge moderner Sexualität im 18. Jahrhundert (Frankfurt: Campus, 1995) is useful on Tissot and Pietist campaigns against masturbation. Cf. Laqueur, *Solitary Sex*, 25–42 on the publishing histories of *Onania* and *Onanism*; Gay, *Education of the Senses*, 295–302 on the enduring influence of *Onania* in Europe; G. J. Barker-Benfield, *The Horrors of the Half-Known Life: Male Attitudes Toward Women and Sexuality in Nineteenth-Century America* (NY: Harper, 1976) 163–88 on *Onania* in the U.S.

158. Laqueur, *Solitary Sex*, ch. 5 and 334–40 on the centrality of scenes of female and male masturbation to pornography; Peter Laslett, “Long-term trends in bastardy in England,” *Family Life and Illicit Love in Earlier Generations* (Camb U, 1977) 102–59; Alain Boureau, *The Lord’s First Night: The Myth of the Droit de Cuissage*, tr. Lydia G. Cochrane (U Chicago, 1998) 34; Anthony E. Simpson, “Vulnerability and the age of female consent,” in *Sexual Underworlds of the Enlightenment*, eds. Rousseau and Porter, 181–205. Noise was at the crux of a case discussed by Kathleen M. Brown in “Murderous uncleanness: the body of the female infanticide in Puritan New England,” in *A Centre of Wonders*, eds. Lindman and Tarter (→ n.112) 76–94, which relates Puritan anxieties about erotic arousal and self-pollution to the grave sin and capital crime of infanticide. Accused of the murder of twin newborns in 1691, Elizabeth Emerson’s defense was their silence at birth, offered as evidence of stillbirth rather than infanticide. Her parents, abed in the same room as their daughter, claimed to have slept through the births, an apparent impossibility had there been two lively newborns. Having borne an illegitimate child five years earlier, Elizabeth had kept silent about this new illicit pregnancy and kept quiet through the births.

159. Stefano Guazzo, *The Civile Conversation of M. Steeven Guazzo*, trs. G. Pettie and B. Young, repr. (NY: AMC, 1967 [1581–1586, orig. Italian 1574]) I, 48–49; Laqueur, *Solitary Sex*, 190–91, 276–96, q. 297; *Onania; or the Heinous Sin of Self-Pollution [together with] A Supplement to the Onania*, 8th ed., repr. (NY: Garland, 1986 [1723]) q. 5, q. 9, q. 10, and 17–20, 113, for ailments caused by masturbation. Ostervald’s *Traité contre l’impureté* (Amsterdam, 1707) was translated into English in 1708. Newly “companionate” marriages may have contributed to English antagonisms toward the solitariness of masturbation: Lawrence Stone, *The Family, Sex, and Marriage in England, 1500–1800* (NY: Harper and Row, 1977) 325–404.

160. *Onania*, 31, 47, 109 on self-conversation; *A Supplement to the Onania* (NY: Garland, 1986 [1725]) 58–59; Samuel A. D. Tissot, *Onanism*, tr. A. Hume (L, 1766) vi, viii, 16–18. The groaning associated with masturbatory climax also echoed the aftermath of the Fall, which scripturally destined Eve’s descendants to hard labor, during which Englishwomen traditionally furnished their female attendants with “groaning beer” and “groaning cakes,” to help them all through the ordeal. In this context female masturbation could be heard as a mockery of childbirth. Consider Laurel T. Ulrich, *Good Wives: Image and Reality in the Lives of Women of Northern New England, 1650–1750* (NY: Knopf, 1982) 127–28; idem, *A Midwife’s Tale: The Life of Martha Ballard, Based on Her Diary, 1785–1812* (NY: Knopf, 1990); Wilson, *Ye Heart of a Man* (→ n.128) 84–85 on husbands hearing the groans of their wives during childbirth.

161. D. T. de Bienville, *Nymphomania, or, a Dissertation Concerning the Furor Uterinus*, tr. E. S. Wilmot, M.D. (L, 1775) q. v on pencil, q. x on blasphemies, q. xii on thunderbolts, q.

28 on fibres, 30, q. 36 on language, q. 37 on monsters and hissing, 74, 76, q. 171 “burning-glass”; *A Supplement to the Onania*, 152–67, swollen clitoris; Groneman, *Nymphomania*, 5, nymphomania in mental institutions, and noting (p. xx) that satyriasis, the male version, was rarely diagnosed, since men by the 1770s were expected to be naturally and boldly passionate.

162. Laqueur, *Solitary Sex*, 29–33, 335, but cf. David Stevenson’s review thereof, *English H R* 119 (2004) 221–23, disputing Laqueur’s identification of Marten as the author; *Onania*, 136 on bashfulness, 181 on Prolific Powder; *Weekly J, or The British Gazetteer* (Feb. 26, 1726), advertisement in Rictor Norton, “Early eighteenth-century newspaper reports: a sourcebook—self-abuse and gleets” at www.infopt.demon.co.uk/grub/onania.htm; Mary Fissell, “Making a masterpiece: the Aristotle texts in vernacular medical culture,” in *Right Living: An Anglo-American Tradition of Self-Help Medicine and Hygiene*, ed. Charles E. Rosenberg (Johns Hopkins U, 2003) 59–87; Gay, *Education of the Senses*, q. 302 from Ware, 377–79 on prurience. Final lines: *The Pleasures of Coition; or, the Nightly Sport of Venus* (L, 1721) prefatory poem, in *Eighteenth-Century British Erotica, II*, ed. Cope, 111. On language in 18th-century medicine, which relied upon patients’ verbal accounts: Roy Porter, “‘Expressing yourself ill’: the language of sickness in Georgian England,” *Language, Self, and Society*, eds. P. Burke and R. Porter (L: Polity, 1991) 276–99.

163. Wagner, *Eros Revived*, 67–68; Samuel Hopkins, *The Life and Character of the Late Reverend Mr. Jonathan Edwards* (B, 1765) 48, put in oral context by Sandra M. Gustafson, *Eloquence is Power: Oratory and Performance in Early America* (U North Carolina, 2000) 65–66; Frank Lambert, *Inventing the “Great Awakening”* (Princeton U, 1999) esp. 3, 43, 48, 90, 97; David Lovejoy, *Religious Enthusiasm in the New World* (Harvard U, 1985) 178–94; Henry Abelove, *The Evangelist of Desire: John Wesley and the Methodists* (Stanford U, 1990) ch. 3; S. J. Rogal, “Electricity: John Wesley’s ‘curious and important subject,’” *Eighteenth-Century Life* 13 (1989) 79–90, q. 80 from comments on Franklin’s experiments in Wesley’s journal for Feb. 17, 1753, *Works*, II, 280–81, and cf. George Eayrs, ed., *Letters of John Wesley* (L, 1915) 80–81, letter of Dec. 26, 1761.

164. On 18th-century electric science and therapy: W. D. Hackmann, *Electricity from Glass: The History of the Frictional Electrical Machine 1600–1850* (Alphen aan den Rijn: Sijthoff & Noordhoff, 1978) 175 on Nollet’s guards and monks; Mary A. B. Brazier, *A History of Neurophysiology in the Seventeenth and Eighteenth Centuries* (NY: Raven, 1984) chs. 13–14; J. L. Heilbron, *Electricity in the Seventeenth and Eighteenth Centuries* (UC, 1979) 160, 279–87, 318; *OED* s.v. “electrified,” “electrify”; Sidney Licht, “History of electrotherapy,” *Therapeutic Electricity and Ultraviolet Radiation*, ed. G. Keith Stillwell (Baltimore: Williams and Wilkins, 1983) 1–69; John Wesley, *The Desideratum: Or, Electricity Made Plain and Useful* (L, 1871 [1760]) 42–43 on lameness, 48–49 as cure for deafness; Tiberius Cavallo, *A Complete Treatise on Electricity in Theory and Practice*, 2nd ed. (L, 1782) 95–96, electricity used to “remove obstructions.” For Franklin, his *Experiments and Observations on Electricity*, 4th ed. (L, 1769), put in context by Michael B. Schiffer, *Draw the Lightning Down: Benjamin Franklin and Electrical Technology in the Age of Enlightenment* (UC, 2003). For Nollet, his *Leçons de physique expérimentale* (P, 1764) III, 395ff. For Graham, Robert Whitworth, “The Temple of Health,” at www.printgeorge.com/ArtEccles_TempleofHealth1.htm and

TempleofHealth2.htm. On the philosophical differences between Franklin and Nollet and the status of electricity in 18th-century thought: Jessica Riskin, *Science in the Age of Sensibility: The Sentimental Empiricists of the French Enlightenment* (U Chicago, 2002) esp. 76–83, 88–90, 196–97. Her chapter on mesmerism is also apt, since sensations of mesmerism (erotically tactile, the mesmerist's thumbs lying lightly "on the nerve plexes which are located at the pit of the stomach, and the fingers on the *hypochondria*") and depictions of mesmerized subjects (sprawling, open-mouthed, half-asleep women) were identical to those for masturbation. Although mesmeric salons used only wands akin to lightning rods drawing down universal fluids into healing tubs, patients did moan and sigh as evidence of cure, and Mesmer himself noted that mesmeric fluid "is communicated, propagated, and intensified by sound": George Bloch, comp. and tr., *Mesmerism: A Translation of the Original Scientific and Medical Writings of Franz Anton Mesmer* (Los Altos: Kaufman, 1980) 63, 82.

165. Heilbron, *Electricity*, 229–35; Schiffer, *Draw the Lightning Down*, 23–26; Francis Hauksbee, *Physico-Mechanical Experiments* (NY: Johnson, 1970 [repr. of 2nd ed., 1719]) 1–176, q. 65, and cf. 266–67 for his "Account of an experiment touching upon the propagation of sound through water," *Phil Trans Royal Soc* 26 (1709) 371–72, where a bell sounding underwater was "very little less, but much more mellow, sweet, and grave at least two or three Notes deeper than it was before." By Graham's time an "influence machine" also referred to equally noisy electrostatic machines that worked by induction, not friction: Arthur D. Moore, *Electrostatics*, 2nd ed. (Morgan Hill: Laplacian, 1997) 34. On the nexus between universal substances and universal language: Lynn R. Wilkinson, *The Dream of an Absolute Language: Emanuel Swedenborg and French Literary Culture* (Albany: SUNY, 1996) esp. 104–106. On sensing electricity: Riskin, *Science in the Age of Sensibility*, 79, quoting Joseph Priestley, *History and Present State of Electricity*, 3rd ed. (L, 1775) 18, on how electricity had begun "to make itself sensible" with its sparks and "a considerable noise, a painful sensation, and a strong phosphoreal smell."

166. Hauksbee, *Physico-Mechanical Experiments*; Benjamin Franklin, "Observations and suppositions . . . for explaining the several phenomena of thunder gusts" (1749), *Papers*, III, ed. Leonard W. Labaree (Yale U, 1959) 365, and "Some directions for the drawing out the tone from the glasses of the armonica," in *ibid.*, XXXI, ed. Barbara B. Oberg (Yale U, 1995) 312–14; *idem*, *Experiments and Observations*, Letter XLIV, 435–37; Brazier, *History of Neurophysiology*, 182 on Nollet; Margaret Cheney, *Tesla: Man Out of Time* (NY: Dell, 1981) 21. On Edison and Bell, see Round Two.

167. For the larger context: James Delbourgo, *A Most Amazing Scene of Wonders: Electricity and Enlightenment in Early America* (Harvard U, 2006). On sexuality: David Stevenson, *The Beggar's Benison: Sex Clubs of Enlightenment Scotland and Their Rituals* (East Linton: Tuckwell, 2001) 32, 35–39, 41; Geoffrey Ashe, *The Hell-Fire Clubs: A History of Anti-Morality* (Stroud: Sutton, 2000 [1974]) esp. ch. 6 on George Dodington, and contrast the sapphic, transvestite, and sodomitic networks studied by Randolph Trumbach, "London's Sapphists: from three sexes to four genders in the making of modern culture," and Theo van der Meer, "Sodomy and the pursuit of a third sex in the early modern period," both in *Third Sex Third Gender*, ed. Gilbert Herdt (NY: Zone, 1994) 11–37, 137–212. For demographic data and discussion: Alan Macfarlane, *Marriage and Love in England, 1300–1840*

(Oxford: Blackwell, 1986) 25–27, 306–10; Stephen Garton, *Histories of Sexuality* (NY: Routledge, 2004) ch. 5. Henry Abelove, “Some speculations on the history of sexual intercourse during the ‘long eighteenth century’ in England,” *Deep Gossip* (U Minnesota, 2003) 21–28, argues that rising fertility during the late 1700s was of a piece with the privileging of production in other realms and that the more climactic forms of family limitation, such as oral sex, anal sex, and mutual masturbation, were being replotted as preliminaries to the main event. The invention of “foreplay” thus rode the same currents as attacks on masturbation, driving full-force toward intercourse.

168. On probability: Keith M. Baker, *Condorcet: From Natural Philosophy to Social Mathematics* (U Chicago, 1975) 129–94. I follow up on the origins and implications of the notion of statistical noise in Rounds Two and Three.

169. See the superb work of Sean Shesgreen, ed., *The Criers and Hawkers of London* (Stanford U, 1990) for illustrations and context, q. 37 from Francis Grose on the milk vendor, q. 37 Swift; Richard B. Schwartz, *Daily Life in Johnson’s London* (U Wisconsin, 1984) 11, 18; Charles Knight, ed., *London* (L, 1841) I, 130–34; Arlo Bates, “Boston street cries,” *New England Mag* 21 (Dec. 1899) 407–10; Joseph Addison, “Street cries of London,” *Spectator* 251 (Dec. 18, 1711); Eric Wilson, “Plagues, fairs, and street cries: sounding out society and space in early modern London,” *Modern Language Studies* 25,3 (1995) 1–42, and for a sense of the turbulence of London streets, John Gay, “Trivia, or the art of walking the streets of London” (1714) in *Poetry of the Landscape and the Night*, ed. Charles Peake (L: Arnold, 1967) 63–81; Penelope Corfield, “Walking the city streets: the urban odyssey in eighteenth-century England,” *J Urban H* 16,2 (1990) 132–74, q. 145 from Jane Austen’s *Persuasion* (wr. 1816, pub. 1818) where one hears “The heavy rumble of carts and drays, the bawling of newsmen, muffin-men, and milkmen, and ceaseless clink of pattens [thick wooden-soled shoes].” On Goethe, *Italian Journey*, trs. W. H. Auden and Elizabeth Mayer (NY, 1962) 58, discussed by Richard Sennett, *Flesh and Stone: The Body and the City in Western Civilization* (NY: Norton, 1994) 274, and complemented by Iain Fenlon’s *Piazza San Marco* (Harvard U, 2009) 108–26. Cf. Agnolo Bronzino, “De’ Romori,” in *Li Capitoli faceti* (Venice, 1822) 376–82, a 16th-century satire. For the Parisian scene, Louis Batiffol, *La Vie de Paris sous Louis XIII* (P, 1932) 30–31; Vincent Milliot, *Les Cris de Paris, ou le peuple travesti: les représentations des petits métiers parisiens (XVIe–XVIIIe siècles)* (P: Sorbonne, 1995); Nicolas Boileau Despréaux, “Les premières satires,” *Oeuvres complètes*, ed. Françoise Escal (P: Gallimard, 1966) Satire VI, 32–36; Victor Fournel, *Les Cris de Paris* (P, 1887) esp. 8 on the first voices heard at dawn in premodern Paris—criers of glasses of brandy, oysters, hot water, milk, and coffee. For sets of illustrations from around Europe, and even more details, see Brigitte Masson, *Les Cris de la ville: commerces ambulants et petits métiers de la rue* (P: Gallimard, 1978), and cf. Hanchao Lu, *Street Criers: A Cultural History of Chinese Beggars* (Stanford U, 2005).

170. J. W. von Goethe, *Scientific Studies*, tr. and ed. Douglas E. Miller (NY: Suhrkamp, 1988) q. 158, 160, 168, 276, q. 299, q. 300 (upper case inserted for Nature); Hilmar Dressler, “Chladnis Klang- und Seebecks Farbfiguren in Goethes Vergleich und einige Widerspiegelungsaspekte der Farbe-Ton-Analogien in der Ästhetik der Goethe-Zeit,” *Jahrbuch des Wiener Goethe-Vereins* 100/101 (1996/1997) 55–68; Wilton Mason, “Father Castel

and his color clavecin,” *J Aesthetics Art Criticism* 17 (1958) 103–16; Joachim Gessinger, “Visible sounds and audible colors: the ocular harpsichord of Louis-Bertrand Castel,” in *Languages of Visuality*, ed. Beate Allert (Wayne State U, 1996) 49–72, and for the larger context: Thomas L. Hankins and Robert J. Silverman, *Instruments and the Imagination* (Princeton U, 1995) ch. 4. Long before the “studious blind man” (probably Nicholas Saunderson, Professor of Mathematics at Cambridge) was cited by John Locke in his *Essay Concerning Human Understanding* (1694) bk. III, ch. 4, §11, the trumpet had associations with war and blood, and John Earle in his *Micro-cosmographie* (Westminster, 1904 [1628]) had intentionally mixed sight and sound when describing a trumpeter (Character No. 48) whose “look is like his noise, blustering and tempestuous.”

171. Michel Faré, *La Nature morte en France: son histoire et son évolution du XVIIe au XXe siècle* (Geneva, 1962) I, 128, 138, 153–55, and II, esp. figs. 342–50, 353–57. Hanging hares, venison, and mutton once prominent in still lives began to reek of decay and disease as late-18th-century physicians began to associate such carcasses with morbid odors: Corbin, *The Foul and the Fragrant* (→ n.127).

172. J. W. von Goethe, *The Sorrows of Young Werther and Novella*, trs. Elizabeth Mayer and Louise Bogan (NY: Random House, 1971) 64–65; Vinge, *Five Senses* (→ n.7) 151 on simultaneity, ch. 6 on synaesthesia; Naumann-Beyer, *Anatomie der Sinne* (→ n.7) 122–26 on Romanticism and the ear; Janet Todd, *Sensibility* (L: Methuen, 1986); Corey Brady et al., “The Dictionary of Sensibility,” www.engl.virginia.edu/enec981/dictionary; *OED* s.v. “sensibility” (1756); Jeffrey R. Watt, “Suicide, gender and religion: the case of Geneva,” in *From Sin to Insanity* (→ n.117) 153, suicides impelled by Goethe’s book; Ann Yearsley, *Poem on the Inhumanity of the Slave Trade* (L, 1788) 3. On the vitalist side of Enlightenment thought: Peter Hanns Reill, *Vitalizing Nature in the Enlightenment* (UC, 2005), esp. 149 on John Elliot’s argument (in *Philosophical Observations on the Senses of Vision and Hearing* [L, 1780]) that “the organs of hearing possessed their own internal tonal scale. . . . Hearing entailed a sympathetic reaction between external sound and the inherent sounds of the ear.” Elliot used tinnitus, and excitations of tinnitus, to (p. 21) “deduce a theory of hearing from ‘a ringing in the ears,’” just as one might deduce a theory of vision from the colored dots one sees when pressing the eyeballs.

173. “Jesus, Lover of My Soul” (1740), in John Wesley, ed., *A Collection of Psalms and Hymns, from Various Authors* (York, 1780) 60, Hymn 79; John Gilbert Cooper, *Letters concerning Taste*, 3rd ed. (NY: Garland, 1970 [1757]) 2–3, 7. On the “typographical exuberance” of sentimental fiction: Todd, *Sensibility*, 5–6, 104–105, 125.

174. Todd, *Sensibility*, 129–46, for critics; Goethe, *Scientific Studies*, 303; Immanuel Kant, *Observations on the Feeling of the Beautiful and Sublime*, tr. John T. Goldthwait (UC, 1960 [1763]) 5–6, q. 47, 52; idem, *Critique of the Power of Judgment*, trs. P. Guyer and E. Matthews (Camb U, 2000 [1790, 2nd ed. 1793]) 143–45. On Kant’s life: Manfred Kuehn, *Kant* (Camb U, 2001) 130 on novels, 151–53 on nerves, 159 on Berlin.

175. Kant, *Observations*, q. 47, 48, q. 52, q. 55, 76–96, 98. The idea of “comfort,” to which Kant opposed the sublime, was being upholstered at just this time: John E. Crowley, *The Invention of Comfort: Sensibilities and Design in Early Modern Britain and Early America* (Johns Hopkins U, 2001). Kant in 1766 moved from lodgings near warehouses along the

Pregel to an apartment away from the noise of river commerce: Kuehn, *Kant*, 159.

176. Edmund Burke, *A Philosophical Enquiry into the Origins of Our Ideas of the Sublime and Beautiful*, ed. Adam Phillips (Oxford U, 1990 [1757, wr. 1747–1753]) 36, 53, 65, 75, 76, 77; Peter De Bolla, *The Discourse of the Sublime* (Oxford: Blackwell, 1989) 62–72 on Burke and how economic inflation and sublime transport shaped the “autonomous subject” of the 1700s. Consult Kuehn, *Kant*, 34–39, 46–47, 51, 54 on Kant’s response to Pietism. In his *Critique of the Power of Judgment*, 158–59, Kant argued that Burke’s physiological explanation of feelings of sublimity and beauty fell short as a reliable basis for aesthetic judgment, since each person’s feelings are idiosyncratic, especially of pain, and a theory that fails to account for shared feelings cannot yield aesthetic standards.

177. Robert Blair, “The Grave” (1743), in Charles Peake, ed., *Poetry of the Landscape and the Night* (L: Arnold, 1967) 119, l. 32ff.; Robert N. Essick and Morton D. Paley, eds., *Robert Blair’s The Grave Illustrated by William Blake (1808)* (L: Scholar, 1982) 3–9 on the “graveyard school” of poetry, not a school and never mentioning “graveyards” (the word itself first appeared in 1779). Blair’s poem arrived at its forty-seventh edition by 1798.

178. Burke, *Philosophical Enquiry*, q. 54, q. 60–61; Eleanor Sleath, *The Orphan of the Rhine* (L, 1798), excerpted in *Gothic Readings: The First Wave*, ed. Rictor Norton (L: Leicester U, 2000) 80, and 7–9 for J. and A. L. Aikin, *Miscellaneous Pieces* (L, 1773) 127–37. Cf. Susan Chaplin, *Law, Sensibility, and the Sublime in Eighteenth-Century Women’s Fiction* (Aldershot: Ashgate, 2004) on romance as a female body of law. On sounds screened or uncoupled from their source, or “acousmatic”: Pierre Schaeffer, *Traité des objets musicaux* (P: Le Seuil, 1966).

179. Ann Radcliffe, *The Romance of the Forest*, ed. Chloe Chard (Oxford U, 1986 [1791]) quotations from 2, 3, 4, 5, 8, 9, 14, 15, 16, 18, 19. This edition has 363 pages of text.

180. Emma Clery and Robert Miles, eds., *Gothic Documents* (Manchester U, 2000) 137 for Robert Southey’s “chill,” 139 for Hole, and 223–25 for the anonymous, “Terrorist Novel Writing,” a contribution to *Spirit of the Public Journals for 1797* (1798). All other quotations are from Norton, *Gothic Readings*: at 304, Maria Edgeworth, *Chosen Letters*, ed. F. V. Barry (L, 1931) 58; at 301–302, “Letter to the editor,” *Monthly Mag* 4,21 (Aug. 1797) 102–104; at 248, Matthew Gregory Lewis, *Tales of Terror with an Introductory Dialogue*, 2nd ed. (L, 1808) 6–7; at 75, Ann Radcliffe, “Superstition,” *A Sicilian Romance* (L, 1790) II,30–31; at 231, Hannah Cowley, “Invocation to Horror” (1787) in *The British Album*, 4th ed. (L, 1792) I,39–42. For the “listening ear,” p. 123, Peter Will, tr. and partial author of *Horrid Mysteries*, ed. Montague Summers (L, 1927 [1797]) I,70 (derived from Karl Grosse’s *Der Genius*): “The awful silence which, for some time, had swayed around the cottage, began by degrees to be enlivened; my listening ear, in which the roaring of the storm, and the cracking of the trees, began to resound again, could plainly distinguish whispers, which seemed to proceed from different people.”

181. Ann Radcliffe, *The Italian: or, The Confessional of the Black Penitents* (L, 1797) II, ch. 4, in Norton, *Gothic Readings*, 75.

182. Maria Edgeworth, *Castle Rackrent*, ed. George Watson (Oxford U, 1995 [1800]) 99–101; Leslie Stephen, “Edgeworth, Maria,” *Dict Natl Biog*, eds. L. Stephen and S. Lee (Oxford U, 1998) VI,380–82; James Beattie, *The Minstrel*, 5th ed. (L, 1775) Stanza XXXII,

in Norton, *Gothic Readings*, 227; Eliott O'Donnell, *The Banshee* (L, 1917?) 9, 17, and cf. John Loftus, ed., *The Memoirs of Anne, Lady Halkett and Ann, Lady Fanshawe* (Oxford: Clarendon, 1979) 125, Fanshawe's 17th-century account of a banshee (heard and then glimpsed by moonlight, "a woman in white, with red hair and a ghastly complexion" speaking "loud in a tone I never heard"), unpublished until copied out in 1766, then excerpted for publication in 1798 and 1827, and edited in 1829.

183. On mechanical birds: Karl Kochmann, *The Black Forest Cuckoo Clock* (Concord, CA: Antique Clock, 1976) 4–5, 19; Georges Pélissier, *A Few Remarks concerning Makers of Singing Bird Boxes of the Eighteenth and Nineteenth Centuries* (NY, 1910); Alfred Chapuis et al., *History of the Music Box and of Mechanical Music*, tr. J.E. Roesch, eds. H.M. Fitch and H. Fitch (Summit: Music Box Soc, 1980). I have not seen Sharon Bailly and Christian Bailly, *Flights of Fancy: Mechanical Singing Birds* (Geneva: Antiquorum, 2001). The Wright painting is wonderfully zoomable at www.nationalgallery.org.uk/cgi-bin/WebObjects.dll/CollectionPublisher.woa/wa/work?workNumber=ng725.

184. Benedict Nicolson, *Joseph Wright of Derby: Painter of Light* (NY: Pantheon, 1968) I, 43–46, 104–105 on Bates; Werner Busch, *Joseph Wright of Derby: Das Experiment mit der Luftpumpe* (Frankfurt am Main: Fischer, 1986); Jenny Uglow, *The Lunar Men* (NY: Farrar Straus Giroux, 2002) 122ff.; Richard L. Edgeworth, *Memoirs of Richard Lovell Edgeworth Begun by Himself and Concluded by His Daughter Maria Edgeworth* (Shannon: Irish U, 1969 [1820]) I, 146–49, 171–72; James Ferguson, *Lectures on Select Subjects in Mechanics, Hydrostatics, Pneumatics, and Optics* (L, 1764 [1760]) 119, plate XIV for an air pump similar to that in *An Experiment*. Stephen Daniels, *Joseph Wright* (Princeton U, 1999) 40–41, notes that Wright had earlier used a white cockatoo as an emblem of luxury in a portrait of *Mr. and Mrs. William Chase*. At www.search.revolutionaryplayers.org.uk, Olga Baird notes that white cockatoos were "little known in England until the 1770s when they were depicted by British draughtsmen taking part on Captain Cook's journeys." Wright could have seen drawings by continental artists familiar with the bird trade from the Dutch East Indies, and the English naturalist Eleazar Albin had indeed beheld a white cockatoo in the flesh in the 1730s (*A Natural History of Birds* [L, 1738] I, 12), but Wright may never have seen a live mature specimen. The bird in his glass sphere is too small, more like a dove than an adult white cockatoo, which averages 17–18 inches long and has a white crest that unfurls like an umbrella. On the loudness of white cockatoos: Karl Diefenbach, *The World of Cockatoos*, tr. Annemarie Lambrich (Neptune City: TFH, 1985) 129.

185. Louise E. Robbins, *Elephant Slaves and Pampered Parrots: Exotic Animals in Eighteenth-Century Paris* (Johns Hopkins U, 2002) 122–46; Schwartz, *Culture of the Copy* (→n.58) 142–53. "How can birds, who have no cochlea, be the most musical species in creation?" asked Claude Nicolas Le Cat in *A Physical Essay on the Senses* (L, 1750 [1743]) 56–57; answer: "their heads are almost as sonorous as a bell."

186. J. C. Beaglehole, ed., *The Journals of Captain James Cook on his Voyages of Discovery* (Woodbridge: Boydell, 1999) I, q. 359, and II, q. 342, 760; William J. Thomson, "Te Pito te Henua, or Easter Island," *U.S. National Museum Annual Report for 1889* (DC, 1891) 446–552, at 448, 452, 460, 463, 466, 492; Paul Carter, *The Sound In-Between: Voice, Space, Performance* (New South Wales U, 1992) 11–12; Nicholas Thomas, *Cook: The Extraordinary*

Voyages of Capt. James Cook (NY: Walker, 2003) 220-25 and cf. 78 on the sound of tattooing, 88 on Maori war chants, 216 on his sailors. See Thomson, figs. 13-16 for ears of the statues, longest (p. 498) in older statues reflecting the chiefs of a "long-eared race" (pp. 528-29) that had reigned before Europeans arrived.

187. Erasmus Darwin, *Zoonomia; or, the Laws of Organic Life*, 2nd Amer. ed., from 3rd London ed. (B, 1803) I,392; idem, *The Temple of Nature* (L: Scholar, 1973 [1803]) q. 115 (Canto III), and Add. Notes XV, 107-20, q. 120; Thomas Sheridan, "Course of Lectures on Elocution" (1762), excerpted in *Proper English?*, ed. Tony Crowley (L: Routledge, 1991) 67, and 99-100 on Walker; Robert Lloyd, "The Actor. Address'd to Bonnell Thornton, Esq.," in his *Poems* (L, 1762) 72; Uglow, *Lunar Men*, xv, 136; Charles de Brosses, *Traité de la formation mécanique des langues* (P, 1801) I,xiv, xli, 143-45, 182, 188, 193, 196. Useful here is Rosina Lippi-Green, "The myth of non-accent," in her *English with an Accent: Language, Ideology, and Discrimination in the United States* (L: Routledge, 1997) ch. 2.

188. On speaking machines: Marcel P.R. Van den Broecke, "Wolfgang von Kempelen's speaking machine as a performer," in *Sound Structures*, ed. Van den Broecke et al. (Dordrecht: Foris, 1983) 9-19; Linda Strauss, "Automata: A Study in the Interface of Science, Technology, and Popular Culture, 1730-1885," Ph.D. thesis, UC San Diego, 1987.

189. Uglow, *Lunar Men*, on Watt and ch. 20 on Priestley; Joseph Priestley, *An Account of Further Discoveries of Air* (1775) appended to *Autobiography* (Fairleigh Dickinson U, 1970) 148-49, testing his air on a live mouse in a glass capsule; Ferguson, *Lectures*, 121; Eric Robinson and Douglas McKie, eds., *Partners in Science: Letters of James Watt and Joseph Black* (Harvard U, 1970) 260; Ben Marsden, *Watt's Perfect Engine* (Columbia U, 2002) 59.

190. Jennifer Tann, ed., *Selected Papers of Boulton and Watt. I. The Engine Partnership 1775-1825* (MIT, 1981) 400; Marsden, *Watt's Perfect Engine*, 125, nervousness about high pressure, as also D.S.L. Cardwell, *From Watt to Clausius* (Cornell U, 1971) 46-50, 84; Thomas H. Marshall, *James Watt* (Edinburgh, 1825) 122 and noting (p. 138) that of the 325 steam engines produced from 1775 to 1800, a preponderance went to textile mills; Francis Trevithick, *Life of Richard Trevithick* (L, 1872) I,59, 103, 120, 123-25, 156, 193, and II,184; Uglow, *Lunar Men*, 97, five miles; Hunter Davies, *A Biographical Study of the Father of Railways, George Stephenson* (L: Weidenfeld and Nicolson, 1975) 41-43. The Prussian Field Marshall Gebhard von Blücher defeated Napoleon at Laon in March 1814 and led his army into Paris as Stephenson was finishing his locomotive; Blücher's forces were later instrumental in the victory at Waterloo.

191. Mary Pharr, "Seward, Anna," *Ency British Women Writers*, eds. P. Schlueter and J. Schlueter, rev. ed. (Rutgers U, 1998) 562-63; Uglow, *Lunar Men*, 179, 318, 410; Edgeworth, *Memoirs of Richard Lovell Edgeworth*, II,267-69; Anna Seward, *The Poetical Works*, ed. Walter Scott (NY: AMS, 1974 [1810]) I,clvii on Eyam Dale, II,33-46 on Captain Cook, 140-42 on Wright of Derby, and 314-19 for Colebrook Dale, q. 314-16; William Cowper, *The Task* (Ilkley: Scholar Press, 1973 [1785]) q. 10, q. 12, 13, 19, q. 128, 137, 141-42, 144, 182-83, q. 219-20, q. 231, 235; James King, *William Cowper* (Duke U, 1986) q. 73, 137, 145, and 155 on the claim of "most widely read poetical text in English until 1800."

192. J. Elfreth Watkins, "The development of the American rail and track," *U.S. National Museum Annual Report for 1889* (DC, 1891) 651-708, on early British developments,

with data for iron industry; Barbara Freese, *Coal: A Human History* (Camb, Mass: Perseus, 2003) 65–66; *Fourteenth Census of the U.S., Vol. XI, Mines and Quarries* (DC, 1922) 258, Table 8; Davies, *George Stephenson*, 41–42, q. 216; Frederick S. Williams, *Our Iron Roads*, 5th ed. (L, 1884) ch. 6 on tunnels, ch. 7 on rails; Mary Brunton, “Extract from Journal,” in *Emmeline. With Some Other Pieces* (L: Routledge/Thiemmes, 1992 [1819]) 159–60.

193. Jelle Z. de Boer and Donald T. Sanders, *Volcanoes in Human History* (Princeton U, 2002) 138–56, assigning Tambora a Volcanic Explosivity Index of 7, greater than the 1883 Krakatoa eruption (at 6) and exceeded (in human experience) only by the Indonesian eruption of Toba (at 8, or “mega-colossal”) around 64,000 B.P.; Hubert H. Lamb, *Climate, History, and the Modern World*, 2nd ed. (L: Routledge, 1995) 247, 298–99; C. Edward Skeen, *1816: America Rising* (U Press Kentucky, 2003) q. 1 Jefferson, 2–9, 13; Percy Bysshe Shelley and Mary Shelley, *History of a Six Weeks’ Tour* (Oxford: Woodstock, 1989 [1817]) q. 88, 93, q. 99, q. 153, 165; Robert Gittings and Jo Manton, *Claire Clairmont and the Shelleys 1798–1879* (Oxford U, 1992) 26–29; John Polidori, *The Diary of Dr. John William Polidori*, ed. William M. Rossetti (Folcroft: Folcroft Lib, 1975) 62–66, 107, 213; George Gordon Byron, Sixth Baron, *Childe Harold’s Pilgrimage* (1812–1818) Canto III, stanzas 25–31 for Waterloo, stanza 92 for storm. In contrast to Byron’s lyricism, the battle had been fought across a muddy, smoky plain where soldiers could not see ten yards ahead, where small rockets shrieked along the ground, where “Wounded or mutilated horses wandered or turned in circles,” neighing loudly, and wounded men lay in heaps, screaming, so that “The noise was deafening” and victory itself an acoustical chaos: Gareth Glover, ed., *Letters from the Battle of Waterloo* (L: Greenhill, 2004) 99, 104, 110–11, 133, 150.

194. Thomas Moore, ed., *Letters and Journals of Lord Byron*, 3rd ed. (L, 1833) II, 217–18, 221 on the weather, 243–49; Jean Baptiste Benoît Eyriès, tr., *Fantasmagoriana* (P, 1812) I, 227–76 (“La Tête de mort”) and II, 103–60 (“L’heure fatale”); Leslie A. Marchard, ed., “So Late into the Night”: *Byron’s Letters and Journals. V. 1816–17* (L: Murray, 1976) 88, 91, letter of Sept. 8, 1816 protesting that he had no love for Claire, “but I could not exactly play the Stoic with a woman—who had scrambled eight hundred miles to unphilosophize me”; Polidori, *Diary*, 99–100, 107, 117, 120, 122, 124–25; David L. Macdonald, *Poor Polidori* (U Toronto, 1991) 35–40 for his dissertation, 73–82 at Geneva; Horst Höhne, *In Pursuit of Love: The Short and Troublesome Life and Work of Percy Bysshe Shelley* (NY: Lang, 2000) 148–64; Anne K. Mellor, *Mary Shelley: Her Life, Her Fiction, Her Monsters* (NY: Routledge, 1988) 53–54; Mary Shelley, *The Journals of Mary Shelley, 1814–1844*, eds. P. R. Feldman and D. Scott-Kilvert (Johns Hopkins U, 1987) I, 65–71, 104–107, q. 70; Gittings and Manton, *Claire Clairmont*, 21, 30–32.

195. Polidori, *Diary*, 15–17, 23–24, 126–28, and his *The Vampyre* (DC: Woodstock, 2001 [1819]) viii–xvi, q. 46–47. Cf. David B. Morris, “Gothic sublimity,” *New Lit H* 16 (1985) 299–319, esp. on “sublimity without transcendence” (p. 305); Robert Mighall, “‘A pestilence which walketh in darkness’: diagnosing the Victorian vampire,” in *Spectral Readings: Towards a Gothic Geography*, eds. G. Byron and D. Punter (NY: St. Martin’s, 1999) 108–24, on identifications of the pallid nocturnalism of vampires with masturbators.

196. Mary Shelley, *Frankenstein or The Modern Prometheus: The 1818 Text*, ed. James Rieger (U Chicago, 1982) Appendix A, “Mary Shelley’s Introduction to the Third Edition

(1831),” 222–29, q. 227; Macdonald, *Poor Polidori*, 84–85; Mellor, *Mary Shelley*, 58, 63–64, 67, 91, 95, 104–107, 113; Samuel H. Vebinder, *Scientific Attitudes in Mary Shelley’s Frankenstein* (Ann Arbor: UMI Research Press, 1984), 76–79, and cf. David Ketterer, “Frankenstein’s ‘conversion’ from natural magic to modern science—and a shifted (and converted) last draft insert,” *Sci Fiction Studies* 24 (1997) 57–78; Reill, *Vitalizing Nature* (→ n.172) 172–76 on Christian Hufeland’s *Der Scheintod* (1808) and vitalist theories of a condition between life and death during which bodies apparently dead can be brought back to life; Humphry Davy, “On some new phenomena of chemical changes produced by electricity,” *Phil Trans Royal Soc* 99 (1808) 1–44, q. 34; Shelley, *Journals*, I, 142, and cf. an undated entry of 1815 (p. 80) for Mary’s recipe for “regeneration,” which included “9 drops of human blood, 7 grains of gunpowder, ½ oz. of putrified brain, and 13 mashed grave worms.” For some illustrations: Susan E. Lederer, *Frankenstein: Penetrating the Secrets of Nature* (Rutgers U, 2002) esp. 15–21.

197. Shelley, *Frankenstein*, 50, 52–53, 95–96. On the motif of birth and abandonment in Shelley’s *oeuvre* and life, cf. Ellen Moers, “Female Gothic,” in *The Endurance of Frankenstein*, eds. G. Levine and U. C. Knoepfelmacher (UC, 1974) 77–87.

198. Michel Gilot and Jean Sgard, “Biographie,” in *Corpus Condillac, 1714–1780*, ed. Jean Sgard (Geneva: Slatkine, 1981) 43–54; Laurence L. Bongie, “A new Condillac letter and the genesis of the *Traité des sensations*,” *J H Phil* 16 (1978) 83–94; Étienne Bonnot de Condillac, “A Treatise on the Sensations (1754),” in *Philosophical Writings of Étienne Bonnot de Condillac, abbé de Condillac*, trs. F. Philip and H. Lane (Hillsdale: Erlbaum, 1982) 204–207, 232–34. Cf. Denis Diderot, “Letter on the deaf and dumb for the use of those who hear and speak” (1751), in *Diderot’s Early Philosophical Works*, tr. Margaret Jourdain (NY: AMS, 1973) 164–65 on analyzing a man sense by sense, and Nicolas Rousseau, *Connaissance et langage chez Condillac* (Geneva: Droz, 1986) 152–59 on how much Diderot borrowed from Condillac. For overviews, Lorne Falkenstein, “Étienne Bonnot de Condillac,” *Stanford Ency Phil*, ed. Edward N. Zalta (Winter 2002 ed.) at <http://plato.stanford.edu/archives/win2002/entries/condillac>; John C. O’Neal, *The Authority of Experience: Sensationalist Theory in the French Enlightenment* (Penn State U, 1996) 13–59. Condillac’s statue, as a sculpture, is put in art-historical context by Linda Walsh, “The ‘hard form’ of sculpture: marble, matter and spirit in European sculpture from the Enlightenment through Romanticism,” *Modern Intellectual H* 5,3 (2008) 445–86 at 458–65.

199. On “cacophony,” *OED*; Robert G. Mayne, *Expository Lexicon of the Terms, Ancient and Modern, in Medical and General Science* (L, 1860) 145, citing Galen; *Le Grand Robert* (→ n.61) I, 1792 s.v. “cacophonie”; M. de Beaunoir [= A.-L.-B. Robineau], *Le Cacophonie: comédie en un acte et en prose* (P, 1786); *La Cacophonie* (P, 1790?), voices pro and con Philippe d’Orléans; Armand Gouffé, *Nouvelle cacophonie, ou faites donc aussi la paix. Impromptu pacifique en un acte, mêlé de vaudevilles* (P, 1796/1797), the paradox of being ever at war in order to maintain peace. For Condillac, “A Treatise on the Sensations,” q. 204, 271–72. Cf. J.-J. Rousseau, “Dissonance, f.f. *en Musique*,” *Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers* (Stuttgart-Bad Canstatt: Frommann, 1966 [1751]) IV, 1049–50, defined initially as “tout accord désagréable à l’oreille,” although delimited within each musical system.

200. Kevin Binfield, *Writings of the Luddites* (Johns Hopkins U, 2004) q. 127 modernized, 153–54, q. 78; *Select Committee on Hand-Loom Weavers' Petitions* (1834) 428, quoted by E. P. Thompson, *The Making of the English Working Class* (L: Penguin, 1968) 307, and 279–82, 522–23 on the declining status of weavers; John E. Archer, *Social Unrest and Popular Protest in England, 1780–1840* (Camb U, 2000) 15–16, 33 and throughout. Mary Shelley finished the first draft of *Frankenstein* in the spring of 1817, then spent a month revising, April 10 to May 13.

201. Thompson, *Making of the English Working Class*, 547–602, 631, 646–48; Höhne, *In Pursuit of Love*, 56–57, 148, 165; Shelley, *Journals*, I, 174, reading the trial proceedings of the Spa Fields “riot” at this time, and also (II, 659) poring over Locke’s *Essay concerning Human Understanding*, from which Condillac drew heavily; Jeremy Bentham, *Plan of Parliamentary Reform in the Form of a Catechism* (NY: AMS, 1977 [1818]) 73; Shelley, *Frankenstein*, 97–99; Mellor, *Mary Shelley*, 113.

202. Condillac, “Treatise on the Sensations,” 330–31, and cf. Aliénor Bertrand, ed., *Condillac, l’origine du langage* (P: PUF, 2002) 10–13; Bernard Connor, *The History of Poland* (L, 1698) I, 342–43, 346–47, quoted in Michael Newton, *Savage Girls and Wild Boys: A History of Feral Children* (NY: St. Martin’s, 2002) 20–21 on the boy’s “hideous” countenance, chs. 2–4 for other 18th-century cases; Mellor, *Mary Shelley*, 54–55. Cf. Edgeworth, *Memoirs*, I, 177–79, 273–76, on Richard Edgeworth’s rearing of his eldest son by Rousseau’s principles, allowing the boy always to engage the world on his own terms, whereupon he became loud and unmanageable.

203. Jean-Luc Chappey, *La Société des Observateurs de l’Homme, 1799–1804* (P: Société des études robespierristes, 2002) 85–105, 363–66; L. F. Jauffret, letter of Jan. 29, 1800 in the “chronologie documentaire” provided by Thierry Gineste, *Victor de l’Aveyron: dernier enfant sauvage, premier enfant fou* (P: Sycamore, 1981) 109; for translations of many of the documents: Harlan L. Lane, *The Wild Boy of Aveyron* (Harvard U, 1976). The report by commissioner Constans-Saint-Estève and administrator Nougairoles, published in the *Journal des débats* (Jan. 24, 1800) 3, is translated by Roger Shattuck, *The Forbidden Experiment: The Story of the Wild Boy of Aveyron* (NY: Washington Square, 1980) 204–207. Useful also is Nancy Yousef, “Savage or solitary? The wild child and Rousseau’s man of nature,” *JH Ideas* 62 (2001) 245–63.

204. Pierre Joseph Bonnaterre, *Tableau encyclopédique et méthodique des trois règnes de la nature* (P, 1788–1790) I, xiv–xxii on the hearing of fish. Bonnaterre’s *Notice historique sur le sauvage de l’Aveyron* (August 1800) appears in Gineste, *Victor de l’Aveyron*, 149–73, q. 149 “ce nouveau membre,” 163 on burns and abuse, 166 on hearing, all translated by Lane, *Wild Boy*, 33–48.

205. Philippe Pinel, “Rapport fait à la Société des Observateurs de l’Homme sur l’enfant connu sous le nom de sauvage de l’Aveyron” (Nov. 29, 1800), in Gineste, *Victor de l’Aveyron*, 197–206, q. 201, translation in Lane, *Wild Boy*, 57–69, and in Jean Marc Gaspard Itard, *The Wild Boy of Aveyron (Le Sauvage de l’Aveyron: rapports et mémoires, 1801–06)*, trs. George and Muriel Humphrey (NY, 1932) 3–6, Itard’s summary of Pinel’s report, as presented in public by Jauffret two days before Sicard appointed Itard to his Institute.

206. Lane, *Wild Boy*, 51–53, 112 (disputing Itard’s account); Itard, *Wild Boy*, 10, q. 13, 29.

One who did pay heed to Bonnaterre was the young pharmacist Julien Joseph Virey in his *Histoire naturelle du genre humain* (1800) in which he distinguished between humans and other animals based in part on the human ability to make systematic distinctions—e.g., we may have less acute hearing, but we are more alert to consonance and dissonance. Such aural discrimination, indeed, was so basic to humanity that “the deaf appear even less intelligent than the blind” (1,74–75 in 1834 Paris edition). Virey’s dissertation on the wild boy is reproduced in Gineste, *Victor de l’Aveyron*, 179–97.

207. Itard, *Wild Boy*, 15, q. 26, q. 28, 55–56, q. 57; Lane, *Wild Boy*, 73ff. on the influence of Condillac; Shelley, *Frankenstein*, 221; Mellor, *Mary Shelley*, 67. Shelley makes no mention of this other Victor, but she likely had heard tell of him, given that Itard’s first report made a splash in England when immediately translated as *An Historical Account of the Discovery and Education of a Savage Man* (L, 1802). Cf. Nancy Yousef, “The monster in a dark room: *Frankenstein*, feminism, and philosophy,” *Modern Language Q* 63,2 (2002) 197–226, on the monster’s lack of an infancy and maternal relations. On a different note, the *topos* of the frozen word was given new life in Rudolph Erich Raspe’s *Baron Munchausen’s Narrative of his Marvellous Travels and Campaigns in Russia* (1785, often anonymously reprinted) ch. 5, “The Great and Wonderful Effects of the Frost upon his Servant’s French Horn,” and cf. Eric G. Wilson, *The Spiritual History of Ice: Romanticism, Science, and the Imagination* (NY: Palgrave Macmillan, 2003) on the new resonance of ice and frozenness.

208. Itard, *Wild Boy*, q. 59, q. 7; Chappey, *La Société des Observateurs de l’homme*, 31–36; Sophia Rosenfeld, *A Revolution in Language: The Problem of Signs in Late Eighteenth-Century France* (Stanford U, 2001), invaluable here and below on philosophical battles over signing and on the role of pantomime in French theater and thought. For a summary of Itard’s pedagogy and Victor’s later life in Paris: Shattuck, *Forbidden Experiment*.

209. *Cacophoniana, ou journal de ce qui s’est passé en la Grand’Chambre du Parnasse . . .* (P, 1790?); Victoire Hallays-Dabot, *Histoire de la censure théâtrale en France* (Geneva: Slotkine, 1970 [1862]) 113ff.; Frederick Brown, *Theater and Revolution: The Culture of the French Stage* (NY: Viking, 1980) ch. 2, “The Speechless Tradition,” and ch. 3, “The Boulevard of Crime,” esp. 87–88; Paul Friedland, *Political Actors: Representative Bodies and Theatricality in the Age of the French Revolution* (Cornell U, 2002) esp. 180–83, and cf. Jay Fliegelman, *Declaring Independence: Jefferson, Natural Language, and the Culture of Performance* (Stanford U, 1993) for an excellent study of the theories and experiences of oratory on the other side of the Atlantic; F. W. J. Hemmings, *Theatre and State in France 1760–1905* (Camb U, 1994) 32–34; Commune de Paris, *Arrête concernant le bruit, entendu dans l’égout de la rue basse du rempart, quartier de la Chaussée d’Antin* (P, 1791); Mona Ozouf, *Festivals and the French Revolution*, tr. Alan Sheridan (Harvard U, 1994); René C.G. de Pixérécourt, *Victor ou l’Enfant de la forêt: mélodrame en 3 actes, en prose et à grand spectacle* (P, Théâtre de l’Ambigü-Comique, June 10, 1798), based upon F.-G. Ducray-Duminil, *Victor ou l’Enfant de la forêt* (P, 1797 [1796?]), discussed by Gineste, *Victor de l’Aveyron*, 38–39, 112–13, and by Pixérécourt, *Théâtre choisi* (Geneva: Slatkine, 1971 [1841]) I,1–li.

210. Rosenfeld, *A Revolution in Language*, ch. 4; Rée, *I See a Voice* (→n.144) 141–94; and from the viewpoint of an advocate of signing and deaf culture, Harlan L. Lane, *When the Mind Hears: A History of the Deaf* (NY: Random House, 1984) on the history of the

imposition of oralist pedagogy, more carefully situated by Anne T. Quartararo, *Deaf Identity and Social Images in Nineteenth-Century France* (Gallaudet U, 2008) 9-67. Examples of 18th-century treatments for deafness may be found in an anonymous text at the National Library of Medicine, MS B 138. Prescriptions and instructions for making various medicines (L, 175-?), 87ff., and cf. James Graham's advertisements in *The Pennsylvania Gazette* (May 28 and July 9, 1772), promising cures of total and partial deafness and of "continual and remitting noises and sounds in the ears." Blindness, similarly, could refer to degrees of weak-sightedness, and the educated "blind," who often had some residual vision, pitied the deaf as socially inept, "uneasy and distrustful amidst a crowd or in company," and therefore "constantly sad": Thérèse-Adele Husson, *Reflections: The Life and Writings of a Young Blind Woman in Post-Revolutionary France*, trs. and eds. Catherine J. Kudlick and Zina Weygand (NYU, 2001 [1825]) 4, 33.

211. Shattuck, *Forbidden Experiment*, esp. 186-87 on Itard's failure to exploit Victor's set of naive signs; Gineste, *Victor de l'Aveyron*, 76-77; Lane, *Wild Boy*, 185-228, 240-41; Shelley, *Journals*, II, 507-508, and "The Mourner," in *The Keepsake for 1830*, ed. Frederic M. Reynolds (L, 1829) 71-72, 96.

212. Philippe Pinel, *Traité médico-philosophique sur l'aliénation mentale*, 2nd ed. (NY: Arno, 1976 [1809]) 21, 63n.-64n., 71-73, 223, 229, 237, 251ff., 162, 172-76, 309-13, 323-33; Jackie Pigeaud, *Aux portes de la psychiatrie: Pinel, l'ancien et le moderne* (P: Aubier, 2001) esp. 171, 179-81, 192-196 on synaesthesia, 230, 243-44; Jan Goldstein, *Console and Classify: The French Psychiatric Profession in the Nineteenth Century* (U Chicago, 2001) 66ff. on the roots of "moral treatment" in Condillac's sensationalism and British analyses of the passions.

213. Shelley, *Frankenstein*, 52; Otto Mayr, *Feedback Mechanisms in the Historical Collections of the National Museum of History and Technology* (DC: Smithsonian, 1971) 1-5; idem, *Authority, Liberty, and Automatic Machinery in Early Modern Europe* (Johns Hopkins U, 1986) 190-99. On the monster as a dislocated worker: Bryan D. Palmer, *Cultures of Darkness: Night Travels in the Histories of Transgression* (NY: Monthly R, 2000) 135.

214. On automata, see, e.g., *Newport Mercury* (Oct. 1, 1764) "To be seen at Mrs. Cowley's, a curious Piece of Clock work, by which the Image of a Man is made to beat upon a Drum to Admiration; his Wife by his Side dances to the Drum, and calls him Cuckold," in Henry Brooks, *Olden-Time Musics* (B, 1888) 59-60; Jean-le-Rond d'Alembert, "Androïde," *Encyclopédie*, I, 448-51, and idem, "Automate," 896-97. On anatomical waxworks: Rebecca Messbarger, "Waxing poetic: Anna Morandi Manzolini's anatomical sculptures," *Configurations* 9,1 (2001) 65-97, and for examples thereof, esp. a waxwork ear, see www.unibo.it/musei/palazzopoggi/poggi_eng/palazzo/foto/700_4.htm and the Museo Zoologica "La Specola" in Florence, www.specola.unifi.it/cere/collezione-ceroplastica.htm. Hofmann's "Sand-Man" appeared in 1817 as the first of a series of "Night-Pieces." On surveillance: Foucault, *Discipline and Punish* (→ n.89).

215. Jean Marc Gaspard Itard, *Traité des maladies de l'oreille et de l'audition* (P, 1821) I, 1-36, 151-57, q. 4; Jean Fernel, *The Physiologia*, ed. and tr. John M. Forrester (Phila: Amer Phil Soc, 2003 [1567]) 111, 333, 469; Erlmann, *Reason and Resonance* (→ n.37) 61-64. One 18th-century anatomist had emphasized the importance of a "limpid serosity" filling the labyrinth, though he could not locate the ducts from which this "humor" had to

come: Peter Degrauers, *A Complete Physico-Medical and Chirurgical Treatise on the Human Eye . . . to Which is Now Added a Treatise on the Human Ear* (NY: Classics of Ophthalmology, 1992 [Edinburgh, 1788]) 249, 262. For a bit more on Valsalva, Morgagni, Meckel, Cotugno, Scarpa, Itard and his contemporaries: Békésy and Rosenblith, "The early history of hearing" (→ n.37).

216. Robert T. Beyers, *Sounds of Our Times: Two Hundred Years of Acoustics* (NY: Springer, 1999) 6-7, 34-36; Jules Gavarret, "Acoustique," *Dict encyclopédique des sciences médicales*, eds. Raige-Delorme and A. Cechambre (P, 1865) I,618; Jean-Daniel Colladon, "Experiments on the velocity of sound in water" (1893), in Lindsay, *Acoustics* (→ n.36) 195-201.

217. Tom G. Vallance et al., comps., *Nature's Investigator: The Diary of Robert Brown in Australia, 1801-1805* (Canberra: Australian Biological Resources Study, 2001) 105; David Mabblerley, *Jupiter Botanicus: Robert Brown of the British Museum* (Braunschweig: Cramer, 1985) 81, 268-71; M. D. Haw, "Colloidal suspensions, Brownian motion, molecular reality: a short history," *J Physics: Condensed Matter* 14 (2002) 7769-79; Robert M. Mazo, *Brownian Motion: Fluctuations, Dynamics, and Applications* (Oxford: Clarendon, 2002) 1-9, and noting (p. 2) that Brown used "molecule" in its premodern meaning, as the ultimate constituent of matter. Cf. G. A. Tokaty, *History and Philosophy of Fluid Mechanics* (NY: Dover, 1994) 85ff., on the upsurge of works on viscosity, 1813-22.

218. Ernst F. F. Chladni, *Traité d'acoustique* (P, 1809 [1802]) esp. i-ii, vii, and 311ff. on speed of sound through water and solids, and cf. an excerpt from Chladni's *Entdeckungen über die Theorie des Klanges* (1787) translated in and by Lindsay, ed., *Acoustics* (→ n.36) 155-65; Myles W. Jackson, *Harmonious Triads: Physicists, Musicians, and Instrument Makers in Nineteenth-Century Germany* (MIT, 2006) 13-44. Napoleon came to the Institut de France to see Chladni demonstrate his figures; the Académie des Sciences then offered a prize for a mathematical model of vibration along elastic surfaces. The only submissions came from Marie-Sophie Germain (1776-1831), who finally won, after three tries, with an incomplete but effective solution in 1816. She would later work out a general equation for vibrations of curved and planar elastic surfaces: Amy D. Dalmédico, "Sophie Germain," *Sci Amer* 265 (Dec. 1991) 117-22. Stubborn problems also arose from Chladni's related acoustic experiments with glass rods: James F. Bell, "The late 20th-century resolution of a mid-19th-century dilemma generated by the 18th-century experiments of Ernst Chladni on the dynamics of rods," *Archive H Exact Sci* 43 (1991) 251-73, and cf. Olivier Darrigol, "Between hydrodynamics and elasticity theory: the first five births of the Navier-Stokes equation," *ibid.* 56 (2002) 95-150. On Chladni himself, Franz E. Melde, *Chladni's Leben und Werke* (Marburg, 1888) esp. 12ff. on his frustrated attempts to arrive at consistent distinctions between sound, tone, timbre, and noise (*Geräusch*); Sigalia C. Dostrovsky, "Chladni, E. F. F.," *DSB*, III,258-59, and for prior history, "Early vibration theory: physics and music in the seventeenth century," *Archive H Exact Sci* 14 (1975) 169-218.

219. Kenneth W. Berger, "Early bone conduction hearing aid devices," *Archives of Otolaryngology* 102 (1976) 315-18, with illustration of bone-conduction device created by Itard himself; Itard, *Traité*, I,134-35, 144. A contemporary, Thomas Buchanan, thought enough of ear wax to imply that it too might be a medium for transmitting sound: *Physiological Illustrations of the Organ of Hearing, More Particularly of the Secretion of Cerumen, and*

Its Effects in Rendering Auditory Perception Accurate and Acute (L, 1828) viii, 33, 36–37. Itard also invented a procedure for “flushing out the lymphatic excrement” from the Eustachian tube, a procedure he foisted upon his students at the Institute: Harlan L. Lane, *Mask of Benevolence: Disabling the Deaf Community* (NY: Knopf, 1992) 212–13.

220. George T. Ealy, “Of ear trumpets and a resonance plate: early hearing aids and Beethoven’s hearing perception,” *19th-Century Music* 17,3 (1994) 262–273; Barry A. R. Cooper, *Beethoven* (Oxford U, 2000) 72, 103, 108, 116, 120, 225, 256, 260, 265, 291; Lawrence Kramer, *Music as Cultural Practice, 1800–1900* (UC, 1990) 49–71 on Opus 111, q. 50; Russell Martin, *Beethoven’s Hair* (NY: Broadway, 2000) 223–38 (hair sample with 42x the average lead level); “Argonne researchers confirm lead in Beethoven’s illness,” *Sci Daily* (Dec. 8, 2005) at www.sciencedaily.com/releases/2005/12/051207211035.htm but contrast Jillyn Smith, *Senses and Sensibilities* (NY: Wiley, 1989) 45, Beethoven suffering from the abnormal bone growth of Paget’s Disease, which can crush the auditory nerves; Peter Charleton, at www.physics.usyd.edu.au/~simonj/lvb/ps_more.html#op111 (site created by Simon Johnston, 2000); Anthony Burr, personal communication, Jan. 2009; Eric Bromberger on Opus 111, in www.performances.org/encores_note/Pogorelich.asp (2004), asking with regard to the second movement, whose final variation employs trills that go on for pages: “Can it be that Beethoven—who had been deaf for years when he wrote these works—made such heavy use of trills so that he could at least *feel* the music beneath his hands even if he could not hear it?” Ealy (p. 264) notes that Beethoven had considered electrical treatments for his deafness but never got them—fortunately, given that Volta had tested his new battery as a means for stimulating hearing but found that after he pushed a metal rod into each of his own ears and closed the circuit, he “began to be conscious of a sound, or rather a Noise in my ears . . . a kind of crackling, jerking or bubbling as if some dough or thick stuff was boiling,” which continued until he broke the tinnital circuit: Alessandro Volta, “On the electricity excited by the mere contact of conducting substances of different kinds,” *Phil Trans Royal Soc* 90 (1800) 403–32, q. 427.

221. Chladni, *Traité d’acoustique*, 46–47, 257, 265; James Tenney, *A History of Consonance and Dissonance* (NY: Excelsior, 1988), esp. 78–80 on the early-19th-century redefinition of dissonance as notes “judged to have a strong tendency to motion,” similar to the constant motion of Brownian particles. For decades Itard had listened *through* the odd timbres and loud tones of the deaf, but he had also listened *to* their incidental noises while laboring to speak, since these noises were key to correcting the mouth shapes and tongue positions of all whose hearing was inadequate to monitor their own sounds.

On “cats’ music”: Fritz Spiegl, *Music Through the Looking Glass* (L: Routledge and Kegan Paul) 56–58, reproducing an engraving by Johannes Kellerthaler (ca. 1560–1637), “Narrenkonzert am Katzenklavier,” after a drawing by Jacques Callot, who reworked an emblem from Johann Theodor de Bry’s *Emblemata Saecularia* (1596), reproduced in Robert J. Richards, “Rhapsodies on a cat-piano, or Johann Christian Reil and the foundations of Romantic psychiatry,” *Critical Inquiry* 24 (Spring 1998) 700–36 at 701. The idea, which reversed the imagery of cats playing musical instruments on late-medieval marginalia, and which had perhaps its origins in a carnivalesque 1549 procession in Brussels, was amplified by Athanasius Kircher in *Musurgia Universalis* (1650) and Caspar Schott, *Magia Naturalis*

(1657): <http://en.wikipedia.org/wiki/Katzenklavier>. Cf. Jeremy Barlow, *The Cat and the Fiddle: Images of Musical Humour from the Middle Ages to Modern Times* (U Chicago, 2006) chs. 1 and 3; Vanessa Agnew, *Enlightenment Orpheus: The Power of Music in Other Worlds* (Oxford U, 2008) 157–60 on late-18th-century cat-pianos.

222. Cf. Bernhard Siegert, “Schüsse, Schocks und Schreie: Zur Undarstellbarkeit des Diskontinuität bei Euler, d’Alembert und Lessing,” in *Das Laokoon-Paradigma: Zeichenregime im 18. Jahrhundert*, eds. Inge Baxmann et al. (Berlin: Akademie, 2000) 291–306.

223. Jenny Uglow, *Elizabeth Gaskell: A Habit of Stories* (L: Faber and Faber, 1993) 95, from a baby diary of her daughter Marianne, whose early sounds Gaskell noted and listed.

224. Dave Bohn, *Glacier Bay, The Land of the Silence*, ed. David Brower (San Francisco: Sierra Club, 1967) 27. Silentiaries: Louis Bréhier, *Les Institutions de l’empire byzantin* (P, 1949) 68, 132; N. M. Penzer, *The Harém* (Phila, 1937) 96–98; M. Miles, “Signing in the seraglio: mutes, dwarfs, and jesters at the Ottoman court, 1500–1790,” *Disability & Soc* 15 (2000) 115–34. Mountain peaks: Horace Bénédicte de Saussure, *Voyages dans les Alpes* (Neuchâtel, 1779–96) IV, 206–207; Showell Styles, *On Top of the World: An Illustrated History of Mountaineering and Mountaineers* (NY: Macmillan, 1967) 9–13ff. Cistercians: Pauline Matarasso, tr. and ed., *The Cistercian World: Monastic Writings of the Twelfth Century* (L: Penguin, 1993) 31; Paul F. Gehl, “*Competens silentium*: varieties of monastic silence in the medieval West,” *Viator* 18 (1987) 125–60; Robert A. Barakat, *The Cistercian Sign Language* (Kalamazoo: Cistercian Pub., 1975); Scott G. Bruce, *Silence and Sign Language in Medieval Monasticism: The Cluniac Tradition c. 900–1200* (Camb U, 2007). Prisons: William Godwin, *Things as They Are; or, The Adventures of Caleb Williams*, 2nd ed. (L, 1796 [1794]) II, 204, 211; Richard M. Andrews, *Law, Magistracy and Crime in Old Regime Paris, 1735–1789* (Camb U, 1994) 345–47, 356 on Salpêtrière; Thorsten Sellin, *Pioneering in Penology: The Amsterdam Houses of Correction in the Sixteenth and Seventeenth Centuries* (U Penn, 1944), updated by Peter Spierenburg, “The sociogenesis of confinement and its development in early modern Europe,” in *The Emergence of Carceral Institutions: Prisons, Gallies, and Lunatic Asylums, 1550–1900*, ed. Spierenburg (Rotterdam: Erasmus U, 1984) 9–77; Edward Brown, *An Account of Several Travels through a Great Part of Germany* (L, 1677) in *Account of Some Travels* (NY: Arno, 1971) 13; Torsten Eriksson, *The Reformers: An Historical Survey of Pioneer Experiments in the Treatment of Criminals*, tr. Catherine Djurklou (NY: Elsevier, 1976) esp. 18–28 on Ghent’s Octagon and Carlo Fontana’s cellular prison for juveniles in Rome. On architectural forerunners—monasteries, castles, bishops’ palaces—see Norman Johnston, *Forms of Constraint: A History of Prison Architecture* (U Illinois, 2000).

225. John H. Langbein, “The historical origins of the sanction of imprisonment for serious crime,” *J Legal Studies* 5 (1976) 35–60, 54 for England; Spierenburg, “The body and the state” (→ n.89) 59, Amsterdam; J. M. Beattie, *Crime and the Courts in London, 1660–1800* (Princeton U, 1986) 450–519, 541 on transportation; Betty T. Bennett, ed., *The Letters of Mary Wollstonecraft Shelley* (Johns Hopkins U, 1980) I, 67, letter of May 13, 1818; Steven Lynn, “Locke and Beccaria: faculty psychology and capital punishment,” in *Executions and the British Experience from the Seventeenth to the Twentieth Century*, ed. William B. Thesing (Jefferson: McFarland, 1990) 9–43; Barry Faulk, “The public execution: urban rhetoric and Victorian crowds,” *ibid.*, 77–91.

226. Michael Ignatieff, *A Just Measure of Pain: The Penitentiary in the Industrial Revolution, 1750–1850* (L: Macmillan, 1978) 102; Jonas Hanway, *Solitude in Imprisonment* (L, 1776) 102–103, 104, 106, 109; G. F. R. Barker, “Hanway, Jonas,” *DNB* VIII, 1196–1200, and cf. Foucault, *Discipline and Punish* (→ n.89). The faith that English prison reformers placed in solitude had shallower roots in monasticism than in mystical, Neoplatonic, and Puritan ideas of the power of private meditation, on which listen to Tom Dixon, “Meditation is the Musick of Souls: the silent music of Peter Sterry (1613–1672),” in *Silence, Music, Silent Music* (→ n.10) 187–203, and to Thomas Bowen, *Thoughts on the Necessity of Moral Discipline in Prisons, As Preliminary to the Religious Instruction of Offenders* (L, 1797) 19: “when they are left to commune with their own hearts in SILENCE and in SOLITUDE, they are then placed in a situation best calculated to dispose their minds for the reception of religious truths.”

227. John Howard, *The State of the Prisons in England and Wales*, 2nd ed. (Warrington, 1780) q. 19, 21, q. 27, 43, 48, q. 52, 108–109, 132–33; Margaret DeLacy, *Prison Reform in Lancashire, 1700–1850* (Stanford U, 1986) 80–94 on typhus; E. P. Thompson, “Time, work-discipline and industrial capitalism,” *Past & Present* 38 (1979) 56–97; Douglas Hay and Francis Snyder, “Using the criminal law, 1750–1850: policing, private prosecution and the State,” in their jointly edited *Policing and Prosecution in Britain: 1750–1859* (Oxford: Clarendon, 1989) 3–54, at 19; Flora Tristan, *The London Journal of Flora Tristan*, tr. Jean Hawkes (L: Virago, 1982 [1842]) 69 on English prisons.

228. Jeremy Bentham, *Correspondence*, ed. Stephen Conway (Oxford: Clarendon, 1988) VIII, 544–46, Letter 2358 to John H. Koe, Aug. 17–18, 1816; Janet Semple, *Bentham’s Prison* (Oxford: Clarendon, 1993) 34, 78–90, q. 288; William Hazlitt, *The Spirit of the Age* (Spelsbury: Woodstock, 1989 [1825]) q. 5; Thomas Moore, “Ode to the Goddess Ceres, by Sir Thomas Lethbridge,” *The Poetical Works* (NY, 1853) 551 on the “post-prandial vibration”; Simon Werrett, “Potemkin and the Panopticon: Samuel Bentham and the architecture of absolutism in eighteenth-century Russia,” *J Bentham Studies* 2 (1999) at www.ucl.ac.uk/Bentham-Project/journal; Johnston, *Forms of Constraint*, 50–51; Jeremy Bentham, *Works*, ed. John Bowring (NY, 1962) IV, 37–172, 41, 46, q. 63, 67, 70–71, q. 72, q. 84n., 91–92, q. 157, also in *The Panopticon Writings*, ed. Miran Božovič (L: Verso, 1995 [1787–1791]); John Bender, *Imagining the Penitentiary: Fiction and the Architecture of Mind in Eighteenth-Century England* (U Chicago, 1987) 201–29 on attitudes toward isolation in the context of ideas of autonomous “character.”

229. Rowland Hill and George Birkbeck Hill, *The Life of Sir Rowland Hill* (L, 1880) I, 89–90, q. 112–13, 122; Semple, *Bentham’s Prison*, 283, 288, 290; Johnston, *Forms of Constraint*, 82–83; Edward L. Ayers, *Vengeance and Justice: Crime and Punishment in the 19th-Century American South* (Oxford, 1984) 38 on Richmond; Hanway, *Solitude in Imprisonment*, q. 103.

230. C. F. A. Marmoy, “The ‘auto-icon’ of Jeremy Bentham at University College, London,” *Med H* 2,2 (1958) 77–86.

231. Robin Evans, *The Fabrication of Virtue: English Prison Architecture, 1750–1840* (Camb U, 1982) 332–35; Ignatieff, *A Just Measure of Pain*, q. 4–5, 9, sounds at Pentonville; Tristan, *London Journal*, 71 for groans, 142–44 for Millbank, and cf. 114–15, 125 on the sounds of

Newgate; W. S. Inman, ed., *Report of the Committee of the House of Commons on Ventilation, Warming and Transmission of Sound* (L, 1836); *Extracts from the Second Report of the Inspectors of Prisons from the Home District* (L, 1837) 33–41. Frederic Hill, inspecting Scottish prisons, could hear the prisoners from a distance, given the “profane language that was shouted to persons walking beneath the walls”: *An Autobiography of Fifty Years in Times of Reform* (L, 1893) ch. 7, q. 122.

232. F. A. F. La Rochefoucauld-Liancourt, *On the Prisons of Philadelphia* (Phila, 1796) 18, and cf. Simon P. Newman, *Embodied History: The Lives of the Poor in Early Philadelphia* (U Penn, 2003) 54, who notes that such quiet rarely obtained; Benjamin Rush, *An Enquiry into the Effects of Public Punishments, upon Criminals, and upon Society* (Phila, 1787) 10, in Michael Meranze, *Laboratories of Virtue: Punishment, Revolution, and Authority in Philadelphia, 1760–1835* (U North Carolina, 1996) q. 133, and 121–35 on Rush; Orlando F. Lewis, *The Development of American Prisons and Prison Customs, 1776–1845* (Montclair: Patterson Smith, 1967) 79–86, 228–30; George W. Smith, *A Defence of the System of Solitary Confinement of Prisoners adopted by the state of Pennsylvania* (Phila, 1833) q. 9, q. 11, q. 62, 65; Robert J. Turnbull, *A Visit to the Philadelphia Prison* (Phila, 1796) 54–56, in Meranze, p. 194. Cf. Andrew Skotnicki, *Religion and the Development of the U.S. Penal System* (U Press of Amer, 2000).

233. William Irwin, *The New Niagara: Tourism, Technology, and the Landscape of Niagara Falls, 1776–1917* (Penn State U, 1996) ch. 1; Jacques Gérard Milbert, *Picturesque Itinerary of the Hudson River*, tr. Constance D. Sherman (Ridgewood: Gregg, 1968 [1828–1829]) 20, 43, 51, 59, 60, 80, 82, 111; La Rochefoucauld-Liancourt, *On the Prisons of Philadelphia*, 20; Basil Hall, *Travels in North America in the Years 1827 and 1828* (Edinburgh, 1829) I, 19–20, 22, 53–56, 89; Prison Discipline Society of Boston, *Reports* (Montclair: Patterson Smith, 1972 [1855]) 1 (for 1826) 10 and 2 (for 1827) 115; Gustave de Beaumont and Alexis de Tocqueville, *On the Penitentiary System in the United States*, ed. and tr. Francis Lieber (Southern Illinois U, 1964 [1833]) 65, and cf. the follow-up by French architect Abel Blouet and Frederic-Auguste De Metz, *Rapports . . . sur les pénitenciers des États-Unis* (P, 1837) especially dubious about the possibility of maintaining absolute silence; Scott Christianson, *With Liberty for Some: 500 Years of Imprisonment in America* (Northeastern U, 1998) 126 for Horace Lane.

234. Francis C. Gray, *Prison Discipline in America* (L, 1848) 32; Carnegie Library of Pittsburgh, *Pittsburgh in 1816* (Pittsburgh, 1916) at www.carnegielibrary.org/locations/pennsylvania/history/pgh1816.html; Prison Discipline Society of Boston, *Reports*, no. 1 (for 1826) 23 on more “colored” than whites, q. 37 on sodomy, q. 46 on moral discipline, and no. 2 (for 1827) 58 against “unrestrained intercourse between villains,” 64 on sodomy; Ayers, *Vengeance and Justice*, 61, 295 on Maryland. On pressures to imprison free blacks in the North: Scott Christianson, *With Liberty for Some: 500 Years of Imprisonment in America* (Northeastern U, 1998) 97, 104–106. National statistics for the years 1880–1970 show that non-white prisoners on average constituted one-quarter to one-third of the prison population but more than a half in parts of the South; the data also suggest that black prisoners everywhere served longer sentences: Jessie C. Smith and Carrell P. Horton, eds., *Historical Statistics of Black America* (NY: Gale, 1995) 425, 455, 541; Margaret W. Cahalan and Lee Anne Parsons, *Historical Corrections Statistics in the United States, 1850–1984* (Rockville:

Westat, 1986) 66, 91, 168.

235. Robert F. Berkhofer, Jr., *The White Man's Indian: Images of the American Indian from Columbus to the Present* (NY: Random House, 1978) esp. 28; George Percy, *Observations Gathered Out of a "Discourse of the Plantation of the Southern Colony in Virginia, by the English, 1606"*, ed. David B. Quinn (U Press of Virginia, 1967) 11–12; John Smith, *A Map of Virginia* (1612), quoted by Sandra M. Gustafson, *Eloquence Is Power: Oratory and Performance in Early America* (U North Carolina, 2000) 6, and 123, 127; Rath, *How Early America Sounded* (→ n.58) ch. 5, esp. 152, 160; Mitford M. Mathews, *Dict of Americanisms on Historical Principles* (U Chicago, 1951) 1297 on "powwow," as also Clyde Ellis et al., eds., *Powwow* (U Nebraska, 2005) 130–49, and Ruth Bender, "Performing patriotism in Native North America: Ojibwa powwow-sounds and the paradoxes of identity," in *The Auditory Culture Reader* (→ n.97) 241–63; Paul E. Kopperman, *Braddock at the Monongahela* (U Pittsburgh, 1977) q. 73, as also E. B. O'Callaghan, ed., *Documents Relative to the Colonial History of the State of New York* (Albany, 1855) X,303–304; Patrick M. Malone, *The Skulking Way of War: Technology and Tactics among the New England Indians* (Lanham: Madison, 1991) 10, 15, 82; Robert Diebold, ed., *The Narrative of the Captivity and Restoration of Mrs. Mary Rowlandson* (Lancaster, Mass: Bicentennial Commission, 1975 [1682+]) 6–7; Julie T. Andresen, *Linguistics in America, 1769–1924* (L: Routledge, 1990) 83–86, 91–95, 99; Barbara De Wolfe, ed., *Discoveries of America* (Camb U, 1997) q. 93 Whitelaw; J. Hector St. John (= Michel de Crèvecoeur), *Letters from an American Farmer* (L, 1782) Letter XII; *DAE*, II,1288, s.v. "hubbub."

236. Advertisement in *The Pennsylvania Gazette* (Sept. 12, 1745).

237. Mark M. Smith, "Time, sound, and the Virginia slave," in *Afro-Virginian History and Culture*, ed. John Saillant (NY: Garland, 1999) 29–60; Winthrop Jordan, *Tumult and Silence at Second Creek: An Inquiry into a Civil War Slave Conspiracy* (Louisiana State U, 1993) 20–28; American Anti-Slavery Society, *James Williams, An American Slave, Who Was for Several Years a Driver on a Cotton Plantation in Alabama* (NY, 1838) 34–35; Sylvia R. Frey and Betty Wood, *Come Shouting to Zion: African-American Protestantism in the American South and British Caribbean to 1830* (U North Carolina, 1998) esp. 144–46; Albert J. Raboteau, *A Fire in the Bones: Reflections on African-American Religious History* (B: Beacon, 1995) ch. 7; Charles Giles, *A Scriptural Discourse on Noise: Being a Plain Vindication of Sonorous Adoration* (Sherburne, 1805) 8, 11, 21 for Rev. 19; William S. White, *The African Preacher* (Phila, 1849) 32–34 for Uncle Jack; *Memoirs of Old Elizabeth A Coloured Woman* (Phila, 1863) 11. For much more: Shane White, *The Sounds of Slavery: Discovering African American History Through Songs, Sermons, and Speech* (B: Beacon, 2005).

238. American Anti-Slavery Society, *James Williams*, 83–88; Louis Hughes, *Thirty Years a Slave: From Bondage to Freedom* (Milwaukee, 1897) 24, 143–45. Cf. John Saillant, "'Remarkably emancipated from bondage, slavery, and death': an African American retelling of the Puritan captivity narrative," *Early Amer Lit* 29,2 (1994) 122–40.

239. William D. Piersen, "African American festive style and the creation of American culture," in *Riot and Revelry in Early America*, eds. William Pencak et al. (Penn State U, 2002) 255–72, q. 256 for "sonorous metals"; Len Travers, *Celebrating the Fourth: Independence Day and the Rites of Nationalism in the Early Republic* (U Mass, 1997); Shane White,

Somewhat More Independent: The End of Slavery in New York City, 1770–1810 (U Georgia, 1991) 96–106 on Pinkster, as also A. J. Williams-Myers, *Long Hammering: Essays on the Forging of an African American Presence in the Hudson River Valley* (Trenton: Africa World, 1994) 85–98; David Roberts, “Forgotten American observances: remembering the First of August,” a well-annotated article at userwww.sfsu.edu/~epf/2002/roberts.html; James Fenimore Cooper, *Satanstoe* (1845) 60, quoted by Eric Lott, *Love and Theft: Blackface Minstrelsy and the American Working Class* (Oxford U, 1993) 46. Cooper, of course, had been responsible for fixing silence upon and within the Native American as well: Christopher Krentz, *Writing Deafness: The Hearing Line in Nineteenth-Century American Literature* (U North Carolina, 2007) 78–88.

240. “Our grand periodical sham!” *Frederick Douglass Paper* (June 16, 1854), and “[Picture of New York],” *ibid.* (Dec. 3, 1852); John Adams to James Warren, April 22, 1776, in *Letters of Delegates to Congress, 1774–1789*, ed. Paul H. Smith (DC: Lib of Congress, 1976–2000) III,570, as also XX,228, Oliver Ellsworth to Oliver Wolcott, May 6, 1783, and XIX,252, David Howell to Nicholas Brown, Oct. 12, 1782, and XXII,522–23, Richard Henry Lee to James Duane, July 20, 1785; Sean Wilentz, *Chants Democratic: New York City and the Rise of the American Working Class, 1788–1850* (Oxford U, 1984) q. 52 from the *Independent Mechanic* (April 13, 1811), and throughout. The Founding Fathers were no friends to urban hurly-burly: Ben Franklin in Philadelphia moved away from the market area to avoid the frequent interruptions that caused him to have to repeat himself in conversation, and he “resented ‘the whole Fraternity of Noise’”; John Adams wrote, when young but already strong-minded: “Who can study in Boston streets? . . . My eyes are so diverted with chimney-sweepers, sawyers of wood, merchants, ladies, priests, carts, horses, oxen, coaches, market-men and women, soldiers, sailors; and my ears with the rabble-gabble of them all, that I cannot think long enough in the street, upon any one thing, to start and pursue a thought”: Carl Bridenbaugh, *Cities in Revolt: Urban Life in America, 1743–1776* (NY, 1964 [1955]) 24, 35–36.

241. Mark M. Smith, *Listening to Nineteenth-Century America* (U North Carolina, 2001); David Walker, *Appeal to the Coloured Citizens of the World* (1820) quoted in Albert J. Raboteau, *Canaan Land: A Religious History of African Americans* (Oxford U, 1999) 30; Charles Ball, *Fifty Years in Chains; Or, The Life of an American Slave* (NY, 1859) 42–43, frolics; Shane White and Graham White, “‘Us likes a mixtery’: listening to African-American slave music,” *Slavery and Abolition* 20 (1999) 22–48, q. 23 for Douglass, 26 for *coloratura* calls; Jon Cruz, “Testimonies and artifacts: elite appropriations of African American music in the nineteenth century,” in *Viewing, Reading, Listening*, eds. Cruz and Justin Lewis (Boulder: Westview, 1994) q. 132 on “cheerful music,” and cf. his larger study, *Culture on the Margins: The Black Spiritual and the Rise of American Cultural Interpretation* (Princeton U, 1999); Roger D. Abrahams, *Singing the Master: The Emergence of African American Culture in the Plantation South* (NY: Pantheon, 1992) xix, q. 5, pass. on corn shucking; Saidiya V. Hartman, *Scenes of Subjection: Terror, Slavery and Self-Making in Nineteenth-Century America* (Oxford U, 1997) esp. 33–37, 45–46.

242. Adam J. Hirsch, *The Rise of the Penitentiary: Prisons and Punishment in Early America* (Yale U, 1992) esp. ch. 7 on prison labor and slavery, and cf. Michael Hindus, *Prison and*

Plantation: Crime, Justice, and Authority in Massachusetts and South Carolina, 1767–1878 (U North Carolina, 1980); Dorothea Lynde Dix, *Remarks on Prisons and Prison Discipline in the United States*, 2nd ed. (Montclair: Patterson Smith, 1984 [1845]) 43 on fees; Ayers, *Vengeance and Justice*, 65–67, 70; Dario Melossi and Massimo Pavarini, *The Prison and the Factory: Origins of the Penitentiary System*, tr. Glynis Cousin (Totowa: Barnes and Noble, 1981) esp. 129–34; William Crawford, *Report on the Penitentiaries of the United States* (Montclair: Paterson Smith, 1969 [1835]) 13 on longer sentences so that each prisoner could learn a trade. But cf. Meranze, *Laboratories of Virtue*, 79–90 on the *débâcle* of chain gangs put to work on public projects in Philadelphia; instead of laboring silently, prisoners (p. 107) would unrepentantly “laugh, sing and swear in their chains.”

243. Elizabeth H. Cawley, ed., *The American Diaries of Richard Cobden* (NY: Greenwood, 1969) 107, 109; Skotnicki, *Religion and the Development of the U.S. Penal System*, 69–70 on the island of cells, designed by William Britton; W. David Lewis, *From Newgate to Dannemora: The Rise of the Penitentiary in New York, 1796–1848* (Cornell U, 1965) 123; Charles Dickens, *American Notes and Pictures from Italy* (L, 1874 [1842]) 116, excerpted and rebutted by Dix (*Remarks*, p. 76) but cf. *David Copperfield* (1850) ch. 61; Lewis, *Development of American Prisons*, q. 184–85 from the 1837 report of chaplain Gerrish Barrett, dismissed soon after. The “hang-dog” look was mentioned explicitly by Charles Dudley Warner in an article of 1885 included in *Papers in Penology* (Elmira, 1886) 9. As for the Eastern Pennsylvania Penitentiary, whose separateness had often been circumvented by prisoners communicating through plumbing lines and skylights, it would be reconfigured in 1856 to reduce isolation after too many prisoners went insane: Jennifer L. Janofsky, “There Is No Hope for the Likes of Me: Eastern State Penitentiary, 1829–1893,” Ph.D. thesis, Temple U, 2004.

244. Charles L. Cherry, *A Quiet Haven: Quakers, Moral Treatment, and Asylum Reform* (Fairleigh Dickinson U, 1989) esp. 21, 25, 40–42, 90–92; Harriet Martineau, *Retrospect of Western Travel* (L, 1838) I, 124–25, quoted by Nicole H. Rafter, *Partial Justice: Women in State Prisons, 1800–1935* (Northeastern U, 1985) 6, and xx–xxi, 4–5, 11 on the “vile,” 15–20 on Farnham; Russell P. Dobash et al., *The Imprisonment of Women* (Oxford: Blackwell, 1986) q. 45; Estelle B. Freedman, *Their Sisters’ Keepers: Women’s Prison Reform in America, 1830–1930* (U Michigan, 1981) ch. 3; Eliza Farnham, *Woman and Her Era* (NY, 1864) II, 249; Jo Ann Levy, *Unsettling the West: Eliza W. Farnham and Georgiana Bruce Kirby in Frontier California* (Berkeley: Heyday, 2004) 11–14, 31, 203–11. Cf. Mark Colvin on women offenders and the Female Moral Reform Society in *Penitentiaries, Reformatories, and Chain Gangs* (NY: St. Martin’s, 1997) pt. II, 135ff.

245. Rafter, *Partial Justice*, 10, and cf. Joel P. Eigen, *Witnessing Insanity: Madness and Mad-Doctors in the English Court* (Yale U, 1995) 23, 94, 100, 145; Mrs. Emma Willard, “Female education,” *Amer Ladies’ Mag* 9 (1836) 51, “purer spirit”; Isaac Ray, *Mental Hygiene* (NY: Hafner, 1968 [1863]) 330; David Rothman, *The Discovery of the Asylum*, rev. ed. (NY: Aldine, 2002) xxxi–xlvi, 135ff.; Diane P. Herndl, *Invalid Women: Figuring Feminine Illness in American Fiction and Culture, 184–1940* (U North Carolina, 1993) chs. 1–2; Thomas J. Brown, *Dorothea Dix: New England Reformer* (Harvard U, 1998) q. 35, 62, 70, q. 92; Karen Halttunen, “Gothic mystery and the birth of the asylum: the cultural construction of

deviance in early-nineteenth-century America,” in *Moral Problems in American Life*, eds. Halttunen and Lewis Perry (Cornell U, 1998) 41–57; Dorothea Lynde Dix, Papers, folder 942, blue commonplace book, p. 3 on “physiology of the mind,” and folder 970, “Special or Supplementary Report made June 28th 1850 To the Bloomingdale Asylum Committee,” pp. 1–3, in BMS Am 1838, Houghton Library, Harvard U; David L. Lightner, ed., *Asylum, Prison, and Poorhouse: The Writings and Reform Work of Dorothea Dix in Illinois* (Southern Illinois U, 1999) Memorial of Jan. 11, 1847, p. 25.

246. Dix Papers, folder 970, Committee response, Aug. 30, 1851, p. 1; Nancy J. Tomes, “A generous confidence: Thomas Story Kirkbride’s philosophy of asylum construction and management,” in *Madhouses, Mad-doctors, and Madmen*, ed. Andrew T. Scull (U Penn, 1981) 121–43, and contrast Scull, “Chimera of the curative asylum,” *Most Solitary of Afflictions: Madness and Society in Britain, 1700–1900* (Yale U, 1993) ch.3; Thomas S. Kirkbride, *Remarks on the Construction and Arrangements of Hospitals for the Insane* (Phila, 1847) 5–8, 10, 13–16, 18; idem, *On the Construction, Organization and General Arrangements of Hospitals for the Insane*, 2nd ed. (NY: Arno, 1973 [1880, 1st ed. 1854]) 42, q. 52, 54, q. 58, 63, 65, q. 68, 80–81, 87, q. 140, 148–50, 216–17, and for illustrations see www.kirkbridebuildings.com/history/kirkbride.html. Cf. Carla Yanni, *The Architecture of Madness: Insane Asylums in the United States* (U Minnesota, 2007) 38–40, 45, 49, and ch. 2 on Kirkbride; Ann Goldberg, *Sex, Religion, and the Making of Modern Madness: The Eberbach Asylum and German Society, 1815–49* (Oxford U, 1999) 90, 97, emphasizing that a woman’s noisiness could be considered one of the prime symptoms of insanity.

247. Beattie, *Crime and the Courts*, 225–29 on fears of demobilized soldiers, 450–519 on transportation; Kirkbride, *On the Construction*, 50, 98–99; David J. Rothman, “Sentencing reforms in historical perspective,” *Crime & Delinquency* 29,4 (1983) 631–47 on the rise of plea bargaining as a result of overcrowded prisons and court dockets. For the continuing “noise and confusion” of asylums, cf. the experience of Andrew M. Sheffield (a woman), committed to an Alabama asylum from 1890 to 1919: John S. Hughes, ed., *The Letters of a Victorian Madwoman* (U South Carolina, 1993) 62, 81, 136, 139, 149, 177–78, 186.

248. Rev. Daniel Nihill, *Prison Discipline in its Relation to Society and Individuals* (L, 1839) 22, q. 23–24, 38, q. 39, q. 57; Dennis Curtis et al., *Kingston Penitentiary . . . 1835–1985* (Ottawa: Correctional Service of Canada, 1985) 28; Philip Priestley, ed., *Victorian Prison Lives* (L: Methuen, 1985) 43, 46–47.

249. Nihill, *Prison Discipline*, 25; Enid Gaudie, *Cruel Habitations: A History of Working-Class Housing, 1780–1918* (L: Allen & Unwin, 1974) 56 and ch. 6 on overcrowding; Peter King, “Pauper inventories and the material lives of the poor in the eighteenth and early nineteenth centuries,” in *Chronicling Poverty*, eds. Tim Hitchcock et al. (NY: St. Martin’s 1997) 155–59, 179; Priestley, *Victorian Prison Lives*, q. 37–38 from Rev. John Clay; Alexander W. Pisciotta, *Benevolent Repression: Social Control and the Reformatory Prison Movement* (NYU, 1994) esp. 40, 54 on whipping and “rest cure cells”; Patricia O’Brien, *The Promise of Punishment: Prisons in Nineteenth-Century France* (Princeton U, 1982) esp. 26–28 on overcrowding; Jacques G. Petit, “The birth and reforms of prisons in France (1791–1885),” in Spierenburg, ed., *Emergence of Carceral Institutions* (n.224) 136–39; Sebastien Scheerer, “Beyond confinement? Notes on the history and possible future of solitary confinement in

Germany,” in *Institutions of Confinement*, eds. Norbert Finzsch and Robert Jütte (Camb U, 1996) 349–61; Robert Roth, *Pratiques pénitentiaires et théorie sociale: l'exemple de la prison de Genève (1825–1862)* (Geneva: Droz, 1981) 224, 227; Silvio Pellico, *My Prisons*, tr. I. G. Capaldi (L, 1963 [1832]) esp. 125, 143; M. Heather Tomlinson, “Penal servitude, 1846–1865,” in *Policing and Punishment in Nineteenth-Century Britain* (Rutgers U, 1981) 126–49; Stephen H. Hobbhouse and A. Fenner Brockway, eds., *English Prisons To-day: Being the Report of the Prison System Enquiry Committee* (NY: Garland, 1984 [1922]) q. 562.

250. Max Neuburger, “Leopold Auenbrugger und sein *Inventum Novum*: eine historische Skizze,” an essay appended to his compilation of a facsimile edition of the Latin text (1761) with French (Corvisart, 1808, abridged), English (John Forbes, 1824) and German (S. Ungar, 1843) translations, all separately paginated (L: Dawsons, 1966 [1922]). My quotations from Auenbrugger follow the Forbes translation, with some amendments; I cite by paragraph numbers as appear in the Latin and most translations. My use of the term “listening-in” oscillates between “listening-in-search” and “listening-in-readiness” as described by Barry Truax, *Acoustic Communication* (Norwood: Ablex, 1984) 19–21.

251. Hippocrates, *Diseases*, II, 59 and 61, in Paul Potter, tr., *Hippocrates* (Harvard U, 1988) V, 302–303, 306–309; Malcolm Nicolson, “Giovanni Battista Morgagni and eighteenth-century physical examination,” in *Medical Theory, Surgical Practice*, ed. Christopher Lawrence (NY: Routledge, 1992) 101–34, and cf. Saul Jarcho, ed. and tr., *The Clinical Consultations of Giambattista Morgagni* (B: Countway Med Lib, Harvard U, 1984), lxxxii, 50, 52, 313; Roy Porter, “The rise of physical examination,” in *Medicine and the Five Senses* (→ n.113) 179–97, emphasizing gender issues; Joan Lane, “‘The doctor scolds me’: the diaries and correspondence of patients in eighteenth-century England,” in *Patients and Practitioners: Lay Perceptions of Medicine in Pre-Industrial Society*, ed. Roy Porter (Camb U, 1985) 205–48; N. D. Jewson, “Medical knowledge and the patronage system in eighteenth-century England,” *Sociology* 8 (1974) 369–85, on status, as also Irvine Loudon, *Medical Care and the General Practitioner, 1750–1850* (Oxford: Clarendon, 1986) 189–207; Edward Shorter, *Bedside Manners: The Troubled History of Doctors and Patients* (NY: Simon and Schuster, 1985) 41–42 on American physicians’ perfunctory exams of patients well into the 1800s, but cf. the review of Laennec’s first edition (by Prof. James Jackson of Harvard?) in *New England J Med and Surgery* 10 (April 1821) 133–34 on earlier habits of listening and close examination, and cf. Mary Lindemann, *Medicine and Society in Early Modern Europe* (Camb U, 1999) 97ff. on the history of bedside teaching, 109ff. on the rising status of surgeons in the 1700s. By way of further contrast, I note that Chinese physicians had touched and listened-in on their patients for centuries, applying a doctrine of the pulse that had both tactile and acoustic elements. Li Shi-chen, a 16th-century master, described the *se* pulse as “fine, slow and short like scraping bamboo with a knife,” the *kê* pulse as “tense and hollow like touching the surface of a drum.” If the pulse resembled water dripping from a crack in a roof, death was near: K. Chimin Wong and Wu Lien-Teh, *History of Chinese Medicine* (Tientsin, 1932) esp. 42–45.

252. Auenbrugger, “On percussion of the chest,” §XI, §I, §II, §III, §V. On the diagnostic shift from symptom to sign: John C. O’Neal, “Auenbrugger, Corvisart, and the perception of disease,” *Eighteenth-Century Studies* 31 (1998) 473–89. Earlier, Jewish Kabbalistic

physicians had devised an aural-tactile diagnostic scheme that correlated pulse beats with the ten Hebrew vocalizations, so that the condition of body and soul were simultaneously bespoken by the sound rhythms of the pulse: Lawrence Fine, *Physician of the Soul, Healer of the Cosmos: Isaac Luria and His Kabbalistic Fellowship* (Stanford U, 2003) 165–66.

253. John A. Rice, *Antonio Salieri and Viennese Opera* (U Chicago, 1998) 281–305, q. 296 from the aria, “Bei meiner Seel’,” q. 305 pan; Auenbrugger, “On percussion of the chest,” §XXVII, §XVIII, §XVI. Josef II of Austria, who commissioned Salieri’s opera, knighted the librettist in 1784, who became *Josef Leopold von Auenbrugger*.

254. Auenbrugger, “On percussion of the chest,” §XLV on dropsy, §X on modifications of sound; Jean E. Ward and Joan Yell, eds., *Medical Casebook of William Brownrigg of the Town of Whitehaven in Cumberland* (L: Wellcome Inst., 1993) q. 26, 32, 36–37, 44, 45, 69; James Gregory, “Clinical lectures and cases, 1789–96,” National Lib of Med, MS B 51, pt. 2, 218, case of William Brown’s neck noises; Victor A. McKusick et al., “An exhibition on the history of cardiovascular sound including the evolution of the stethoscope,” *Bull H Med* 31 (1957) 464 for Douglas, 466 for Burns, 467 for Bayle; James B. Herrick, “A note concerning the long neglect of Auenbrugger’s *Inventum Novum*,” *Archives of Internal Med* 71 (1943) 741–48, amplified by Bernhard Noltenius-Bremen, “Zur geschichte der Perkussion van ihren Bekanntgabe durch Auenbrugger bis zu ihrer Wiederbelebung durch Corvisart,” [*Sudhoff’s*] *Archiv für Geschichte der Medizin* 1 (1968) 329–50 and 403–28; Saul Jarcho, “Auenbrugger, Laennec and John Keats,” *Med H* 5 (1961) 167–69, technical difficulties; Corbin, *The Foul and the Fragrant* (→ n.127); Neuburger, “Leopold Auenbrugger,” 23ff. on opposition to auscultation, 34–35 on Rozière; Michel Foucault, *The Birth of the Clinic*, tr. A. M. Sheridan (NY: Pantheon, 1973); O’Neal, “Auenbrugger, Corvisart, and the perception of disease,” q. 477; François J. Double, *Séméiologie générale* (P, 1817) II,31, 35, 39, 105–107, 186; Jacalyn Duffin, *To See with a Better Eye: A Life of R. T. H. Laennec* (Princeton U, 1998) 32–33 on Corvisart, 37–40, 96–100 and 124 on Bayle, as also Marie-José Imbault-Huart, “Bayle, Laennec et la méthode anatomo-clinique,” in *Commémoration du bicentenaire de la naissance de Laennec*, special issue of *Revue du Palais de la Découverte* 22 (1981) 79–90. For a fine summary of auscultation vis-à-vis “consumption”: Thomas Dormandy, *The White Death: A History of Tuberculosis* (L: Hambledon, 1999) 27–32.

255. R. T. H. Laennec, *De l’auscultation médiate; ou, Traité du diagnostic des maladies des poumons et du coeur, fondé principalement sur ce nouveau moyen d’exploration*, facs. ed. (Bruxelles: Culture et civilisation, 1968 [1819]) I,7, passage translated and put in context by Duffin, *To See with a Better Eye*, 122–23, building upon Mirko D. Grmek, “L’invention de l’auscultation médiate,” *Commémoration du bicentenaire*, 107–16; William Wollaston, “The Croonian Lecture. Part I. On the duration of muscular action,” *Phil Trans Royal Soc* 100 (1810) 2–5, and cf. Maria Stokes and Max Blythe, “Muscle sounds rediscovered,” *Lancet* 346 (1995) 779, on the diagnostic neglect of muscle sounds. On the “anatomo-clinical” method: Foucault, *Birth of the Clinic*, 133–40; Imbault-Huart, “Bayle, Laennec et la méthode anatomo-clinique.” Recent scholars, including Duffin (pp. 209–39), dispute earlier claims that the medical profession reluctantly took up stethoscopy: Stanley J. Reiser, “Aspects of role of the stethoscope in the introduction of auscultation to Great Britain and the United States,” *Proc. 23rd Intl Congress H Med* (L, 1974) I,832–40; Malcolm

Nicolson, “The introduction of percussion and stethoscopy in early nineteenth-century Edinburgh,” in *Medicine and the Five Senses*, (→ n.113), 134–53; M. Donald Blaufox, *An Ear to the Chest: An Illustrated History of the Evolution of the Stethoscope* (Boca Raton: Parthenon, 2002) 15–18, esp. on Germany; Dale C. Smith, “Austin Flint and auscultation in America,” *J H Med Allied Sci* 33 (April 1978) 129–49.

256. Alfred Rouxau, *L’Enfance et la jeunesse d’un grand homme: Laennec avant 1806* (P, 1912) 69–71, 74ff., 130, 136; Duffin, *To See with a Better Eye*, 23, 42–43 on Buisson.

257. On Haydn’s Auenbrugger Sonatas (Hob. XVI, 35–39 and the earlier *Sonata in C*, XVI, 20): H. C. Robbins Landon, *Haydn: Chronicle and Works. II. Haydn at Eszterháza, 1766–1790* (Indiana U, 1978) II,430, 508, dedication to Francisca and Marianna Auenbrugger, but also to Caterina and Marianna; Daniel Hertz, *Haydn, Mozart, and the Viennese School, 1740–1830* (NY: Norton, 1995) 319, 321; Bernard Harrison, *Haydn’s Keyboard Music: Studies in Performance Practice* (Oxford: Clarendon, 1997) 22–27, 29–31. On keyboard instruments, I am drawing upon “Piano 300: Celebrating Three Centuries of People and Pianos,” exhibition at the Smithsonian Intl Gallery, S. Dillon Ripley Center, DC (March 9, 2000–Oct. 21, 2001); Edwin M. Good, *Giraffes, Black Dragons, and Other Pianos: A Technological History from Cristofori to the Modern Concert Grand* (Stanford U, 1982) 32–33, 55–56, 60; David Rowland, *A History of Pianoforte Pedalling* (Camb U, 1993) 9, q. 12 for Voltaire, 14, and throughout. For Laennec’s comments on immediate percussion: *De l’auscultation médiate* (facs. 1st ed.) I,4–7, 160, 171, 179–81. On hospital architecture: Gutton, *Bruits et sons* (→ n.18) 88, citing Jacques Tenon, *Mémoires sur les hôpitaux de Paris* (P, 1788) 170, 360.

258. On voice and flute: Marc Colombat de l’Isère, *Du Bégaiement et de tous les autres vices de la parole* (P, 1830) 29–35. For profiles and sizes of Laennec stethoscopes: www.antiquemed.com/monaural_stethoscope.html. On naming the stethoscope: Laennec, *De l’auscultation médiate* (facs. 1st ed.) I,11n. and 18; F. V. Mérat, “Pectoriloque,” *Dict des sci médicales*, ed. C. L. F. Pancoucke (P, 1819) XL,9–35. On reversing a speaking trumpet to construct an ear trumpet, an early instance appears in John Clayton, “A letter . . . May 12, 1688 giving an account of several observables in Virginia, and his voyage thither,” *Phil Trans Royal Soc* 201 (1693) 782; John C. Saunders, with additions by William Price, *The Anatomy of the Human Ear* (Phila, 1821, adapted from 2nd London ed. [1st ed. 1806]) 114 on Mr. Curtis’s invention of “a hearing-trumpet, forming a parabolic conoid, on the same principle as the speaking trumpet used at sea.” On flutes: Ardal Powell, *The Flute* (Yale U, 2002) 88–89, q. 97 on Quantz, 104 on hissing; Johann Joachim Quantz, *On Playing the Flute*, tr. Edward R. Reilly, 2nd ed. (NY: Schirmer, 1985 [1752, 3rd ed. 1789]) 50, 56, 59, 119, 163; Rachel Brown, *The Early Flute: A Practical Guide* (Camb U, 2002) 48–49, 111; John Solum, *The Early Flute* (Oxford U, 1992) 45, 90 on Quantz’s preference for lower registers, and cf. Jarcho, “Auenbrugger, Laennec, and John Keats,” 169, on Laennec’s reference to the embouchure of the German flute in connection to pectoriloquy. See Duffin, *To See with a Better Eye*, 79, 166–73 on asthma and 138–39 for succussion, occasionally practiced by Laennec. An American doctor gave directions: “Let a man be seated, and then seizing him by both shoulders, shake suddenly and somewhat forcibly the whole trunk. If air and fluid are in the pleural sac, you may hear a sound like that produced by shaking a bottle containing a little fluid”: Henry Bowditch, *The Young Stethoscopist*, 2nd ed. (NY, 1848) 22.

259. Laennec, *De l'auscultation médiate* (facs. 1st ed.) I, 138–43; idem, *Traité de l'auscultation médiate et des maladies des poumons et du coeur*, ed. Mériadec Laennec, 3rd ed. (P, 1831) I, 62, 70–71; idem, *A Treatise on the Diseases of the Chest and on Mediate Auscultation*, tr. John Forbes from 3rd ed., with notes by Prof. Andral from 4th French ed., tr. John D. Fisher (NY, 1838) 45 on silvery voice of *egophonie*, and cf. Duffin, *To See with a Better Eye*, 134–38; Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Duke U, 2003) 126. For the siren: Charles Cagniard de la Tour, “Sur la sirène, nouvelle machine d’acoustique destinée à mesurer les vibrations de l’air qui constituent le son,” *Annales de chimie et de physique*, 2nd ser., 18 (1819) 167–71, reprinted as “The sirene, a new acoustic instrument designed to measure the vibrations of air which constitute sound,” *Phil Mag and J* 55,1 (1820) 293–94; Caroline Welsh, «Die Sirene und das Klavier: Vom Mythos der Sphärenharmonie zur experimentellen Sinnesphysiologie,» in *Parasiten und Sirenen*, eds. B. J. Dotzler and H. Schmidgen (Bielefeld: Transcript, 2008) 143–178. Félix Savart would soon use a series of toothed wheels (similar to those conceived by Hooke) as well as Cagniard de la Tour’s siren to determine the frequency limits of human hearing: “On the sensitivity of the ear” [1830], tr. Lindsay, *Acoustics* (→ n.36) 203–209.

260. Thomas De Quincey, “*The English Mail-Coach*” [1849] and *Other Essays*, ed. John E. Jordan (L, 1961) q. 12; Anthony C. Baines, “Post Horns,” *New Grove Dict of Musical Instruments*, ed. Stanley Sadie (L: Macmillan, 1984) III, 142–43, more thoroughly illustrated in Albert Hiller, *Das Grosse Buch vom Posthorn* (Wilhelmshaven: Heinrichshofen, 1985); Leon Botstein, “Music and its public. Habits of listening and the crisis of musical modernism in Vienna, 1870–1914,” Ph.D. thesis, Harvard U, 1985, esp. 503–509 on the piano, as also Rowland, *History of Pianoforte Pedalling*, 19; Powell, *The Flute*, 132, 138, 145; Conrad L. Donakowski, *A Muse for the Masses: Ritual and Music in an Age of Democratic Revolution* (U Chicago, 1977) 51, 191ff. on chorales, as also Laura Mason, *Singing the French Revolution: Popular Culture and Politics, 1787–1799* (Cornell U, 1996); Keith Willard on shape-note singing, “Fasola timeline” at http://fasola.org/fasola_timeline.html; Arthur Schopenhauer, “On noise,” *Studies in Pessimism*, 4th ed., tr. T. Bailey Saunders (L, 1893, from *Parerga und Paralipomena* II, ch. 30 [1851]) 123; James Beresford, *The Miseries of Human Life*, 9th ed. (B, 1807) 62–63; Laennec, *De l'auscultation médiate* (facs. 1st ed.) I, 157; Mérat, “Pectoriloque,” 12, room silence, and cf. Austin Flint, *A Manual of Auscultation and Percussion*, 3rd ed. (Phila, 1883) 69: “Generally, at first, complete stillness in the room is indispensable for the study of auscultatory sounds; with practice, however, in concentrating the attention, this becomes less and less essential.” For Henri Lafleur, teaching medicine at McGill University in Montreal (1897–1924), stethoscopy still demanded silence: “During his ward rounds no extraneous noise was tolerated; a loud-ticking clock was removed, and nurses stood as still as statues lest their starched uniforms make a rustling noise,” perhaps because he could spend an hour on a patient and cover every square inch of the chest: Harold N. Segall, “The introduction of the stethoscope and clinical auscultation in Canada,” *JH Med and Allied Sci* 22 (1967) q. 417.

261. Laennec, *De l'auscultation médiate* (facs. 1st ed.) I, 154, 158–59, 179; Quantz, *On Playing the Flute*, 13, breath control. Early stethoscopes appear to have amplified internal sounds by as much as 8–18 db, depending on frequency: Paul Y. Ertel et al., “Stethoscope

acoustics. II. Transmission and filtration patterns,” *Circulation* 34 (1966) 905. Duffin attributes the choice of “stethoscope,” a word that first appeared in a student’s medical thesis in 1818, to Laennec’s “technological extrapolation of Corvisart’s ‘gaze’ through the ears instead of the eyes,” but she notes that Laennec’s physician-cousin Mériadec cautioned against the visual analogy: *To See with a Better Eye*, 129–30. Cf. Sterne, *Audible Past*, 104–105 on the “disjuncture between the aurality of a practice and the ocularcentric language used to describe it.”

262. Laennec, *De l’auscultation médiate* (facs. 1st ed.) I, q. 171, 172–74, 215, and II, 1–4, 196–97, 202, 206, 211, and 95 for the fly in a vase, translated by Duffin, *To See with a Better Eye*, q. 141; idem, *A Treatise on . . . Mediate Auscultation* (tr. John Forbes from 3rd ed.) 56–61, 580, 588, 602–03; idem, *Traité de l’auscultation médiate* (3rd ed.) I, 44–45. A. John Robertson and Robert Coope warn that it is difficult to know what *râle* meant to Laennec; literally a “rattle,” it was more likely a wheeze, given that Laennec spent much of his time listening-in to patients who had “phthisis,” a covering term for pneumonias and tuberculosis: “Râles, rhonchi, and Laennec,” *Lancet* 2 (1957) 417–23.

263. Victor A. McKusick, *Cardiovascular Sound in Health and Disease* (Baltimore, 1958) sect. I, 7–9, 20; A. Calò, *Les bruits du coeur et des vaisseaux* (P, 1950) 15–32; Duffin, *To See with a Better Eye*, 174–201, 211; Evan Bedford, “Cardiology in the days of Laennec,” *British Heart J* 34 (1972) 1193–98; Henri Stofft, “Laennec et Kergaradec,” in *Commémoration du bicentenaire* (→ n.254) 152–69, on Meyer too; Evory Kennedy, with additions by Isaac E. Taylor, *Observations on Obstetric Auscultation* (NY, 1843) 3, 71, 89, 95, q. 101, and cf. Blaufox, *An Ear to the Chest*, 65, on German obstetric stethoscopy.

264. Blaufox, *An Ear to the Chest*, 18ff. on improvements, 45–51 on Cammann; Mary D. Waller, *Chladni Figures: A Study in Symmetry* (L, 1961) on Chladni, some of whose figures resisted mathematical explanation as late as the 1950s; Louis L. Bucciarelli and Nancy Dworsky, *Sophie Germain: An Essay in the History of the Theory of Elasticity* (Dordrecht: D. Reidel, 1980); Charles Wheatstone, “On the figures obtained by strewing sand on vibrating surfaces, commonly called acoustic figures,” *Phil Trans Royal Soc* 122 (1833) 593–633, and his earlier “New experiments on sound,” *Annals Phil* 20 (Aug. 1823) 81–90 in Lindsay, ed., *Acoustics* (→ n.36) 184–93; Thomas D. Rossing, “Seebeck’s siren,” *Physics Teacher* 17 (1979) 352, 406; J. F. Schouten, “The residue revisited,” in *Frequency Analysis and Periodicity Detection in Hearing*, eds. R. Plomp and G. F. Smoorenburg (Leiden: Sijthoff, 1970) 41–59 on L.-F.-W.-August Seebeck (1805–1849), who trusted to his hearing (“only the ear can decide the tone”), on Ohm, who trusted to Fourier analysis, and on Helmholtz, who wanted to establish the psychophysical laws by which hearing diverges from mathematical acoustics. For Bell and Müller, begin with Sterne, *Audible Past*, 59–62.

265. John Forbes, *Original Cases with Dissections and Observations illustrating the Use of the Stethoscope and Percussion in the Diagnoses of Diseases of the Chest* (L, 1824 [where appears the first English version of Auenbrugger’s work]) 86; William Stokes, *Introduction to the Use of the Stethoscope* (Edinburgh, 1825) 103–104; McKusick, *Cardiovascular Sound*, 15–18, for Elliotson, Bouillaud, *Nonnensausen*. Cf. Charles Hooker, *Essays on Intestinal Auscultation* (B, 1849) for attempts to sort out borborygmi as an index to cholera and colic. Oliver Wendell Holmes, poet and Harvard professor of physiology, satirized the congeries of

sounds in “The Stethoscope Song” (1848), in which a physician mistakes the “concert” of two flies trapped within his stethoscope for *amphoric buzzing*, or *bruit de râpe*, *bruit de scie*, and *bruit de diable* all at once: *The Poetical Works* (B, 1904) I, 148–52. Cf. also the mistaken deductions made by the narrator in Edgar Allan Poe’s “The Oblong Box,” *Godey’s Lady’s Bk* 29 (Sept 1844) 132–36, who listens through the thin walls of a ship’s stateroom to determine what lies in a mysterious box being opened and shut in the next room over.

266. Edward I. Bluth, “James Hope and the acceptance of auscultation,” *J H Med Allied Sci* 25 (1970) 202–10, complemented by Eric Rackow and Erik Soiferman, “The James Hope presentation stethoscope,” at www.antiquemed.com/james_hope.html; McKusick, *Cardiovascular Sound*, q. 18–19 from Hope’s *Diseases of the Heart*, 3rd ed. (L, 1839) 118; Joseph P. Colgan, *An Appeal to the Medical Profession in Brooklyn, in Behalf of Those Afflicted with Deafness and other Diseases of the Ear* (B, 1858) 18–19; Jens Lachmund, “Making sense of sound: auscultation and lung sound codification in nineteenth-century French and German medicine,” *Sci, Tech, and Human Values* 24,4 (1999) 419–50; Samuel J. Gee, *Auscultation and Percussion*, 2nd ed. (L, 1877) 70. For medical dictionaries, Mayne, *Expository Lexicon* (→ n.199) 137; Henri Roger and J.-B.-P. Barth, “Musicaux (bruits),” *Dict encyclopédique des sciences médicales*, ed. A. Dechambre (P, 1876) LXIII, 127–28. For another, not uncomplementary take, consider Sterne, *Audible Past*, 124–25, 128–36, who considers the analogies as part of a futile effort to (p. 130) “posit *indexical* connections between sonic signs and illnesses.” On current pedagogy of sounds: Tom Rice, “Learning to listen: auscultation and the transmission of auditory knowledge,” *J Royal Anthropol Inst* 16 (2010) 541–61.

267. Prosper Mérimée, “Charles Nodier” [1845] in *Portraits historiques et littéraires*, ed. Pierre Jourda, in *Oeuvres complètes*, eds. P. Trahard and E. Champion (P, 1927–1933) V, 111–40, esp. 123, 135–36; Charles Nodier, *Dict raisonné des onomatopées françaises* (P, 1808) viii, 1, 9, 11–14, 32, 34, 179; Jean-Baptiste Bouillaud, *Traité clinique des maladies du cœur* (P, 1842) 213, cited in McKusick, *Cardiovascular Sound*, 15. For a good modern example of sound-words foreign to Westerners, consider James F. Weiner, *The Empty Place: Poetry, Space and Being among the Foi of Papua New Guinea* (Indiana U, 1991) 83ff.

268. William Gardiner, *The Music of Nature* (B, 1856 [1832]) q. 13. New England was the site of the longest-running controversy over church singing (by oral “lining-out,” with its “horrid Medley of confused and disorderly Noises,” or by notated psalmbooks that required sightreading), but England also hosted controversies with regard to the hymn-“shouting” of Methodists and the Anglican contraposition of rehearsed choirs to congregational singing of psalms: Laurel L. Becker, “Ministers versus laymen: the singing controversy in Puritan New England, 1720–1740,” *New England Q* 55 (1982) 79–95; Daniels, *Puritans at Play* (→ n.123) 52–56, 62–63; Brooks, *Olden-Time Musics* (→ n.214) 17–25, 43–44, 48, 71, 78, 109, 210–12, 219–22; Ronald L. Davis, *A History of Music in American Life* (Huntington: Krieger, 1980) I, 8–15; Lemuel Hedge, *The Duty and Manner of Singing in Christian Churches* (B, 1772) defending the old way; Nicholas E. Tawa, *High-Minded and Low-Down: Music in the Lives of Americans, 1800–1861* (Northeastern U, 2000) 29, 34, 57, 216ff.; Jack Larkin, *The Reshaping of Everyday Life, 1790–1840* (NY: Harper and Row, 1988) 254–56; Michael Broyles, “*Music of the Highest Class*”: *Elitism and Populism in Antebellum*

Boston (Yale U, 1992) 33–91, 98–105, 127–33; Arnold Rattenbury, “Methodism and the tatterdemalions,” in *Popular Culture and Class Conflict 1590–1914*, eds. E. Yeo and S. Yeo (Brighton: Harvester, 1981) 31ff.; Anne D. McLucas, *The Musical Ear: Oral Traditions in the United States of America* (Burlington, VT: Ashgate, 2010) 83–89, defending the aesthetics of the Old or “Usual Way” of singing against accusations of cacophony.

269. Gardiner, *The Music of Nature*, 17, 19, q. 23, q. 24, q. 25, 27, q. 35, q. 37n., q. 39, q. 56, q. 59.

270. Robert Spittal, *A Treatise on Auscultation* (Edinburgh, 1830) 5; Adam Raciborski, *An Elementary Treatise on Auscultation and Percussion*, tr. Minturn Post (NY, 1839 [1835]) 77 and note by translator, 66n.–67n.; Jean-Baptiste-Philippe Barth and Henri Roger, *A Practical Treatise on Auscultation*, tr. Patrick Newbigging (Lexington, 1847 [1841]) q. 1, 7, q. 9, 328; Bowditch, *Young Stethoscopist*, 26 on fingernails; Stokes, *Introduction*, 12; McKusick, *Cardiovascular Sound*, 22 for Potain, and contrast Peyton Blakiston, *Practical Observations on Certain Diseases of the Chest and On the Principles of Auscultation* (Phila, 1848) 24, 77, preferring solid, short (bone-conducting) cylinders; Flint, *Manual*, 66–67 on the quietness of flexible-tube stethoscopes; Blaurock, *An Ear to the Chest*, 34–54; James E. Pollock, “On a self-adjusting double stethoscope,” *Lancet* 2 (1856) 23–25, and cf. James K. Crook, “Some remarks on mediate auscultation,” *The Post-Graduate* 3 (1888) 5–11, defending binaural devices despite their tendency to magnify extraneous sounds. On Piorry, consult Alex Sakula, “Pierre Adolphe Piorry (1794–1879): pioneer of percussion and pleximetry,” *Thorax* 34 (1979) 575–81; Pierre Adolphe Piorry, *De la percussion médiate et des signes obtenus à l’aide de ce nouveau moyen d’exploration* (P, 1828) esp. 9–12 on advantages of the pleximeter; Carl Hoppe, *Percussion and Auscultation as Diagnostic Aids*, tr. L. C. Lane (Phila, 1869 [1865]) 11ff. on refinements of pleximetry and the substitution of two fingers of the left hand for the pleximeter. For a recent and poetic account in which stethoscopy is accounted as the last and least of all forms of diagnostic listening: Abraham Verghese, “Soundings,” *Granta* 39 (1992) 83–90. I wish to thank Alan Hawk, curator at the National Museum of Health and Medicine, Washington, D.C., for giving me the opportunity to examine many 19th-century stethoscopes.

271. Paul Y. Ertel et al., “Stethoscope acoustics. I. The doctor and his stethoscope,” *Circulation* 34 (1966) 889–98; Robert J. Dobrow et al., “A study of physician variation in heart-sound interpretation,” *Med Annals District of Columbia* 33 (July 1964) 305–308; Tom Rice, “‘Beautiful murmurs’: stethoscopic listening and acoustic objectification,” *The Senses & Society* 3 (Nov. 2008) 293–316 on patients’ responses to stethoscopic regimes. Cf. earlier accounts of confusions and problems: Louis Bard, “De la multiplicité anormale des bruits du coeur,” *La Semaine médicale* 28 (1908) 3–5; Samuel A. Levine and W. Proctor Harvey, *Clinical Auscultation of the Heart* (Phila, 1949) 4, 7, 39, 55–56, 144, 159, 162. Then try it yourself: Thomas A. Blackwell et al., *Auscultation Skills: Breath & Heart Sounds* (Springhouse: Springhouse Corp, 1998), two audiocassettes of forty breath sounds and fifty heart sounds, electronically generated, with accompanying guide and tips “for detecting whispered pectoriloquy and other tricky sounds” (back of box), or consult the Auscultation Assistant at www.wilkes.med.ucla.edu/intro.html. On the “separation of the senses”: Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*

(MIT, 1990) 89-90; Sterne, *Audible Past*, 60, 110-11.

272. For Arnott: Isaac Hays, ed., *Elements of Physics*, 1st American ed. from 3rd London ed. (Phila, 1829 [1827]) pt. III, sect. 4, 406-407 on noise, 418 on the city at night.

273. McKusick, *Cardiovascular Sound*, 416 on Bricheteau, 17 on Graves, 299 on Duroziez; Bowditch, *Young Stethoscopist*, 51n.-52n. on Bigelow; Robert Martin, ed., *Collected Works of Dr. Peter M. Latham* (L, 1876-1878) I, q. 3, 30, q. 53, q. 49. Cf. Richard Bradford, *Silence and Sound: Theories of Poetics from the Eighteenth Century* (Fairleigh Dickinson U, 1992) on literary discussions of how printed poetry, especially blank verse, could be approached; silent readers (listening-in upon the text) were liable to mis-hear the voice and passions of verse, while those who read aloud might mis-speak the lines, if untrained in declamation or insensitive to the cadences, accents, and implicit variations in intensity.

274. Thomas N. Bonner, *Becoming a Physician: Medical Education in Britain, France, Germany, and the United States, 1750-1945* (Johns Hopkins U, 2000) 74-75, 84 on unruly students, *pass.* on use of auscultation during the 19th century; Kenneth D. Keele, "The application of the physics of sound to nineteenth-century cardiology with particular reference to the part played by C. J. B. Williams and James Hope," *Clio Medica* 8 (1973) 191-221; Charles J. B. Williams, *Memoirs of Life and Work* (L, 1884) 11, q. 12, 43-46, q. 47-48, 66, q. 67, 101-11, 122, 128-31, and see 432-35 for his use of stethoscopic acoustics to redo ear trumpets; Erna Lesky, *Perkussion und Auskultation* (Basle: Geigy, 1970) II,24; William H. Day, *Diseases of Children*, 2nd ed. (Phila, 1881) 534 on Salter, and 370 for a brief catalog of coughs. Not all physicians stopped resorting to simile, to be sure. In 1911, Edward M. Brockbank described the first heart sound as dull and deliberate, "like sailors holding the ropes of a flapping sail": *Heart Sounds and Murmurs* (L, 1911) 4.

275. Thomas Buchanan, *Illustrations of Acoustic Surgery* (L, 1825) 6-7, "Inspector Auris."

276. Codman & Shurtleff's [*Catalog of*] *Surgical and Dental Instruments and Kindred Articles* (B, 1888) 92-93, lists the advantages of Cammann's "double" or binaural stethoscope: it better excluded external noises, better intensified internal sounds, was easier to hold in place, and allowed a practitioner to keep his eyes on the bell-end. Endorsed by Austin Flint, it was refined by Dr. James A. Knight, who added a spring that kept the two earpieces opposed. The catalog quotes Knight urging "all who practice auscultation to use the double instrument, and would simply suggest that they not be dissuaded from its use by the *roaring* which will annoy them at first, but which they will soon disregard..." According to studies reported by P. J. Hollins, "The stethoscope: some facts and fallacies," *British J Hospital Med* 5 (1971) 509-16, the smaller the diameter and longer the stethoscopic tubing, the more noise and acoustical loss, but the binaural system generally affords a 20-db advantage over the monaural at 60-400 Hz (the range of most visceral sounds), while at 850-1000 Hz the monaural system can be more sensitive, an argument made earlier for the naked ear by Lewis A. Conner, "On certain acoustic limitations of the stethoscope and their clinical importance," *Trans Assn Amer Physicians* 22 (1907) 113-21, and arguing (p. 120) that "In the case of the lungs... the sounds least well propagated through the stethoscope are those which, from the standpoint of diagnosis, are among the most important to be heard."

277. Williams, *Memoirs*, 30–31, 40, q. 49, 49n., 122, q. 123–24; Frederic Chopin, *Selected Correspondence*, tr. Arthur Hedley (NY: DaCapo, 1979) 93; Duffin, *To See with a Better Eye* (→n.254) 282–83, q. 160 on autopsy cries; Siméon Denis Poisson, “Memoir on the theory of sound [1808],” tr. Lindsay, ed., *Acoustics* (→n.36) 173–79, q. 179; Victor A. McKusick and H. Kenneth Wiskind, “Félix Savart (1791–1841), physician-physicist,” *J H Med Allied Sci* 14 (1959) 411–23; McKusick, *Cardiovascular Sound*, 43 on Corrigan; Richard E. Klabunde, “Cardiovascular physiology concepts,” at www.cvphysiology.com/Hemodynamics/H003.htm (rev. June 2005); Victor A. McKusick, “Rouanet of Paris and New Orleans: experiments on the valvular origin of the heart sounds 125 years ago,” *Bull H Med* 32 (1958) 137–51, q. 139; Henry M. Hughes, *A Clinical Introduction to the Practice of Auscultation* (L, 1845) 185, paraphrased by Herbert Davies, *Lectures on the Physical Diagnosis of Diseases of the Hearts and Lungs* (L, 1851) 237. For current ideas about the acoustics of stethoscopic tubing: Blaufox, *An Ear to the Chest*, 23–26. For later medical catalogs of sounds: Gee, *Auscultation and Percussion*, 61ff.; Paul Guttman, *A Handbook of Physical Diagnosis Comprising the Throat, Thorax, and Abdomen*, tr. Alex Napier (NY, 1880) throughout.

278. Joseph-Honoré-Simone Beau, *Traité expérimentale et clinique d’auscultation* (P, 1856) ix, 46; Paul Hamon, “Colombat (Marc),” *Dict de biographie française*, ed. Roman d’Arnat (P, 1961) IX, 322–23; Marc Colombat de l’Isère, *Du begaiement et de tous les autres vices de la parole* (P, 1830) esp. 35, 111; idem, *Le Mécanisme des cris et leur intonation notée dans chaque espèce de douleurs, physiques et morales* (P, 1840) q. 1, 2, 6, 9, 11, 12; Jean-Georges Kastner, *Les Voix de Paris . . . suivi de Les Cris de Paris, Grande Symphonie humoristique vocale et instrumentale* (P, 1857) v–vi, 1, 3n., 13n., 14–15, 26, 28, 36, 51, 74–77; George Augustus Sala, *Twice Round the Clock; or, The Hours of the Day and Night in London* (L, 1859). This celebration of the interjection had not gone unattacked: John Horne Tooke, *ΕΠΕΑ ΠΤΕΠΟΝΤΑ or The Diversions of Purley*, 2nd ed. (L, 1798) 1, 60–63, who argued that interjections, like “sneezing, coughing, groaning, shrieking, and every other involuntary convulsion with oral sound,” were only “the miserable refuge of the speechless” and unworthy of a place among the parts of speech, however “beautiful and gaudy.”

279. Armen Carapetyan, “Music and medicine in the Renaissance and seventeenth and eighteenth centuries,” *Music and Medicine*, eds. D. M. Schullian and M. Schoen (NY, 1948) 117–57; Penelope Gouk, “Raising spirits and restoring souls: early modern medical explanations for music’s effects,” in *Hearing Cultures: Essays on Sound, Listening and Modernity*, ed. Veit Erlmann (Oxford: Berg, 2004) 87–106; Veit Erlmann, ed., *Musical Healing in Cultural Contexts* (Guilford: Ashgate, 2000), esp. George Rousseau, “The inflected voice: attraction and curative properties,” 93–112, and Cheryce Kramer, “Soul music as exemplified in nineteenth-century German psychiatry,” 137–48; Colombat de l’Isère, *Du begaiement*, 146, 151ff. on the technique “labiochoréique”; David E. Bartlett, “Music among the deaf and dumb,” *Amer Annals of the Deaf and Dumb* 2 (Oct. 1848) 5–6; Laurinda S. Dixon, *Perilous Chastity: Women and Illness in Pre-Enlightenment Art and Medicine* (Cornell U, 1995) 174ff.; Richard Browne, *Medicina Musica*, rev. ed. (L, 1729) 4; Erhard Völkel, *Die spekulative Musiktherapie zur Zeit der Romantik* (Düsseldorf: Tritsch, 1979); Edward Warren, “Remarks on stammering,” *Amer J Med Sci* 21 (1837) 75–99; Horden, ed., *Music As Medicine* (→n.137) q. 3 (Novalis) from his initial chapter, and esp. Cheryce Kramer, “Music

as cause and cure of illness in nineteenth-century Europe,” 338–52; A. Laurent, “Quelques observations relatives à l’influence qu’exerce la musique sur les aliénés,” *Annales médico-psychologiques* 6 (1860) 331–36, q. 333; Samuel Mathews, *On the Effects of Music in Curing and Palliating Diseases* (Phila, 1806) 17.

280. Michel Poizat, *The Angel’s Cry: Beyond the Pleasure Principle in Opera*, tr. Arthur Denner (Cornell U, 1992) 6, 37, q. 40 on Berlioz, q. 47 “trans-sensical,” 52, 56, 67, 76; Pier Francesco Tosi [a castrato], *Observations on the Florid Song*, tr. John E. Galliard, ed. Michael Pilkington (L: Stainer and Bell, 1987 [1723]) on falsetto. On the replacement of castrati in the 1800s by sopranos, the best of whom were described as having equally pure and unsexed, uncanny voices: Felicia Frank, *The Mechanical Song: Women, Voice and the Artificial in Nineteenth-Century French Narrative* (Stanford U, 1995). For G. W. F. Hegel, his *Aesthetics: Lectures on Fine Art*, tr. T. M. Knox (Oxford: Clarendon, 1975) II, 888–958, q. 891, q. 903.

281. Much of the historical study of audiences has come from French contexts: James H. Johnson, *Listening in Paris: A Cultural History* (UC, 1995) ch. 1, and 24ff.; Barbara G. Mittman, *Spectators on the Paris Stage in the Seventeenth and Eighteenth Centuries* (Ann Arbor: UMI, 1984); Jeffrey Ravel, *The Contested Parterre: Public Theater and French Political Culture, 1680–1791* (Cornell U, 1999) esp. 38–45; Victor Hugo, *Hernani*, ed. Herbert F. Collins (L: Macmillan, 1968) xl–xlv; Jules Lan, *Mémoires d’un chef de claque* (P, 1883), a first-hand account; “Retirement of David,” *Dwight’s J of Music* 17 (Sept. 15, 1860) 200; Mark E. Perugini, *The Omnibus Box: Being Digressions and Asides on Social and Theatrical Life in London and Paris, 1830–1850* (L, 1933) esp. 110–12, and ch. 13 on Auguste, “King of the Claque”; Hector Berlioz, “The current state of singing” (1853) in *The Art of Music and Other Essays*, tr. Elizabeth Csicsery-Rónay (Indiana U, 1994) 60–66, 192–96, also 80 on shouts of *encore!* during Hamlet’s soliloquy; Marie Henri Beyle Stendhal, *Life of Rossini*, tr. Richard N. Coe (NY: Orion, 1970 [wr. 1823]) q. 118. On Viennese audiences, Leon Botstein, “Music and its public” (→ n.260). On German and European-wide audiences: William Weber, *The Great Transformation of Musical Taste: Concert Programming from Haydn to Brahms* (Oxford U, 2008). On the English, Dutton Cook, *A Book of the Play*, 4th ed. (L, 1882) throughout, esp. 373, accessories; Charles Lamb, “A chapter on ears,” *Essays of Elia* (NY, 1943 [first series, 1823]) 48, and “On the custom of hissing at the theatres” (1811) in *The Works of Charles and Mary Lamb*, ed. E. V. Lucas (L, 1903) I, 87–90, q. 412; William T. Parke, *Musical Memoirs* (L, 1830) I, 110, 187, 191, and II, 11, 14, 121, 131, q. 134 on Braham; “Encores in concerts,” *Dwight’s J of Music* 2 (March 19, 1853) 189 for the critic. On North Americans, John F. Kasson, *Rudeness and Civility: Manners in Nineteenth-Century Urban America* (NY: Hill and Wang, 1990) 221; Lawrence W. Levine, *Highbrow/Lowbrow: The Emergence of Cultural Hierarchy in America* (Harvard U, 1988) 25–30.

282. Johnson, *Listening in Paris*, ch. 3 on the new attentiveness; Michael Fried, *Absorption and Theatricality: Painting and Beholder in the Age of Diderot* (U Chicago, 1980) q. 55; Michael P. Steinberg, *Listening to Reason: Culture, Subjectivity, and Nineteenth-Century Music* (Princeton U, 2004); Louis Sebastien Mercier, *Le Tableau de Paris*, ed. J.-C. Bonnet (P: Mercure de France, 1994 [1783]) II, 703 (= ch. 744) on varieties of applause—and throughout, on most everything else optical and acoustic; John Brown, *A Dissertation on*

the Rise, Union, and Power . . . of Poetry and Music (L, 1763) excerpted in Enrico Fubini, ed., *Music and Culture in Eighteenth-Century Europe* (U Chicago, 1995) 172–73, italics removed. Already in the 1730s the playwright and director Aaron Hill had urged actors to assume their characters “in earnest,” at the same time demanding a quieter audience: Aaron Hill, *The Prompter*, eds. W. W. Appleton and K. A. Burnim (NY: Blom, 1966 [1734–1736]) 78, 163. Attentiveness led to more complaints about the acoustics of performance halls: Mathieu François Pidansat de Mairobert, *L’Espion anglais, ou correspondance secrète entre Milord All’eye et Milord Alle’ar [sic]* (L, 1779) III, Lettre XXXV, 216, 220–21.

283. Ralph Colp, Jr., *To Be an Invalid: The Illness of Charles Darwin* (U Chicago, 1977) 3–5; Charles Pickering, *Creative Malady: Illness in the Lives and Minds of Charles Darwin, Florence Nightingale . . .* (L: Allen & Unwin, 1974) 34–98; Charles Darwin, *Correspondence*, eds. F. Burkhardt and S. Smith (Camb U, 1986) II, 234, 249, 253; R. W. Baloh, “Neurotology of migraine,” *Headache* 37 (1997) 615–21, “phonophobia” as the most common auditory symptom; Lucy Larcom, *A New England Girlhood* (NY, 1961 [1889]) 72–73; Harriet Farley, “Letters from Susan. Letter second,” *The Lowell Offering* ser. 2, 4 (June 1844) 170; Thomas Man, “Picture of a factory village” (1833) in *The New England Mill Village, 1790–1860*, eds. Gary Kulik et al. (MIT, 1982) 339; John Dizikes, *Opera in America* (Yale U, 1993) q. 69, 243. On quieting congregations, Larkin, *Reshaping of Everyday Life*, 300, noting how in 1823 one “young minister in Shrewsbury, Massachusetts, stunned his congregation by ordering the dogs banned from the meetinghouse after they had run free from time immemorial”; other ministers banned geese and the spitting of tobacco. More on Sabbath quiet in the next Round.

284. Peter Szendy, *Écoute: une histoire de nos oreilles* (P: Éditions de Minuit, 2001) 93, quoting an 1858 tirade against the barbarous arrangements that itinerant musicians played as “advance publicity” of operas; Dizikes, *Opera in America*, 95; Leon Botstein, “Music and Its Public” (→ n.260) on the musical skills and education of audiences; Levine, *Highbrow/Lowbrow*, 86–90, q. 91.

285. Lynn Abrams, *Workers’ Culture in Imperial Germany* (L: Routledge, 1992) 99–101 on the *Tingel-Tangel* saloons, so-called from the noise made by patrons who “jangled spoons and forks against their beer glasses during song refrains”; *L Times* (Oct. 20, 1809) q. 3:1–3; Cook, *A Book of the Play*, q. 373 King’s Bench, 101 footlights, 291–94 on encores; Stendhal, *Life of Rossini*, 17; Anselm Gerhard, *The Urbanization of Opera: Music Theater in Paris in the Nineteenth Century*, tr. Mary Whittall (U Chicago, 1998) 79, 82–84, 122; Chopin, *Selected Correspondence*, 100 on Meyerbeer’s opera, as also Johnson, *Listening in Paris*, 250; *Pioneer, or Grand National Consolidated Trade Union Magazine* 17 Supp. (Dec. 28, 1833) as reprinted (NY: Greenwood, 1968) 138; Wolfgang Schivelbusch, *Disenchanted Night: The Industrialization of Light in the Nineteenth Century*, tr. Angela Davies (Oxford: Berg, 1988) 192–206, on theater lighting; Dizikes, *Opera in America*, 243, on Wagner (always with the proviso that Verdi in 1853 had composed the first anvil chorus, for *Il Trovatore*); Bruce McCornachie, “Pacifying American theatrical audiences, 1820–1900,” in *For Fun and Profit: The Transformation of Leisure into Consumption*, ed. Richard Butsch (Temple U, 1990) 47–70; C. John Hexamer, “On the preventing of fires in theatres,” *J Franklin Inst* 114 (Sept. 1882) 211–19, as also William P. Gerhard, “The safety of theater audiences,” *Amer Architect and*

Building News 66 (Oct. 21, 1899) 19–22; Kasson, *Rudeness and Civility*, 230–55, q. 242 from Smiley; Levine, *Highbrow/Lowbrow*, 112–19, 182, 187–89, 192–93; Rose Thomas, *Memoirs of Theodore Thomas* (NY, 1911) 311 on baton, 77, 239 and 314 on dislike of encores; Theodore Thomas, *A Musical Autobiography*, ed. G. P. Upton (Chicago, 1905) II, 18–19; George W. Curtis, “Editor’s easy chair,” *Harper’s New Monthly Mag* 60 (Feb. 1880) 463, Thomas stopping a concert when audience members were talking, and 66 (April 1883) 794; “Encores in concerts,” *Dwight’s J of Music* 2 (March 19, 1853) 189–90, and “Music in the West,” *Dwight’s J of Music* 3 (June 4, 1853) 71, followed up by “Correspondence,” *ibid.* (July 30, 1853) 132, a noisy St. Louis audience “so sharply rebuked in all the daily papers” that at succeeding concerts the room was suitably quiet, but further battles over the “Encore Swindle” as described by *Punch* were reprinted in *Dwight’s J of Music* 10 (Jan. 31, 1857) 140, in 13 (May 1, 1858) 36–37, and in 15 (Sept. 3, 1859) 83 and (Sept. 10, 1859) 188–89. Later debates over encores, and their dark twins, hissing and booing, may be tracked through the “Applause and Encores” clippings file of the Harvard Theatre Collection, Houghton Library, Harvard U, especially Dutton Cook, “Applause, calls, and encores,” *Every Saturday* (Jan. 22, 1870) 54–55, a seminal article.

The noisiness of audiences had also been a function of the length of concerts, which could last six hours, auditors coming and going, eating and drinking, according to their own rhythms. As programs were shortened, theater directors and conductors could more readily demand that audiences sit quietly. Cf. Peter A. Bloom, “The public for orchestral music in the nineteenth century,” in *The Orchestra: Origins and Transformations*, ed. Joan Peyser (NY: Scribner’s, 1986) 251–89. On 19th-century shifts in hearing and viewing music, see Richard Leppert, “The social discipline of listening,” in *Aural Cultures*, ed. Jim Drobnick (Toronto: YYZ, 2004) 19–35, noting that the less spontaneously responsive were music audiences, the more histrionic became performers and conductors, compensating for lost interactions, on which cf. Sennett, *Fall of Public Man* (→ n.129) 191, 202.

286. Stephan Oettermann, *The Panorama: History of a Mass Medium*, tr. Deborah L. Schneider (NY: Zone, 1997) esp. 51, q. 107 *Journal London und Paris* 3 (1799) 309–11; Bruce McConachie, *Melodramatic Formations: American Theatre and Society, 1820–1870* (U Iowa, 1992) esp. 142–44 on the lighting of “apocalyptic melodramas” and panoramas. For an earwitness account of Napoleonic warfare: Jakob Walter, *The Diary of a Napoleonic Foot Soldier*, tr. Otto Springer with Frank E. Melvin, ed. Marc Raeff (NY: Penguin, 1991) 16: “The grenades . . . and more so the bombs, behave like vultures in the air which race past the ear with storming wings.”

287. Menahem Blondheim, *News Over the Wires: The Telegraph and the Flow of Public Information in America, 1844–1897* (Harvard U, 1994) 33, 65, q. 67; J. B. Calvert, “The telegraph sounder,” at www.du.edu/~jcalvert/tel/sounder.htm, dated July 18, 1999; Edwin Gabler, *The American Telegrapher: A Social History, 1860–1900* (Rutgers U, 1988) esp. 34, 51, 110–11 on listening; Sterne, *Audible Past*, 137–54, valuable. For connections made by contemporaries between telegraphy and spiritualist communication: Richard Noakes, “Telegraphy is an occult art: Cromwell Fleetwood Varley and the diffusion of electricity to the Other World,” *British J H Sci* 32 (1999) 421–59; Robert S. Cox, *Body and Soul: A Sympathetic History of American Spiritualism* (U Virginia, 2003) 87–88. On Swedenborg:

Alexander J. Grieve, “Swedenborg (or Swedberg), Emanuel,” *Ency Britannica*, 11th ed. (NY, 1911) XXVI, 221–23; Emanuel Swedenborg, [*Arcana Coelestia, the section called*] *The Universal Human, and Soul-Body Interaction*, tr. G. F. Pole (NY: Paulist, 1984) 150–54; Bret E. Carroll, *Spiritualism in Antebellum America* (Indiana U, 1977); Herbert G. Jackson, Jr., *The Spirit Rappers: The Strange Story of Kate and Maggie Fox* (Garden City: Doubleday, 1972) 3, 20, 23–24, 31–32; Gerald Oster, “Muscle sounds,” *Sci Amer* 250,3 (1984) 108–14; “The mysterious rapping—public meetings for investigation,” *The North Star (Rochester)* (Nov. 23, 1849) stethoscope; Robert Dale Owen, *Footfalls on the Boundary of Another World* (Phila, 1860) 240–41 for 1798 ghosts; Logie Barrow, *Independent Spirits: Spiritualism and English Plebeians, 1850–1910* (L: Routledge & Kegan Paul, 1986); Lizzie Doten, *Poems from the Inner Life*, 7th ed. (B, 1869 [1863]) xii, xix, xxi, 86–87, 104.

288. Giles B. Stebbins, “Two golden volumes—poems by Elizabeth Doten,” *The Arena* 80 (July 1896) 228–37, noting that her two volumes sold more than twenty thousand copies, and q. 231 for excerpt of a letter from Doten; “Doten, Miss Lizzie (1828–1908),” *Ency of Occultism and Parapsychology*, ed. J. Gordon Melton, 5th ed. (Detroit: Gale, 2001) I, 438; Charles Dickens et al., *The Haunted House* (L: Hesperus, 2002 [1862]) 13; Alex Owen, *The Darkened Room: Women, Power, and Spiritualism in Late Victorian England* (U Penn, 1990) 10–11, 46, pass.; Janet Oppenheim, *The Other World: Spiritualism and Psychical Research in England, 1850–1914* (Camb U, 1985).

289. Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind* (B: Houghton Mifflin, 1976), but contrast Schmidt, *Hearing Things* (→n.12) 25; Mrs. Cecil M. Cook, *The Voice Triumphant: The Revelations of a Medium* (NY, 1931) 15, 17 on ear trumpets, as also Hamlin Garland, *Forty Years of Psychic Research* (Freeport: Books for Libraries, 1980 [1936]) 15, 33, 36, 39 and David P. Abbott, “The history of a strange case: a study in occultism,” *Open Court* 22 (May 1908) 257–83; “Auscultation extraordinary,” *Lancet* 1 (1829) 96, poem; *OED*, s.v. “detective,” “paranoia,” “snoop”; Partridge, *Dict of the Underworld* (→n.45), s.v. “gumshoes” and “sneaks”; Kasson, *Rudeness and Civility*, 92ff., 110–11 on detectives; “Asks for help: Elderd wants relief from his wicked neighbors,” *Brooklyn Daily Eagle* (Dec. 17, 1889) 6, and “Mr. Elderd’s tormentors” (Feb. 11, 1890) 1.

290. Obversely, Johnson, *Listening in Paris*, 23off., associates the “emergent code of silence during performances” in France after 1820 with a newly confident bourgeoisie whose silence was as much an act of social vigilance and self-reassurance as the result of the creation of a “private space for inner communion” with music or drama, so it could be hard to tell whether an audience was entranced or politely bored, especially with less “representational” music, on which cf. Carl Dalhaus, *The Idea of Absolute Music*, tr. Roger Lustig (U Chicago, 1989).

291. Henry David Thoreau, *Journal. Volume I: 1837–1844*, ed. E. H. Witherell et al. (Princeton U, 1981) 34, and also 50, entry for Aug. 5, 1838: “Some sounds seem to reverberate along the plain, and then settle to earth again like dust; such are Noise—Discord—Jargon. But such only as spring heavenward, and I may catch from steeples and hill tops in their upward course, which are the more refined parts of the former—are the true sphere music—pure, unmixed music—in which no wail mingles.”

292. Chris R. Vanden Bossche, *Carlyle and the Search for Authority* (Ohio State U, 1991)

34, 37, 40–44, 97–102; Thomas Carlyle, *Sartor Resartus: The Life and Opinions of Herr Teufelsdröckh* (L, 1891 [wr. 1830–1831]) 151–52, 167; idem, *On Heroes, Hero-Worship and the Heroic in History*, ed. Carl Niemeyer (U Nebraska, 1966 [1841]) 184–85, 224; William Sharp, “The country of Carlyle,” *Literary Geography* (L, 1904) 146–59; Thomas Carlyle, “Signs of the Times,” in *Complete Works* (NY, 1901) XIII, 462–87, q. 465; Charles R. Sanders et al., eds., *The Collected Letters of Thomas and Jane Welsh Carlyle* (Duke U, 1970–) VI, 320 quiet, and VIII, 249 contrasting London and Ecclefechan (henceforth: the Carlyles, *Collected Letters*).

293. The Carlyles, *Collected Letters*, XII, 46, 248, and XXX, “Ellen Twisleton’s Account of Life at Craigenputtoch, 1828–34,” 267–68; Charles Eliot Norton, ed., *Two Note Books of Thomas Carlyle from 23rd March 1822 to 16th May 1832* (Mamaroneck: Appel, 1972) 176; Fred Kaplan, *Thomas Carlyle* (Cornell U, 1983) 149; Virginia Surtees, *Jane Welsh Carlyle* (Salisbury: Michael Russell, 1986) 102 on “tongue-work”; Mrs. Oliphant, *The Life of Edward Irving* (L, 1862) II, 198ff., q. 207–208; Thomas Carlyle, “The Death of Edward Irving [1834],” in *Complete Works*, XV, 222–25, q. 222; idem, *Sartor Resartus*, 169.

294. Thea Holme, *The Carlyles at Home* (Oxford U, 1965) 58–76; Carlyle, *Sartor Resartus*, 167; Adrian Desmond and James Moore, *Darwin* (L: Michael Joseph, 1991) 212–17; Charles Lyell, *Life, Letters, and Journals*, ed. Mrs. Lyell (NY: AMS, 1983 [1881]) II, 3, 7; Leonard G. Wilson, *Lyell in America* (Johns Hopkins U, 1998) 40; the Carlyles, *Collected Letters* XI, 19n. and 141, XII, 37 and 46, XV, 35n. on “wall-neighbor,” from “Notes of a three-days’ tour of the Netherlands,” *Cornhill Mag* 52 (1922) 627–28. On “silence is golden” as popularized by Carlyle, consider the fine chapter on “Taciturnity” in Paul Langford’s *Englishness Identified: Manners and Character, 1650–1850* (Oxford U, 2000) 175ff., and the range (p. 178) of English disparagements of useless talk—“jabber, babble, chatter, patter, blabber, prattle, tattle, blather.” Carlyle’s antipathy toward piano practice must be put in context: not until the 1870s was an effective *sostenuto* pedal widely installed, so the tendency of Romantic composers to use a sustaining pedal for long stretches (and richer sonorities) became, in the hands of novices, a long loud confusion of sounds: Rowland, *A History of Pianoforte Pedalling*, 23, 122–23.

295. J. M. Dubbey, *The Mathematical Work of Charles Babbage* (Camb U, 1978) 184; the Carlyles, *Collected Letters*, XI, 19; Anthony Hyman, *Charles Babbage, Pioneer of the Computer* (Princeton U, 1982); Charles Babbage, *On the Economy of Machinery and Manufactures* (L, 1832) 9–10; idem, *The Ninth Bridgewater Treatise*, 2nd ed. (1838) in *The Works of Charles Babbage*, ed. Martin Campbell-Kelly (L: Pickering, 1989) IX, 35–39.

296. Charles Babbage, “Reflections on the Decline of Science in England...” (1830) in *Works*, VII, 86; idem, *Passages from the Life of a Philosopher*, ed. Martin Campbell-Kelly (Rutgers U, 1994 [1864]) 253–54, 259–60; Hyman, *Charles Babbage*, 145, 214, 219, 246–47, and plates 8, 12, 16, 17; H. Charles Barton, “Charles Babbage and the beginning of die casting,” *Machinery and Production Engineering* (Oct. 27, 1971) 624–31; Simon Schaffer, “Babbage’s intelligence: calculating engines and the factory system,” *Critical Inquiry* 21, 1 (1994) 203–27. Had it been built, Babbage’s Difference Engine would have been quite loud; you can hear one, constructed according to Babbage’s plans, at the website of the Computer History Museum (Mountain View, CA), www.computerhistory.org/babbage.

297. On separate spheres: Micki McGee, *Self-Help, Inc.: Makeover Culture in American Life* (Oxford U, 2005) 29, neatly concise, as is 210 n.13 with bibliography. On the 100,000: John Hollingshead, *Ragged London in 1861* (NY: Garland, 1985 [1861]) 28. For Babbage, his *Passages*, 262–63, 269, 270–71 (my italics); James H. Winter, *London's Teeming Streets, 1830–1914* (L: Routledge, 1993) 71–76; Maboth Moseley, *Irascible Genius: The Life of Charles Babbage* (Chicago: Regnery, 1970) 52–53; Hyman, *Charles Babbage*, 65, 206. Hardly sedate, music halls featured “swell songs” that “triumphalised noise” as well as the “thundering brattle” of step-dancing (and clogging) with steel-toed shoes: Peter Bailey, *Popular Culture and Performance in the Victorian City* (Camb U, 1998) 208–209. For the class context, see Edward Jacobs, “Disvaluing the popular: London street culture, ‘industrial literacy,’ and the emergence of mass culture in Victorian England,” in *Victorian Urban Settings*, eds. D. N. Mancoff and D. J. Trela (NY: Garland, 1996) 89–113; and, in the American West, Louise Clappe (“Dame Shirley”), letter to Molly Smith (Sept. 30, 1851) in *Women's Letters: American from the Revolutionary War to the Present*, eds. L. Grunwald and S. J. Adler (NY: Dial, 2005) 211–14, an upper-middle-class woman excoriating the profanity and noisiness of goldminers.

298. John Tosh, *A Man's Place: Masculinity and the Middle-Class Home in Victorian England* (Yale U, 1999) 15–17, 140–42; John Graham, Jr., ed., *Letters of Thomas Carlyle to William Graham* (Princeton U, 1950) 77, 79; John M. Picker, *Victorian Soundscapes* (Oxford U, 2003) 52–55; Holme, *The Carlyles at Home*, 59–60 on Jane's sensitivities; the Carlyles, *Collected Letters*, XI,94 Jane on parrots, XIII,308 and XIV,49–50, Jane on cocks, and XXVII,356–57, Thomas's letter; Surtees, *Jane Welsh Carlyle*, 133, lecturing without notes; Michael T. Bass, *Street Music in the Metropolis* (L, 1864) q. 8–9 Baune, also analyzed by Picker. On brainwork, cf. Jan R. McTavish, “The headache in American medical practice in the 19th century,” *Headache* 39 (1999) 287–97, then an inexplicable if common complaint.

299. Bass, *Street Music*, 3, 17, 25–27, 30, q. 34–35 “nigger melodies,” q. 41 “nearly mad,” 59, q. 67 widow, q. 68 boy band; *Hansard's Parliamentary Debates* 172 (July 17, 1863) col. 972; Charles Manby Smith, *Curiosities of London Life* (L: Frank Cass, 1972 [1853]) q. 3, 4–5 on metal reeds, 7, q. 10; Picker, *Victorian Soundscapes*, 55–59; Babbage, *On the Economy of Machinery*, 5, growth. On privacy and sociability, Sennett, *Fall of Public Man* (→ n.129). I have woefully neglected the influence of Alfred, Lord Tennyson on Victorian acoustemology. Listen, to begin with, to the Silent Isle and the Isle of Shouting in “The Voyage of Maeldune,” *Poetical Works*, ed. Eugene Parsons (NY, 1897, 1900) 583–86.

300. On slaughterhouses and sensibilities, James H. Winter, *Secure from Rash Assault: Sustaining the Victorian Environment* (UC Berkeley, 1999) 207; A. Roger Ekirch, *At Day's Close: Night in Times Past* (NY: Norton, 2005) 172–73; Keith Thomas, *Man and the Natural World: Changing Attitudes in England, 1500–1800* (L: Allen Lane, 1983) 275ff.; Harriet Ritvo, *The Animal Estate: The English and Other Creatures in the Victorian Age* (Harvard U, 1987) 125–66. On firebells and engines, I have benefitted from a visit to the Hall of Flame Museum of Firefighting in Phoenix as well as Charles F. T. Young, *Fires, Fire Engines, and Fire Brigades* (L, 1866) 21–25 for lists of fires, 36 on apprentices; Paul C. Ditzel, *Fire Engines, Fire Fighters . . . from Colonial Days to the Present* (NY: Bonanza, 1976); Amy S.

Greenberg, *Cause for Alarm: The Volunteer Fire Department in the Nineteenth Century* (Princeton U, 1998); [Andrew Wynter], “Fires and fire-insurance,” *QR* 96 (1854) 1–43, q. 2. For the Carlyles, *Collected Letters*, VIII, 197, and XIV, 49–50.

301. Winter, *London’s Teeming Streets*, 76, Irish M. P. Baron Fermoy on Bass’s drays; “Trial of Samuel Drury [dray driver] for killing . . . Thomas Love, 16 Sept 1830,” in Proceedings of the Old Bailey, Ref. t18300916–252, at www.hrionline.ac.uk/luceneweb/hri3/; Hyman, *Charles Babbage*, 158–63; Moseley, *Irascible Genius*, 22 on the Earl of Dysart, 202 on parrots; Charles Dickens, “Street minstrelsy,” *Household Words* 19 (1859) 577–80; idem, “Noises,” *All the Year ’Round* 27 (Dec. 16, 1871) 55–59; Kathleen Tillotson, ed., *Letters of Charles Dickens* (Oxford: Clarendon, 1977) IV, 612–13, and V, 162–63.

302. Aleph [= William Harvey], *London Scenes and London People* (L, 1863) 343–52, q. 344, q. 346; Olive Malvery, *The Soul Market* (NY, 1907) 35 on “grizzlers,” 32–46 on street music; Thomas Young, “On the propagation of sound,” *A Course of Lectures on Natural Philosophy and the Mechanical Arts* (L, 1807) 367; Hermann Helmholtz, *On the Sensations of Tone As a Physiological Basis for the Theory of Music*, tr. Alexander J. Ellis (NY: Dover, 1954 [1885, 1st ed. 1862]) 7–8; Bass, *Street Music*, 2, 17; Kasson, *Rudeness and Civility*, 126–27; Charles Dickens, “Whistlers and whistling,” *All the Year ’Round* 29 (1873) 182–86, generally defending whistling against the disdain of the polite; M. Strickland Blacklock, “The Italian Girl,” *City Sounds and Rural Echoes* (NY, 1874) 8; McGee, *Self-Help, Inc.*, 139–41 on work versus labor, as also Thomas Carlyle, *Past and Present* (1843) III, 190–94.

303. Holme, *The Carlyles at Home*, 65–98; the Carlyles, *Collected Letters*, XXVIII, 214, q. 240, 241, q. 245, q. 251, 255, q. 262, 265, q. 273, 281, 290, 295–96, q. 318, q. 326, q. 342, q. 367, and XXIX, 50, q. 64, q. 97, q. 100–101, 108, 169, 226—the room at last comfortable and acceptably quiet, as of 1854; James A. Froude, *Thomas Carlyle: A History of His Life in London, 1834–1881* (NY, 1910) II, q. 136, 142, q. 151, and cf. 153. *OED* finds no uses of “sound[-]proof” or “soundproofing” before a *Health Exhibition Catalog* of 1884. For an interior illustration of the Carlyles’ Cheyne Walk home, see Jenni Calder, *The Victorian Home* (L: Batsford, 1977) 32, and throughout for the qualities of domestic architecture during their era. On the acoustics of townhouses like theirs: Bernard L. Herman, *Town House: Architecture and Material Life in the Early American City, 1780–1830* (U North Carolina, 2005) esp. 30–31.

304. J. Baxter Upham, *Acoustic Architecture: Or, the Construction of Buildings with Reference to Sound and the Best Musical Effect* (New Haven, 1853) 11, 33, and cf. “Circumstances affecting individual and public health,” *B Med and Surgical J* 38 (1848) 407–408 on the virtues of fresh air, as also “Ventilation of buildings,” *ibid.* 40 (1849) 445, and cf. Luther V. Bell, “Considerations on a new state lunatic hospital,” *ibid.* 51 (1849) 351 on ventilating while separating the “quiet and harmless” from the “noise, disturbance, and violence of the excitable curable.” For the Carlyles: *Collected Letters*, IX, 50.

305. Upham, *Acoustic Architecture*, q. 13–14, 16–20, q. 21, q. 22, 41; Jeanne H. Kilde, *When Church Became Theatre: The Transformation of Evangelical Architecture and Worship in Nineteenth-Century America* (Oxford U, 2002) 42–44, 112–13; Eugene Kelly, *Architectural Acoustics* (Buffalo, 1898) 67–68, wires; Benjamin Latrobe, *Correspondence and Miscellaneous Papers*, eds. J. C. Van Horne and L. W. Formwalt (Yale U, 1984) I, 400–408, q. 405;

William Shand, “Observations on the adaptation of public buildings to the propagation of sound,” *J Franklin Inst* 39 (1845) 1–8; Joseph Henry, “On acoustics applied to public buildings [1856],” in *Scientific Writings* (DC, 1887) II, 403–20, q. 420; Luther S. Cushing, *Cushing’s Manual of Parliamentary Practice*, rev. Paul E. Lowe (NY, 1925 [1844]) 183; Nathan Reingold et al., *The Papers of Joseph Henry* (DC: Smithsonian, 1972) III, 134, letter of Dec. 28, 1836. Cf. Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (MIT, 2002) 18–29. Contrast Paul E. Sabine, “The acoustics of the remodeled House and Senate chambers of the National Capitol,” *JASA* 24 (Mar 1952) 121–24, still at work on improvements.

306. Henry P. Babbage, *Memoirs and Correspondence* (L, 1915) 5, 12, 20–21, 180–83, q. 182; Rosemary Ashton, *Thomas and Jane Carlyle: Portrait of a Marriage* (L: Chatto and Windus, 2002) 434, 440; the Carlyles, *Collected Letters*, XXXII, 182, 207; J. F. Murray, “The World of London. Part VIII. Foreigners in London,” *Blackwoods Mag* 51 (Jan. 20, 1842) q. 24–25. On campaigns to “save the children”: John E. Zucchi, *The Little Slaves of the Harp: Italian Child Street Musicians in Nineteenth-Century Paris, London, and New York* (McGill-Queen’s U, 1992). On Paris street musicians and debates over organ-grinders: Robert A. Green, *The Hurdy-Gurdy in Eighteenth-Century France* (Indiana U, 1995); Série D, B/201, “Chanteurs et musiciens ambulants, Joueurs d’orgues,” Archives de la Préfecture de Police, Paris, newsclips, including a 1908 clip quoting Danton defending street musicians against Robespierre in 1793—a political resonance elsewhere often absent, but cf. Winter, *London’s Teeming Streets*, 77–78, 171, for Londoners’ defenses of street music, as also David Cohen and Ben Greenwood, *The Buskers: A History of Street Entertainment* (Newton Abbott: David & Charles, 1981) 134–55 and, in America, George W. Curtis, “Editor’s easy chair,” *Harper’s New Mo Mag* 80 (Jan 1890) 314–16.

307. Ashton, *Thomas and Jane Carlyle*, 295; *OED* s.v. “quinism” (1880); Prosper Lemaître, *Des effets physiologiques du sulfate de quinine* (Paris, 1850) 25–26; Otis F. Manson, *A Treatise on the Physiological and Therapeutic Action of the Sulphate of Quinine* (Phila, 1882) 23–29, 35, 96–98, 154 on tinnitus and deafness from quinine.

308. Benedict Prévost, “Doublement d’un objet par un oeil unique,” *Annales de chimie et de physique* 51 (1932) 210–24, with “Observation de M. Babbage,” 212ff., translated in part by C. R. Keeler in his “Babbage the unfortunate,” *British J Ophthalmology* 88 (2004) 730–32; Brian Rotman, “Think of a number?” *noise*, eds. A. Lowe and S. Schaffer (Camb: Kettle’s Yard, 2000) unpaginated, on Babbage’s concern for legibility, with examples in color of *Specimens of Logarithmic Tables Printed with Different Coloured Inks*... (1831); Michael R. Williams, “The ‘last word’ on Charles Babbage,” *Annals H of Computing* 20,4 (1998) 10–14, using an autopsy located by Dr. Neville F. Babbage, who offers three causes for his great-great-grandfather’s hyperacuity: pain from renal cholic, leading to social reclusiveness; uraemia from inflammation of the prostate, leading to nightmares and severe headaches; calcareous disease of the carotid and vertebral arteries, i.e., peripheral arterial disease: “Autopsy report on the body of Charles Babbage,” *Med J Australia* 154 (1991) 758–59. Cf. Doron Swade, *The Cogwheel Brain: Charles Babbage and the Quest to Build the First Computer* (L: Little, Brown, 2000) 214–17; T. Nakashima et al., “Disorders of cochlear brain flow,” *Brain Research [&] Brain Research R* 43 (2003) 17–28.

309. Alan G. Hill, ed., *The Letters of William and Dorothy Wordsworth*, 2nd ed. (Oxford: Clarendon, 1979) V, 697-98, 747; William Wordsworth, "On the Power of Sound" (1828-1829, pub. 1835), in *Last Poems, 1821-1850*, eds. Jared Curtis et al. (Cornell U, 1999) 112-24; William Wordsworth, *The Fourteen-Book Prelude*, ed. W. J. B. Owen (Cornell U, 1985 [1798-1805, rev. 1831-1832, pub. 1850]) bk. 2, ll. 302-10; Kerry McSweeney, *The Language of the Senses: Sensory Perceptual Dynamics in Wordsworth, Coleridge, Thoreau, Whitman, and Dickinson* (McGill-Queen's U, 1998) 46-55, q. 52 from a 1790s fragment; Leonore Daviddoff, *The Best Circles: Women and Society in Victorian England* (Totowa: Rowman & Littlefield, 1973) 35. By the early 1800s, cataracts were being treated with a reported success rate of 80-90 percent: Julius Hirschberg, *The History of Ophthalmology. VII. First Half of the Nine-teenth Century. (Part Three). France*, tr. F. C. Blodi (Bonn: Wayenborgh, 1986) 291-93.

310. The Carlyles, *Collected Letters*, XXVIII, 23, q. 265 (to Emerson), XXX, 16, and on Dumfries, XXXI, 143ff.; John Thomas, *A Regional History of the Railways of Great Britain VI. Scotland: The Lowlands and the Borders* (Newton Abbott: David & Charles, 1971) 28, 58-59, 260, 263 on railroads in Dumfries and Ecclefechan.

311. Charles E. Lee, "Adrian Stephens: inventor of the steam whistle," *Trans Newcomen Soc* 27 (1949-1951) 163-73, q. 168; *Wikipedia*, entry for *Best Friend of Charleston* at http://en.wikipedia.org/wiki/Best_Friend_of_Charleston#_note-Rivanna_NRHS.2C_June; Thomas P. Jones, "On explosions in steam boilers," *J Franklin Inst* 3 (1829) q. 70, and remarks on a patent "for improvements in the making and construction of steam engine boilers," *ibid.* 7 (1831) 268-69; Thomas Cooper, in Roberts Vaux et al., "Explosion of steamboilers," *ibid.* 8 (1831) q. 240-41; Alexander Dallas Bache et al., "General report . . . on the explosions of steam-boilers," *ibid.* 17 (1835) 92 *et seq.* and 18 (1836) 217-32 *et seq.*; Connecticut River Steam Boat Company, *Report of the Board of Examiners . . . into the Causes of the Explosion of the Steam Boat New England which occurred at Essex, October 9th, 1833* (New Haven, 1833) 5-6, analyzed by R. John Brockman, *Twisted Rails, Sunken Ships: The Rhetoric of Nineteenth-Century Steamboat and Railroad Accident Investigation Reports, 1822-1879* (Amityville: Baywood, 2004) 19-39; Paul F. Paskoff, *Troubled Waters: Steamboat Disasters, River Improvements, and American Public Policy, 1821-1860* (Louisiana State U, 2007) 19-24, 146-50; William Wollaston, "On sounds inaudible by certain ears," *Phil Trans Royal Soc* 110 (1820) 306-309; John Hooper and R. C. Ormiston-Chant, "The Eldritch shriek," *British Railway J* 20 (1988) 25-33, with follow-up at *ibid.* 24 (1988) 219; Edward A. Fagen, *The Engine's Moan: American Steam Whistles* (Mendham: Astragal, 2001) 2, 11-17, 21-24, 27, and throughout; "Lays of the Line: The Song of the Engine" (1846), in Michael Freeman, *Railways and the Victorian Imagination* (Yale U, 1999) q. 103 from *Illustrated L News*.

312. Henry David Thoreau, *Walden, or Life in the Woods* (B, 1854) 125-28, and *Journal, V: 1852-1853*, ed. Patrick F. O'Connell (Princeton U, 1992) 92, for June 11, 1852. Cf. Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (Oxford U, 1964) 250-54. On "soundmarks" and railroad noise: Schafer, *The Tuning of the World* (→ n.26) 10, 81-82. While Stephens was perfecting the steam whistle, Savart was studying the acoustics of jets of water moving through tubes of varying lengths and diameters: McKusick and Wiskind, "Félix Savart" (→ n.277) 419-20.

ROUND TWO

1. Nadar, *Quand j'étais photographe* (P, 1900) 281, quoted in Walter Benjamin, *The Arcades Project*, trs. H. Eiland and K. McLaughlin (Harvard U, 1999) 90.

2. Félix Nadar, *Charles Baudelaire intime: le poète vierge* (P: Obsidiane, 1985 [1911]); Sylvia Aubenas, "Beyond the portrait, beyond the artist," tr. Frederick Brown, in Nadar, eds. M. M. Hambourg et al. (NY: Abrams, 1995) 98–102; Walter Benjamin, *Charles Baudelaire: A Lyric Poet in the Era of High Capitalism*, tr. Harry Zohn (NY: Verso, 1989) 174–75 "strategic beautification"; Richard Sennett, *Flesh and Stone: The Body and the City in Western Civilization* (NY: Norton, 1994) 329–32; Donald Reid, *Paris Sewers and Sewermen* (Harvard U, 1991) q. 29, 39, 41, 44, 49; Matthew Gandy, "The Paris sewers and the rationalization of urban space," *Trans Inst British Geographers* n.s. 24 (1999) 23–44; Victor Hugo, *Les Misérables*, trs. L. Fahnestock and N. MacAfee (NY: New Amer Lib, 1987 [1862, begun ca. 1840]) III, 1261, 1269 on "fetid, savage" underworld; David S. Barnes, *The Great Stink of Paris and the Nineteenth-Century Struggle against Filth and Germs* (Johns Hopkins U, 2006) esp. 52–53; Michael Carmona, *Hausmann: His Life and Times, and the Making of Modern Paris*, tr. Patrick Camiller (Chicago: Dee, 2002) 400–401, 426–28 (tax records show that "the very poor layers of the population were far from having been swept out of Paris"), but contrast David Harvey, *Paris, Capitol of Modernity* (NY: Routledge, 2003) esp. 234–38, 251–52; Philippe Néagu and J.-J. Poulet-Allamagn, *Le Paris souterrain de Félix Nadar* (P: Caisse nationale des monuments historiques . . . , 1982) figs. 74–96; Matthew Luckiesh, *Artificial Light: Its Influence upon Civilization* (NY, 1920) 116, arc-lights. Cf. John Hollingshead, *UndergEound London* (L, 1862) 63, 181–82, sewer sounds audible aboveground; Rodolphe Radau, *Wonders of Acoustics*, tr. Robert Ball (NY, 1872) 20, on the catacombs as sounding-boards amplifying carriage rumbles on streets above. On colors, see Simon Garfield, *Mauve: How One Man Invented a Color That Changed the World* (NY: Norton, 2001) esp. 69–70, 78; Anthony S. Travis, "Theory from practice: portraying the constitution of synthetic dyestuffs in the 1860s," *The Invisible Industrialists*, eds. J. P. Gaudillère and I. Löwy (NY: St. Martin's, 1998) 123ff.; Philip Ball, *Bright Earth: The Invention of Color* (NY: Farrar Straus Giroux, 2002) 197–230; J. W. von Goethe, "Theory of color" (1810) in his *Scientific Studies*, tr. and ed. Douglas E. Miller (NY: Suhrkamp, 1988) 288, quenched; William Makepeace Thackeray, *The History of Pendennis* (L, 1849–1850) I, 304 and II, 7–8 on loud clothing; Common Sense, "The streets of London," *L Times* (Jan. 21, 1862) 10 on loud stockings, and Eliza Lynn Linton, "Out walking," *Temple Bar* 5 (April 1862) 133 on "loud colors," both quoted by Lynda Nead, *Victorian Babylon: People, Streets and Images in Nineteenth-Century London* (Yale U, 2000) 64, 66, and also 88 on the 360,000 gas streetlamps installed in London during the 1850s, which changed the intensity, hue, and values of the colors of the night even as the industrial by-products of gas companies introduced into the air more particles likely to make the night louder with coughing and catarrh.

3. On Baudelaire: his *Artificial Paradise*, tr. Ellen Fox (NY: Herder & Herder, 1971 [1857]) q. 21, 22, a French edition of which (Claude Pichois, *Les Paradis artificiels* [P, 1961] 1–44) includes three of his chief sources J. W. Théophile Gautier's accounts of taking opium and hashish, esp. "Le Hachich" (1843), where Gautier heard "the noise of colors" and "Green, red, blue, yellow sounds came to me in waves perfectly distinct"; Jonathan

Mayne, tr. and ed., *Art in Paris 1845-1862: Salons and Other Exhibitions reviewed by Charles Baudelaire* (L: Phaidon, 1965) q. 33, 51, q. 93-94, q. 114, his translations amended based on Baudelaire's *Salon de 1846*, ed. David Kelley (Oxford: Clarendon, 1975) 162, 178; Chasagnol neveu, *Tintamarre-Salon* (P, 1868?). Perhaps the earliest instance of art criticism couched in acoustic terms (as "an unbearable racket to the eyes") was Diderot's attack in the 1760s on the work of François Boucher ("*Toutes ses compositions font aux yeux un tapage insupportable*"), in Denis Diderot, *Salons*, eds. J. Sezec and J. Adhémar (Oxford: Clarendon, 1975) II,70-71. This is put in philosophical and art-historical context by Michael Fried, *Absorption and Theatricality: Painting and the Beholder in the Age of Diderot* (UC, 1980) 41.

On tone: Johann Gottfried Herder, "Music, an art of humanity" (1802), tr. Edward A. Lippman, in *German Essays on Music*, eds. J. Hermand and M. Gilbert (NY: Continuum, 1994) 41-50; Goethe, "Theory of color," 276; Henry Fuseli, "Lecture VIII" (1810), in *Lectures on Painting by the Royal Academicians. Barry, Opie, and Fuseli*, ed. Ralph N. Wornum (L: Bohn, 1848) 504, 508, 512; William Marshall Craig, *A Course of Lectures on Drawing, Painting, and Engraving* (L, 1821) 128-29, 143-44; John Ruskin, *Modern Painters* (L, 1843) q. 99 on tone, q. 128 on dazzle; Bryan Simms, "Choron, Fétis, and the theory of tonality," *J Music Theory* 19 (1975) 112-39; Brian Hyer, "Tonality," *New Grove*, XXV,583ff.; and cf. the satirical definition of "thon" in [J.-L.-A.] Commerson, *Petite encyclopédie bouffonne, contenant . . . le dictionnaire du Tintamarre* (P, 1853) 323. For an earful of Hoffmann, who deplored the "shrieking, squeaking, miaowing, gurgling, groaning, moaning, warbling, wobbling" of bad singers, consult David Charlton, ed., *E. T. A. Hoffman's Musical Writings*, tr. Martyn Clarke (Camb U, 1989) esp. 83, 126. Greek philosophers anticipated the sound-color analogy in *De Audibilibus*, a fragment often attributed to Aristotle: "Clearness in sound resembles clearness in color," such that harsh voices were "grey," clear voices "white": W.D. Ross, ed., *The Works of Aristotle: VI. Opuscula*, trs. T. Loveday and E.S. Forster (Oxford, 1913) 801b, 802a.

On theories of metaphor: In the context of Philip Wheelwright's *Metaphor and Reality* (Indiana U, 1962) 70-91, this chapter traces a shift from noise as epiphor, a mimetic and "semantic movement from one term over *onto* another, resembling it but less well known," to noise as diaphor, a ludic and experiential juxtaposition from which arises "new meanings or fresh recognitions." Epiphor (p. 91) hints at significance; diaphor creates presence.

4. Charles Baudelaire, "Correspondances" et "Les Bijoux," *Les Fleurs du mal* (P, 1870) 10, 273-74, my translations/paraphrases, and cf. "Les Phares," 13-14 on sounds of paintings; Thomas W. Bakewell, in Roberts Vaux et al., "Explosion of steam boilers," *J Franklin Inst* 7 (1831) 386, the "tell-tale"; Lois Hyslop and Francis E. Hyslop, Jr., trs. and eds., *Baudelaire on Poe* (State College, 1952) 136, irritability, and 153 on furniture; Benjamin, *Arcades Project*, 248-49, *boa*; Edgar Allan Poe, "The Fall of the House of Usher" in *Collected Works*, eds. Thomas O. Mabott et al. (Harvard U, 1978) II,405, and 195-200 for "Silence," 494-504 for "Philosophy of Furniture," III,789-99 for "The Tell-Tale Heart." Cf. Christopher Prendergast, *Paris and the Nineteenth Century* (Oxford U, 1992) 126-32 on how city noise led Baudelaire to the prose poem; Jerrold Seigel, *Bohemian Paris: Culture, Politics, and the Boundaries of Bourgeois Life, 1830-1930* (Johns Hopkins U, 1985) ch. 4 on

Baudelaire and (p. 116) the importance of “concentration” to a poet-dandy; Emily Jane Cohen, “Mud into gold: Baudelaire and the alchemy of public hygiene,” *Romantic Review* 87 (1996) 239–55; David L. Pike, *Subterranean Cities: The World Beneath Paris and London, 1800–1945* (Cornell U, 2005) 256, Baudelaire on the sewers, 107–24 on the ambiance of the Paris catacombs, throughout for illustrations of European life underground, real and imagined, as also Wendy Lesser, *The Life Below the Ground: A Study of the Subterranean in Literature* (B: Faber and Faber, 1987).

5. Benjamin, *Charles Baudelaire*, 36–37, 44, 50, 62, 153, 157–61; J.D. Hood and A. Kayan, “Neuro-otology and migraine,” in *Migraine*, ed. J.N. Blau (Johns Hopkins U, 1987) 597–624; G.L. Darmstadt and J.P. Harris, “Luetic hearing loss,” *Amer J Otolaryngology* 10 (1989) 410–21; William J. Kimberling, “Genetic hearing loss associated with eye disorders,” in *Hereditary Hearing Loss and Its Syndromes*, eds. H. V. Toriello et al. (Oxford U, 2004) 126–65; Bronya J.B. Keats and David P. Corey, “The Usher syndromes,” *Amer J Med Genetics* 89,3 (1999) 158–66. On migraine: Henry G. Wright, *Headaches: Their Cause and Cure* (NY, 1856); Hansruedi Isler and F. Clifford Rose, “Historical background,” in *The Headaches*, eds. J. Olesen et al. (Phila: Lippincott Williams & Wilkins, 2000) 1–7; Robert B. Lipton et al., “Epidemiology and impact of headache,” in *Wolff’s Headache*, 7th ed., eds. S.D. Silberstein et al. (Oxford U, 2001) 85–91; J.R. McTavish, *Pain and Profits: The History of the Headache and Its Remedies in America* (Rutgers U, 2004). On syphilis: Allan M. Brandt, *No Magic Bullet: A Social History of Venereal Disease in the United States since 1880* (Oxford U, 1985) 12–13; Peter Baldwin, *Contagion and the State in Europe, 1830–1930* (Camb U, 1999) esp. 424–25; John T. Crissey and Lawrence C. Parish, “Lues II,” *Dermatology and Syphilology of the Nineteenth Century* (NY: Praeger, 1981) 217–30; Lesley A. Hall, “‘The Great Scourge’: syphilis as a medical problem and moral metaphor, 1880–1916” (1998) at <http://homepages.primex.co.uk/~lesleyah/grtsgrge.htm>; Roger Davidson and Lesley A. Hall, eds., *Sex, Sin, and Suffering: Venereal Disease and European Society since 1870* (L: Routledge, 2001).

6. Patrick Beaver, *A History of Tunnels* (L: Davies, 1972) 47, q. 48, 50, 55–66; George I. Brown, *The Big Bang: A History of Explosives* (Stroud: Sutton, 1998) 92–94, 105; Michael Freeman, *Railways and the Victorian Imagination* (Yale U, 1999) q. 40 from *Railway Mag and Annals of Sci* 1 (1836) 112, “electrifying,” and 207, Rondo (1830s); “Music and railways,” www.uclan.ac.uk/library/musrail.htm; Anthony Hyman, *Charles Babbage, Pioneer of the Computer* (Princeton U, 1982) 148; Rosalind H. Williams, *Notes on the Underground: An Essay on Technology, Society, and the Imagination* (MIT, 1990) 56–63 on tunnels, 72–75 on subways; Daniel V. Boudillion and Andrew T. Bowers, “Hoosac Tunnel: Abode of the Damned?” (2002) at www.boudillion.com/hoosac/hoosac.htm; Hollingshead, *Underground London*, 53 on sounds aboveground heard from below; Lesser, *Life Below the Ground*, 69–70 on Schliemann. The labor historian Raphael Samuel, in “Mineral workers,” *Miners, Quarrymen and Saltworkers*, ed. R. Samuel (L: Routledge & Kegan Paul, 1977) 37–40, observes that mechanical cutters and steam drills were rarely used by English miners before 1900, but the “dull, muffled, roof-shaking boom” of gunpowder blasts—to open out a tunnel—still startled the ears of novices in the 1860s. My estimate of total tunnel length is driven by Gunnar Lotsberg, “The World’s Longest Tunnel Page” (Aug. 6, 2003)

at <http://home.no.net/lotsberg/data/old.html>.

7. “Locomotive engineers—their responsibilities and estimation,” *Locomotive Engineers Mo J* 2 (Feb. 1868) 42; Horace-Bénédict de Saussure, *Voyages dans les Alpes* (Geneva, 1786) II, 562 and (Neuchâtel, 1796) IV, 145; Alain Faure, “Sordid class, dangerous class? Observations on Parisian ragpickers and their *Cités* during the nineteenth century,” tr. Lee Mitzman, *Intl R Social H* 41 (1994, Suppl 4) 157–76; Benjamin, *Charles Baudelaire*, 18–21, mid-century fascinations with ragpickers; Registry Dept., City of Boston, “Instructions to the Captain of the Watch” (1821), *Selectmen’s Minutes Sept. 1, 1818–April 24, 1822* (B, 1909) 198. Night noises can be heard in Proceedings of the Old Bailey at Jan. 10, 1828, trial of Thomas Collison (ref. t1828o110–32), or Oct. 29, 1829, trial of Stephen Sandford and William Lesslie (ref. t18291029–189), or May 17, 1832, trial of David Elliott (ref. t1832o517–4), all online at www.hrionline.ac.uk/luceneweb/hri3; Bryan D. Palmer, *Cultures of Darkness: Night Travels in the Histories of Transgression* (NY: Monthly R, 2000) 234 on ragpickers, quoting Jules Janin, *Un hiver à Paris* (1845); Steven L. Kaplan, *The Bakers of Paris and the Bread Question, 1700–1775* (Duke U, 1996) 227–31.

8. Alan Gallop, *Children of the Dark: Life and Death Underground in Victoria’s England* (Stroud: Sutton, 2003) 39–41; David W. Brunton and John A. Davis, *Safety and Efficiency in Mine Tunneling* (DC, 1914) 50–51, the arrival of gas-engine air compressors did not do away with the use of steam engines for boilers; Dave Douglas, “Pit talk in county Durham,” in Samuel, ed., *Miners, Quarrymen and Saltworkers*, 325, jowl; Vvyyan Holland, *Son of Oscar Wilde* (Oxford U, 1988) 59–60; Stephen Halliday, *Underground to Everywhere* (Phoenix Mill: Sutton, 2001) q. 23 from Ford Maddox Ford’s *The Soul of London* (1895), q. 22 from *English Illustrated Mag*; Bobrick Benson, *Labyrinths of Iron: A History of the World’s Subways* (NY: Newsweek, 1981) 31, 111ff.; Pike, *Subterranean Cities*, 36–47, tunnels in London daily life; B. D. Lewin, “Claustrophobia,” *Psychoanalytic Q* 4 (1935) 227–33; Benjamin Ball, “On claustrophobia,” *British Med J* (Sept. 6, 1879) 371; C. F. O. Westphal, “Die Agoraphobie, eine neuropathische Erscheinung,” *Archiv für Psychiatrie und Nervenkrankheiten* 3 (1871–1872) 138–61. On the experience and theory of crowds: Susanna Barrows, *Distorting Mirrors: Visions of the Crowd in Late Nineteenth-Century France* (Yale U, 1981); Jeffrey T. Schnapp and Matthew Tiews, eds., *Crowds* (Stanford U, 2006), esp. the fine sidebar essays on the historical meanings of “turba,” “mass,” “crowd,” “multitude,” “mob,” etc.

9. George Alston Tripp, Medical School of Maine, Student Notebook II, Diseases of Children (1896), on croup, pseudo-croup, and catarrhal pertussis, in OHA 335, Natl Museum of Health and Med, DC; [excerpt from *The Mirror*], “To prevent the croup,” *The Plough, the Loom, and the Anvil* 4 (1852) 572, “a shrill, sonorous cough”; Eugène Bouchut, *Treatise on the Diseases of Children and Infants at the Breast*, tr. Peter H. Bird (L, 1855) 348–69 on whooping cough; Anne Hardy, *The Epidemic Streets: Infectious Disease and the Rise of Preventive Medicine, 1856–1900* (NY: Clarendon, 1993) esp. ch. 4 on diphtheria, ch. 8 on tuberculosis; Halliday, *Underground to Everywhere*, 23 for Bell; Peter C. English, *Old Paint: A Medical History of Childhood Lead-Paint Poisoning in the United States to 1980* (Rutgers U, 2001) 33–34; Charles Dickens, *Our Mutual Friend* (1865) bk. III, ch. 1, as well as *Bleak House* (1853) ch. 1; Robert W. Edis, *Decoration and Furniture of Town Houses* (L, 1881) 17–18, in “*Busy Times*”: *Human Documents from the Age of the Forsytes*, ed. Royston Pike (NY:

Praeger, 1969) 24–25, and 203ff. on sweated labor; James P. Cassells, *Shut Your Mouth and Save Your Life: Being Remarks on Mouth-Breathing* (Edinburgh, 1877) 6–7; John C. Cutler, *Lessons in Hygiene* (Phila, 1885) 65 on mouth-breathing; Tucson Indian Training School Records 1888–1953, MS 809, Subgroup 3, Box 2, Haddington Brown Correspondence, v.4, p. 331, letter of 25 Jan 1907, and p. 447, letter of 24 Sept 1906, Arizona Historical Society Lib and Archives, Southern Division; Lesser, *Life Below the Ground*, 83ff., q. 92 from Henry James, *The Princess Casamassima* (serialized 1885–1886). For a sense-theoretical approach to the cough as “the creature voiced,” listen to David Appelbaum, *Voice* (SUNY, 1990) 1–13.

10. Brian W. Clapp, *Environmental History of Britain since the Industrial Revolution* (L: Longman, 1994) 14, q. 31 for Evelyn; Alexis de Tocqueville, *Journeys to England and Ireland*, trs. G. Lawrence and K. P. Mayer (L, 1968) 105–108, letter of July 2, 1835, in Harold L. Platt, *Shock Cities: The Environmental Transformation and Reform of Manchester and Chicago* (U Chicago, 2005) 5, and Platt throughout; Charles Turner Thackrah, *The Effects of Arts, Trades and Professions . . . on Health and Longevity* (L, 1832) repr. in A. Meiklejohn, *The Life, Work and Times of Charles Turner Thackrah*, 2nd ed. (Edinburgh, 1957) 74n.–75n.; Angela Gugliotta, “How, when, and for whom was smoke a problem in Pittsburgh?” in *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region*, ed. Joel A. Tarr (U Pittsburgh, 2003) 110–13; Thomas Galbraith, *Chasing the Cure in Colorado* (1907), quoted in Thomas Dormandy, *The White Death: A History of Tuberculosis* (L: Hambledon, 1999) 121; Amoret Scott and Christopher Scott, *Tobacco and the Collector* (L: Parrish, 1966) 143–44, spittoons; Abel de Moyria-Mailla, *Manuel des usages et des manières* (P, 1847) 23; John P. Whitwell, *Volatile, Aromatic, and Head-Ache Snuff* (B, 1813); William H. Day, *Diseases of Children*, 2nd ed. (Phila, 1881) 368–70; Sheila M. Rothman, *Living in the Shadow of Death: Tuberculosis and the Social Experience of Illness in American History* (NY: Basic, 1994) 14, 16 on stages defined by coughing, and 120–22; Dwight Thomas and David K. Jackson, *The Poe Log* (B: Hall, 1987) 644, Gove visiting in 1846, shortly before Virginia died; Hannah S. Decker, *Freud, Dora and Vienna 1900* (NY: Free Press, 1991) 65, 70, 206–207; Gabriel Tarde, “Foules et sectes au point de vue criminel,” *R des deux mondes* (Nov. 15, 1893) 367, tr. in Athena Vrettos, *Somatic Fictions: Imagining Illness in Victorian Culture* (Stanford U, 1995) 81.

11. Rothman, *Living in the Shadow of Death*, 109, q. 114 from Deborah Vinal Fische, who died of tuberculosis in 1844; Frederick Engels, *The Condition of the Working Class in England*, tr. Florence K. Wischnewetzky (L, 1952 [1845]) 242–49, q. 245; Jules Verne, *The Underground City*, tr. Sarah Crozier, foreword by Ian Thompson (Edinburgh: Luath, 2005) ix–xii, 61 on penitents, q. 79. Cf. Pike, *Subterranean Cities*, 75–88, 144–65 on Verne’s and other visions of mines.

12. John E. Crowley, *The Invention of Comfort* (Johns Hopkins U, 2000) 103–30; Nead, *Victorian Babylon*, 93–94; Wolfgang Schivelbusch, *Disenchanted Night: The Industrialization of Light in the Nineteenth Century*, tr. Angela Davies (Oxford: Berg, 1988); Simone Delattre, *Les douze heures noires: la nuit à Paris au XIXe siècle* (P: Albin Michel, 2000) 19, 70, 82–116.

13. George A. Sala, *Gaslight and Daylight* (L, 1859) 156, from Nead, *Victorian Babylon*, q. 101; Thomas Lackland (= George C. Hill), *Homespun; or, Five and Twenty Years Ago* (NY,

1867) 49–50; L. Gaylord Clark, *Knick-Knacks from an Editor's Table* (NY, 1852) 82, shriek; Pierre C. Reynard, "Public order and privilege: 18th-century French roots of environmental regulation," *Technology and Culture* 43 (2002) 1–28 at 11n.; J. A. Cantrell, *James Nasmyth and the Bridgewater Foundry* (Manchester U, 1984) 139–80 on steam hammers, as also Samuel Smiles, *Industrial Biography: Iron Workers and Tool Makers* (Newton Abbot: David & Charles, 1967 [1863]) 288–89; Elizabeth Blackwell, *Pioneer Work in Opening the Medical Profession to Women* (NY, 1895) 265, letter of 1849 on furnaces; Marietta Holley, *Josiah Allen's Wife as a P. A. and P. I.: Samantha at the Centennial* (Hartford, 1887) 507–508.

14. The first Night of Edward Young's *Night Thoughts* (1742) appears in Charles Peake, ed., *Poetry of the Landscape and the Night: Two Eighteenth-Century Traditions* (L: Arnold, 1967) with other examples of expectations of night silence, and cf. Dominique Bertrand, "À travers les nuits (XVIIe–XVIIIe siècles)," in her *Penser la nuit* (P: Champion, 2003) 7–14; Søren Kierkegaard, *For Self-Examination; Judge for Yourself!*, trs. H. V. Hong and E. H. Hong (Princeton U, 1990) 48; Michael Dalton, *The Country Justice* (L, 1690) 140; A. Roger Ekirch, *At Day's Close: Night in Times Past* (NY: Norton, 2005) 154–70 on nightwork, 287–94 on bugs and babies, 300–23 on two sleeps; Douglas A. Reid, "The decline of Saint Monday, 1766–1876," *Past & Present* 71 (1976) 76–101; George A. Sala, *Twice Round the Clock* (L, 1878 [1859]) q. 25. Cf. Delattre, *Les douze heures noires*, 240–56 on the noises of nightwork, and of nightworkers, in mid-19th-century Paris.

15. Jean Verdon, *Night in the Middle Ages*, tr. George Holoch (U Notre Dame, 2002) 80–82, 85–99 on the nightwatch; Elisabeth Crouzet-Pavan, *Espaces, pouvoir et société à Venise à la fin du moyen âge* (Rome: École française de Rome, 1992) I, 225–61, 804–806; Ekirch, *At Day's Close*, 63–65, 72–73, 76ff.; Sala, *Twice Round the Clock*, 300, comparable to the noisiness of American receptions as deplored by Charles Dudley Warner, "Editor's drawer," *Harper's New Mo Mag* 79 (June 1889) 156–57. The night shrank earlier in Paris: once reflecting lamps were installed in the streets (1788–1794), Restif de la Bretonne found the quiet and darkness of the night had diminished to a single hour, between 3 and 4 a.m., when the *reverbères* had guttered out and dawn had not yet arrived: *Les Nuits de Paris* (P: Hachette, 1960) 93 (= 151st night), 106 (= 180th night). Cf. Yi-Fu Tuan, *Landscapes of Fear* (U Minnesota, 1979) 163 on the crying of curfew in the city of Ch'ang-an during the Tang, when drums were beaten eight hundred times, and beaten again to reopen the gates in the morning.

16. Louis Chevalier, *Histoires de la nuit parisienne* (P: Fayard, 1982) 17, quoted in Joachim Schlör, *Nights in the Big City: Paris, Berlin, London 1840–1930*, trs. P. G. Imhof and D. R. Roberts (L: Reaktion, 1998) 55; Palmer, *Cultures of Darkness*, esp. chs. 5, 7, 10, and p. 190 for law case of 1860; Andreas Gestrich, "After dark: girls' leisure, work, and sexuality in 18th- and 19th-century rural southwestern Germany," in *Secret Gardens, Satanic Mills: Placing Girls in European History, 1750–1960*, eds. Mary Jo Maynes et al. (Indiana U, 2005) 54–68; Delattre, *Les douze heures noires*, 74, q. 75 for de Jouy and Féval, 133–37. On the quiet of a small town and how that affected what was experienced as loud or noisy: Guy Thuillier, *Pour une histoire du quotidien au XIXe siècle en Nivernais* (P: Mouton, 1977) 230–44.

17. Schlör, *Nights in the Big City*, 42 on noisiness, 44 on watchmen, 46 on concentrated

life, 89 on “ears listening out” (from Jules-Émile Legras, *Spreer-Athen* [1892]), 93 on night shifts, 121ff. on journalists and reformers, 145–61 on homelessness, 238ff. on nightwalking, q. 229 from E. Heine (“Sketches from the moral and social misery of the metropolis,” in *Zertreten Blüten* [Berlin, n.d.] 5), q. 285 from Robert Springer (*Berlin wird Weltstadt* [Berlin, 1868] 61). Cf. Delattre, *Les douze heures noires*, 182–200, on the Parisian *Noctambules*.

18. Ekirch, *At Day's Close*, 288–90; Thomas R. Moore et al., “Diurnal and gestational patterns of uterine activity in normal human pregnancy,” *Obstetrics and Gynecology* 83,4 (1994) 517–23; J. B. Gould et al., “Time of birth and the risk of neonatal death,” *Obstetrics and Gynecology* 106,2 (2005) 352–58; Olaf Stephansson et al., “Time of birth and risk of intrapartum and early neonatal death,” *Epidemiology* 14 (2003) 218–22; Ichiro Kawachi et al., “Prospective study of shift work and risk of coronary heart disease,” *Circulation* 92 (1995) 3178–82; Atanu K. Pati et al., “Shift work: consequences and management,” *Current Sci* 81 (2002) 32–47; Akbar Sharifian et al., “Shift work as an oxidative stressor,” *J Circadian Rhythms* 3 (Dec. 28, 2005) at www.jcircadianrhythms.com. It is risky to extrapolate data on labor and childbirth back to the 19th century, given historical changes in levels of stress, noise, and lighting, each of which affects the blood plasma level of oxytocin, a pituitary hormone that stimulates uterine contractions and whose concentrations normally peak around 3 a.m. and less steeply around 5 p.m. However, if the body’s chronicities are, as current science suggests, highly conservative, then there would be a place here for the work of A. G. Ava et al., “Chronobiology of labour pain perception,” *British J Anaesthesiology* 93,3 (2004) 451–53, finding that sensitivity to labor pain is heightened at night, so that the nocturnal sounds of women in labor may have been not only more frequent but louder than during the day. Obversely, Victorian lying-in rooms were to have “perfect quiet,” with carpeting to absorb sounds and “noiseless crockery”: Annmarie Adams, *Architecture in the Family Way: Doctors, Houses, and Women, 1870–1900* (McGill-Queen’s U, 1996) 115, discussing Mrs. Catherine Gladstone, *Health Nurseries and Bedrooms, including the Lying-in Room* (L, 1884) 144.

19. John W. F. Herschel, “Sound” [1830], *Encyclopaedia Metropolitana* (L, 1817–1845) First Division: Pure Sciences, IV,752; W. Mullinger Higgins, *The Philosophy of Sound and History of Music* (L, 1838) 13; Alexander von Humboldt and Aimé Bonplan, *Personal Narrative of Travels to the Equinoctial Regions of the New Continent, During the Years 1799–1804*, tr. Helen Maria Williams (NY: AMS, 1966 [1818–1829]) V,67–69 on “Oroonoko” cataracts, and IV,436–38 on night noises, 505–506 on noon calm, and cf. a summary in “Clearness of sound at night,” *The Colored American* (NY) (Nov. 2, 1839). On Humboldt’s (and other Europeans’) inability to appreciate the “barbarous, lustful, ululating, and angry shouting” of the bogas, or boatmen, who took him downriver from the Caribbean into the Amazon: Ana Maria Ochoa, “Listening and the constitution of aural regimes of knowledge in 19th-century Colombia,” *Conference on Thinking Hearing: The Auditory Turn in the Humanities* (U Texas at Austin, Oct. 2, 2009). Also at work here was the Northern European typification of world geography in terms of a humanly quiet but mechanically loud North as opposed to a humanly loud but industrially quiet South, which figured as well in the prelude to the Civil War in the United States: Mark M. Smith, *Listening to Nineteenth-Century America* (U North Carolina, 2001).

20. Humboldt and Bonplan, *Personal Narrative*, IV, 438, and V, 69-72. Humboldt was quoting from the popular *Problemata Aristotelis*, a collection as dubious in Latin as was the pseudo-Aristotelian English text, *Problems of Aristotle* [L, 1682], which asked, sig E3v, "Why do we hear better in the night than in the day?" On the text: Ann Blair, "Authority in the popular 'Problemata Aristotelis,'" *Early Sci and Med* 4,3 (1999) 189-227. In any case, Humboldt heard but a small proportion of jungle sounds: John S. Saby and Howard A. Thorpe, "Ultrasonic ambient noise in tropical jungles," *JASA* 18 (Oct. 1946) 271-73.

21. Edward Warren, *Life of John Collins Warren, M.D.* (B, 1860) I, 179; John C. Warren, "Etherization, with surgical remarks," in Richard H. Dana, Jr., "The ether discovery," *Littell's Living Age* 20 (March 18, 1848) 557; Francis D. Moore, "John Collins Warren and his act of conscience," *Annals of Surgery* 229 (1999) 187-96; M.D., "London noise and London sleep," *L Times* (Aug. 13, 1869) 8:f, followed up on August 17 by other letters to the editor (6:ab) and an editorial (6:e); "City noises," *NY Daily Trib* (Aug. 5, 1879) 4, with a reprise, "City night noises," (June 28, 1885) 6, deploring street cries at 3 a.m.; Robert Machray, *The Night Side of London* (L, 1902) 22, and cf. A. R. Buckland, "London Street Life. IV. After Dark," *Good Words* 33 (1892) 742-49. On nocturnal atmospherics: John M. Bacon, "Midnight in cloudland," *Living Age* 240 (1904) 107-12, and n.224 below.

22. Sara, "[Letter to] Woman's department," *Railroad Trainmen's J* 10 (April 1893) 302; Walt Whitman, "Song of Myself" (1855) in *Complete Poems*, ed. Francis Murphy (L: Penguin, 1975) ll. 1332-33; idem, *Memoranda During the War*, ed. Peter Coviello (Oxford U, 2004 [1875]) 18-19, 23-24; Jerome Loving, *Walt Whitman: The Song of Himself* (UC, 1999) 10, 18-19, 262-71, q. 268; U.S. Surgeon General's Office, *Medical and Surgical History of the War of the Rebellion, 1861-65* (DC, 1870-1888) vol. II, pt. 1, 212; Louisa May Alcott, *Journals*, eds. Joel Myerson et al. (B: Little, Brown, 1989) q. 114; idem, *Hospital Sketches* (B, 1863) 30, 32, 43, 46, 47, 49; Jane E. Schultz, *Women at the Front: Hospital Workers in Civil War America* (U North Carolina, 2004) 96.

23. Linda Stratmann, *Chloroform: The Quest for Oblivion* (Phoenix Mill: Sutton, 2003) 52, medical objections; Mary Poovey, "'Scenes of an indelicate character': the medical treatment of Victorian women," in *The Making of the Modern Body: Sexuality and Society in the 19th Century*, eds. C. Gallagher and T. W. Laqueur (UC, 1987) 137-68; Thomas E. Keys, *The History of Surgical Anesthesia* (NY, 1945) 33, clerical objections; Thomas Dormandy, *The Worst of Evils: The Fight Against Pain* (Yale U, 2006) 168-81 on pain during surgery, 234 on the noise in operating theaters, 284-87 on objections to pain-killers; Maurice S. Albin, "The use of anaesthetics during the Civil War 1861-65," *Pharmacy in H* 42,3/4 (2000) 99-114; William Ingalls, "Recollections of surgery before the use of anesthetics," *B Med Surgical J* 136 (Jan. 7, 1897) 5. On the denial of anaesthetics to the chronically sick: Martin S. Pernick, *A Calculus of Suffering: Pain, Professionalism, and Anesthesia in Nineteenth-Century America* (Columbia U, 1985).

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ear, q. 15 hearing loss and sheet iron, q. 16 Fisk, q. 22 Evans; John William De Forest, “The first time under fire,” *Harper’s New Weekly Mag* (Sept. 1864), in Louis P. Masur, comp., “—*The Real War Will Never Get in the Books*”; *Selections from Writers During the Civil War* (Oxford U, 1993) 92, 94–95; Milton Meltzer, *Voices from the Civil War* (NY: Harper, 1989) 68 on Thompson, 95 for “peal on peal” from Augustus Buell’s “Recollections of service in the Army of the Potomac,” 98–99 from Abner Small’s *The Road to Richmond* on the murk. On the noise of Civil War artillery: Linda Wheeler, “Capturing the sounds and smells of battle,” *Washington Post* (Oct. 14, 2004) District Extra, 17. On *charivari* as precedent: Rocky Mountain, Esq., *The Charivari: . . . What Was Done, and What Wasn’t Done by the Sheet Iron Band* (Chicago, 1843). On putative precedents for, and the powerful echoes of, the “rebel yell”: H. Allen Smith, *The Rebel Yell, Being a Carpetbagger’s Attempt to Establish the Truth Concerning the Screech of the Confederate Soldier* (NY, 1954). On stage thunder and theatrical “thunder wars” of the 1850s: Max Keith Culver, “A History of Theatre Sound Effects Devices to 1927,” Ph.D. thesis, U Illinois at Urbana-Champaign, 1981, 69–103.

25. James I. Robertson, Jr., *Stonewall Jackson* (NY: Macmillan, 1997) 726–31, q. 726; Hess, *Union Soldier in Battle*, 17, miscommunication; Donald Yacovone, ed., *A Voice of Thunder: The Civil War Letters of George E. Stephens* (U Illinois, 1997) 170, “death-like stillness”; David E. Johnston, *The Story of a Confederate Boy in the Civil War* (Portland, Ore, 1914) 205, waiting in silence for six hours at Gettysburg; Meltzer, *Voices from the Civil War*, 70 Chamberlain; Peter Cozzens, *This Terrible Sound: The Battle of Chickamauga* (U Illinois, 1996) ch. 6, and q. 283 Guest, q. 380 “infernal noise,” 487 “chill influence”; Ambrose Bierce, “A Tough Tussle,” and “Chickamauga,” in *Phantoms of a Blood-Stained Period*, eds. R. Duncan and D. J. Klooster (U Mass, 2002) q. 67, 189–94, q. 192, 195–204.

26. Charles D. Ross, *Civil War Acoustic Shadows* (Shippensburg: White Mane, 2001) 3, q. 4, 5; idem, “Outdoor sound propagation in the U.S. Civil War,” *Applied Acoustics* 59,2 (2000) 137–47. Brian Black makes much also of the deceptive ridges in Gettysburg: *Nature and Environment in Nineteenth-Century American Life* (Westport: Greenwood, 2006) 99–102.

27. U.S. Civil War Center, www.cwc.lsu.edu/cwc/other/stats/warcost.htm for statistics, which I have matched with age-data from the 1860 census—though boys younger than fifteen fought on both sides as drummers and buglers; Margaret Humphreys, *Intensely Human: The Health of the Black Soldier in the American Civil War* (Johns Hopkins U, 2008), 67–79; U.S. Surgeon General’s Office, *Medical and Surgical History*, II, pt. 1, 116–18 for data on deafness, incomplete, since soldiers reported hearing loss only when debilitating; I. Friedmann et al., “Epidemic typhus fever and hearing loss,” *JLO* 107 (1993) 275–83; Yacovone, *A Voice of Thunder*, 170 on demons; Hess, *Union Soldier in Battle*, 132 on McAllister; Terry L. Jones, ed., *The Civil War Memoirs of Capt. William J. Seymour* (Louisiana State U, 1991) 77; Cozzens, *This Terrible Sound*, 283 for Guest; Black, *Nature and Environment*, 102, horses and vultures; James Marten, *The Children’s Civil War* (U North Carolina, 1998) 166, 177; Emma E. Werner, *Reluctant Witnesses: Children’s Voices from the Civil War* (Boulder: Westview, 1998) 63, muskets; Mrs. Roger A. Pryor, *My Day: Reminiscences of a Long Life* (NY, 1909) 200. Mark M. Smith, “Of bells, booms, sounds, and silences: listening to the Civil War South,” in *The War Was You and Me: Civilians in the American Civil War*, ed.

Joan E. Cashin (Princeton U, 2002) 9-34, argues that home and battlefield were never as segregated acoustically as they were visually, particularly in the Confederacy, where the noises of war, and the disconcerting silences after the war, were more at odds with the South's traditional aural registers.

28. James Ryder Randall, *Maryland, My Maryland and Other Poems* (Baltimore, 1908) 20; Jason Phillips, "A brothers' war? Exploring confederate perceptions of the enemy," in *The View from the Ground: Experiences of Civil War Soldiers*, ed. Aaron Sheehan-Dean (U Press of Kentucky, 2007) 67-90 on the special importance of song to Confederate soldiers; Matthew White, "Statistics of wars, oppressions and atrocities of the nineteenth century" at <http://users.erols.com/mwhite28/wars19c.htm> (updated 2004). The "greater than" sign, >, indicates that I am using minimum estimates.

29. Mary P. Ryan, *Civic Wars: Democracy and Public Life in the American City during the Nineteenth Century* (UC, 1997); Victor Bailey, "Salvation Army riots, the 'skeleton army' and legal authority in the provincial town," in *Social Control in Nineteenth-Century Britain*, ed. A. P. Donajrodzki (L: Croom Helm, 1977) 231-39; Geoffrey F. A. Best, *Mid-Victorian Britain, 1851-1875* (L: Weidenfeld and Nicolson, 1971) 6-7; Jorge Arango, *The Urbanization of the Earth* (B: Beacon, 1970) 38ff.; Kenneth Barkin, *The Controversy over German Industrialization, 1890-1902* (U Chicago, 1970) 107, Table 12, for percentage born out of the city in eight major German centers; Adna Ferrin Weber, "The significance of recent city growth: the era of small industrial centres," *Annals Amer Acad Political Social Sci* 23 (1904) 223-36; David Hamer, *New Towns in the New World: Images and Perceptions of the Nineteenth-Century Urban Frontier* (Columbia U, 1990) 48, 176 on civic boosterism, 179 on grids; Marlou Schrover et al., "History of International Migration: Industrial Revolution," at www.let.leidenuniv.nl/history/migration/chapter3.html.

30. J. M. DaCosta, "On irritable heart," *Amer J Med Sci* n.s. 61 (1871) 17-52; Mary A. Clarke, "Memoir of J. M. DaCosta, M.D.," *Amer J Med Sci* 125 (1903) 318-29; Charles F. Wooley, "Jacob Mendez DaCosta," *Amer J Cardiology* 50 (1982) 1145-48; idem, "Where are the diseases of yesteryear? DaCosta's syndrome, soldier's heart, the effort syndrome, neuro-circulatory asthenia, and the mitral valve prolapse syndrome," *Circulation* 53 (1978) 749-51; Judith Pizarro et al., "Physical and mental health costs of traumatic war experiences among Civil War veterans," *Archives of General Psychiatry* 63,2 (2006) 193-200.

31. Cecil Woodham-Smith, *Florence Nightingale 1820-1910* (NY, 1951) 34, 38-40, q. 41 from a letter of May 29, 1854, 43, q. 59 for Monckton Milnes, 60-61, 69, 72; Gillian Gill, *Nightingales: The Extraordinary Upbringing and Curious Life of Miss Florence Nightingale* (Random House, 2004) 7, 41-42, 78, 87, 102, 125-26, 133, 155, 173, 190-91, 195, 200, 222-28 on Milnes, 252, 268, 277-79; Mark Bostridge, *Florence Nightingale: The Making of an Icon* (Farrar, Straus and Giroux, 2008) esp. 88-160; Miriam Bailin, *The Sickroom in Victorian Fiction: the Art of Being Ill* (Camb U, 1994) 30-39; Samantha Williams, "Caring for the sick poor: nurses in Bedfordshire, c. 1770-1830," in *Women, Work and Wages in England, 1600-1850*, eds. Penelope Lane et al. (Rochester: Boydell, 2004) 141-69; Julia Hallam, "Ethical lives in the early nineteenth century: nursing and a history of caring," in *New Directions in the History of Nursing*, eds. Barbara Mortimer and Susan McGann (L: Routledge, 2004) 22-39; Florence Nightingale, *On Hospital Reform*, ed. Charles E. Rosenberg

(NY: Garland, 1989 [from 3rd ed. 1863]) 20-21 on nurse mortality; Martha Vicinus and Bea Nergaard, eds., *Ever Yours, Florence Nightingale: Selected Letters* (Harvard U, 1990) 17, 23, 27, 39-40, q. 47, 52-54; Country Joe McDonald on the smelter, hat factory, and lead and mercury poisoning, www.countryjoe.com/nightingale/index.html; F.B. Smith, *Florence Nightingale: Reputation and Power* (L: Croom Helm, 1982) q. 40, after listening to recordings, as at www.bl.uk/onlinegallery/themes/voices/nightingale.html.

32. Vicinus and Nergaard, eds., *Ever Yours, Florence Nightingale*, 77-195, and q. 50, q. 65, q. 84, q. 203, 233, 238, 268; Smith, *Florence Nightingale*, 11-15, 25, 35-36, 40-43; Edward Cook, *The Life of Florence Nightingale* (L, 1914) I, 166-80; Gill, *Nightingales*, 282-93, 312-13, 325-51, 377-83, 388-89, 412-17; Bostridge, *Florence Nightingale*, 188-277; "The Nightingale's Return," *Punch, or the London Charivari* 31 (Aug. 23, 1856) 73; Mary C. Sullivan, ed., *The Friendship of Florence Nightingale and Mary Clare Moore* (U Penn, 1999) 2 on the letters, now being published in their entirety in *The Collected Works of Florence Nightingale*, ed. Lynn McDonald (Wilfrid Laurier U, 2001-). In the first volume, *Florence Nightingale: An Introduction to Her Life and Family* (2002) 843-45, McDonald disputes the critiques of Smith, Vicinus, and Nergaard. Anne Summers, *Angels and Citizens: British Women as Military Nurses, 1854-1914* (L: Routledge & Kegan Paul, 1988) 30-74, attends to Nightingale's prejudices against paid, working-class nurses (disputed by Gill) and suggests that Catharine Leslie Anderson, a lady volunteer, was sometimes mistaken for Nightingale, so that tales of her personal nursing may have been misattributed. The quotations on discipline and nursing reform come from a letter to Mary Jones of Jan. 8, 1867, in vol. 3, *Florence Nightingale's Theology* (2002) 468. For retrospective diagnoses of Nightingale's illness(es): Charles Pickering, *Creative Malady: Illness in the Lives and Minds of Charles Darwin, Florence Nightingale, Mary Baker Eddy, Sigmund Freud, Marcel Proust, Elizabeth Barrett Browning* (L: Allen & Unwin, 1974) 99-182, psychoneurosis; Marion J. Brook, "Some thoughts and reflections on the life of Florence Nightingale from a twentieth-century perspective," in *Florence Nightingale and Her Era*, eds. Vern Bullough et al. (NY: Garland, 1990) 23-39, stress disorder; D. A. B. Young, "Florence Nightingale's fever," *Brit Med J* 311 (Dec. 23, 1995) 1697-1700, brucellosis, developed by Gill, *Nightingales*, 423-31; Katherine L. Wisner et al., "A case of glimmering gloom," *The Pharos (Alpha Omega Alpha Honor Med Soc)* 68 (Autumn 2005) 4-13, bipolar disorder; Bostridge, *Florence Nightingale*, 324-31, brucellosis and more.

33. Lois A. Monteiro, ed., *Letters of Florence Nightingale* (Boston U, 1974) q. 27, 34; Florence Nightingale, *Notes on Nursing: What It Is, and What It Is Not* (L: Duckworth, 1970 [1860]) 25-33; idem, *Notes on Nursing for the Labouring Classes* (L, 1861) ch. 4, q. 35, 40; Smith, *Florence Nightingale*, 157-59, probationers at St. Thomas's nursing school; Monica E. Baly, *Florence Nightingale and the Nursing Legacy* (L: Croom Helm, 1986) esp. 43, 46, 54. In her emphasis on audition, Nightingale's response to S. M. degli Angeli, in Lynn McDonald, ed., *Florence Nightingale's European Travels* (Wilfrid Laurier U, 2004) 221, was resoundingly similar to that of her first visit (1847) to the Sistine Chapel, where she was particularly impressed by the figure of Isaiah, who "is listening and he is speaking 'that which we hear, we say unto you.'" She closely identified with Michelangelo's Delphic Sibyl: "There is an anxiety, an effort to hear, even, about the Delphian . . . there is no uncertainty

in her feeling of being *called*...but she fears her earthly ears are ‘heavy’ and gross, and corrupt the meaning of the heavenly words”: Gill, *Nightingales*, 213. As for the more prosaic acoustics of sick rooms and hospitals: Adams, *Architecture in the Family Way* (→ n.18) 89–92, on locating sick rooms at the top of a house or in a quiet annex; Hillel Schwartz, “Inner and outer sancta: earplugs and hospitals,” *Oxford Handbook of Sound Studies*, eds. T. Pinch and K. Bijsterveld (Oxford U, 2011) 357–90.

34. J. Milner Fothergill, *The Town Dweller His Needs and Wants* (NY, 1889) q. 1, 6, q. 25–26, 27, 61, 96–98, 110, and cf. Arthur Helps, *Social Pressure* (B, 1875) 45–46 on a like effect of noise upon the constitutions of old-form “gentlemen”; Andrew Lees, *Cities Perceived: Urban Society in European and American Thought, 1820–1940* (Columbia U, 1985) 137–38.

35. Lutz Koepnick, “Benjamin’s silence,” in *Sound Matters: Essays on the Acoustics of German Culture*, eds. Nora M. Alter and Lutz Koepnick (NY: Berghahn, 2004) 117–29 at 119; Susan Fenimore Cooper, *Rural Hours* (Syracuse U, 1968 [1850, rev. 1887]) 29; Rufus Usher, “On the influence of sound,” *People’s J* 6 (1848) 275–79; Francis Ellingwood Abbott, “Noise and Silence” (a sermon first delivered in 1866), in his Papers, HUG 1101, Box 86, No. 82, Harvard U Archives, Pusey Lib, Harvard U, and quoted with permission of Betsey Abbot Wells Farber, who wonders (note to author, March 29, 2011) whether her great-grandfather’s “feelings about noise could possibly have been influenced by having sons aged two and four at home?!”

36. “The time to study,” *The Colored American* (June 17, 1837) and “A country life,” *ibid.* (July 25, 1840); Smith, *Listening to Nineteenth-Century America* (→ n.19) esp. on aural conditions of slave life on Southern plantations. On tensions between the countryside as quiet/brutish: Raymond Williams, *The Country and the City* (Oxford U, 1973).

37. See, e.g., Bernard Beugnot, *Le Discours de la retraite au XVIIIe siècle: loin du monde et du bruit* (P: PUF, 1996); Andrew McRae, *God Speed the Plough: The Representation of Agrarian England 1500–1660* (Camb U, 1996) esp. ch. 9 on “Rural Poetics.” Noisy urban nights were as ancient as Julius Caesar’s attempt to reduce traffic congestion by issuing an edict that the wagons of carters (who provisioned Rome and removed waste) could enter the city only between sunset and sunrise, which led to a less congested daytime but a noisier night, an edict often reissued and imitated throughout the Empire: Jérôme Carcopino, *Daily Life in Ancient Rome—The People and the City at the Height of the Empire*, ed. Henry T. Rowell, tr. E. O. Lorimer (Yale U, 1940) 48–51.

38. F. Elizabeth Crowell, “Painter’s row: the company house,” in *The Pittsburgh District: Civic Frontage*, ed. Paul U. Kellogg (NY, 1914) 131; Charles L. Brace, *The Dangerous Classes of New York and Twenty Years’ Work Among Them*, 3rd ed. (Montclair: Patterson Smith, 1967 [1880 ed.]) chs. 5, 16; Christine Stansell, *City of Women: Sex and Class in New York, 1789–1860* (NY: Knopf, 1986) 47–49, 55–61 on sounds heard through tenement and boarding house walls, from legal depositions; Anne Cauquelin, *La Ville, la nuit* (P: PUF, 1977) 22; Prendergast, *Paris and the Nineteenth Century* (→ n. 4) 127–32, q. 127 from Amédée de Tissot, *Paris et Londres comparées* (P, 1830) 172–73; “London street-noises,” *Chambers’s J* ser. 3, 15 (1861) 315–16; Caroline Atkinson, ed., *Letters of Susan Hale* (B, 1919) 11, 425, 472 on Chicago; Jane Austen, *Mansfield Park*, ed. Claudia L. Johnson (NY: Norton, 1998 [1814–1816])

III, chs. 7–8, q. 266; Kate Elizabeth Clark, “Music and noise,” *Outlook (NY)* 57 (Nov. 20, 1897) 718–20; Carl J. George, *Urban Ecology* (NY: McGraw-Hill, 1974) 59; T. Pinney, ed., *Selected Letters of Thomas Babington Macaulay* (Camb U, 1982) 248. Despite more paving and policing, the average speed of traffic in London slowed during the 1800s: James H. Winter, *London’s Teeming Streets, 1830–1914* (L: Routledge, 1993) 194ff. The same held for Manhattan and Paris. Compression, then, more than acceleration, would have solidified a sense of the interminability of noise.

39. Henry W. Longfellow, “Hymn to the night,” *Voices of the Night* (Camb, Mass, 1839) 6; Susan Stewart, “Out of the darkness: nocturnes,” in her *Poetry and the Fate of the Senses* (UC, 2002) 255–91; Kate Elizabeth Clark, “An Autumn Night,” *American Sonnets*, ed. Walter Sharp (L, 1889) at www.sonnets.org/clark.htm; Michael Kennedy and Joyce Bourne, eds., “Nocturne,” *Concise Oxford Dict of Music*, 4th ed. (Oxford U, 1996); Maurice J. E. Brown and Kenneth L. Hamilton, “Nocturne,” *New Grove*, XVIII, 11–12; Charles K. Moss, “John Field,” with musical examples, at www.carolinaclassical.com, and cf. Laurence Kramer, *Music as Cultural Practice 1800–1900* (UC, 2000) 83 on the climax of silence in Chopin’s Prelude in A-Minor; Percy Bysshe Shelley, “Letter to Maria Gisborne” (1820) in *Complete Works*, eds. R. Ingpen and W. E. Peck (NY: Gordian, 1965) IV, 3; Alexander Smith, “Glasgow” (1857) in Hannah Whyte, ed., *Noise and Smoky Breath: An Illustrated Anthology of Glasgow Poems, 1900–1983* (Glasgow: Third Eye Centre, 1983) 10; Irene Maver, *Glasgow* (Edinburgh U, 2000) 41–42, 113–16, 170; Walt Whitman, *Democratic Vistas* (1871) in *Prose Works 1892*, ed. Floyd Stovall (NYU, 1963–1964) II, 371, well-framed by David R. Weimer, *The City as Metaphor* (NY: Random House, 1966) 14–33; “Noise,” *Euterpeiad, or Musical Intelligencer, and Ladies’ Gazette* 2 (Jan. 5, 1821) 165 on the “business of life”; Rev. Edwin H. Chapin, *Moral Aspects of City Life* (NY, 1856) 173.

40. James Buzard, *The Beaten Track: European Tourism, Literature, and the Ways to Culture, 1800–1918* (Oxford U, 1993) ch. 2, q. 177 William Beckford on Verona, q. 181 for Jameson; Henry Matthews, *The Diary of an Invalid* (L, 1820) 4, q. 5, q. 7, q. 19, 22, q. 29, 54, 129, q. 159, q. 179; Jean Arasanayagam, “Arthur Johnston’s forgotten descendants in Sri Lanka,” www.lankalibrary.com/cul/burghers8.htm; Samuel W. Baker, *Eight Years’ Wanderings in Ceylon* (1869 [1855]) 15–17. Cf. Peter Fritzsche, *Stranded in the Present: Modern Time and the Melancholy of History* (Harvard U, 2004) 92–130.

41. Lincoln P. Paine et al., *Ships of the World* (B: Houghton Mifflin, 1997) online at http://college.hmco.com/history/readerscomp/ships/html/sh_071600_usspowhatan.htm; Paul Greenhalgh, *Ephemeral Vistas: The Expositions Universelles, Great Exhibitions, and World’s Fairs, 1851–1939* (Manchester U, 1988) 101, 105, 148–49; Robert Rydell, *All the World’s a Fair: Visions of Empire at American International Expositions, 1876–1916* (U Chicago, 1984) 48–52, 180–82, 185–86, 200–205; New England Women’s Club Meeting Notebooks, 1 April 1907, in MS 178, Box 4, v.15, Arthur and Elizabeth Schlesinger Lib on the History of Women, Radcliffe Institute, Harvard U; Edward S. Morse, *Japan Day by Day, 1877, 1878–79, 1882–83* (Atlanta: Cherokee, 1990 [1917]) 10, 19; Donald Keene, ed., *Modern Japanese Diaries* (NY: Holt, 1995) 17, 77; Masao Miyoshi, *As We Saw Them: The First Japanese Embassy to the United States* (UC, 1979) 73, Tomogorō; W. G. Beasley, *Japan Encounters the Barbarian: Japanese Travellers in America and Europe* (Yale U, 1995) 56–70, q.

64 on Congress and San Francisco.

42. Morse, *Japan Day by Day*, 3, 12, 20, 115; Keene, ed., *Modern Japanese Diaries*, 298–99 for Higuchi Ichiyō; Edward Seidensticker, *Low City, High City: Tokyo from Edo to the Earthquake* (Harvard U, 1991) 13, 42–43, 92, q. 101; Yone Noguchi, “Theatres and theatre-going in Japan,” *The Theatre* 4 (1904) 168, and listen to the complaints from a German visitor, Dr. Engelbert Kaempfer, who visited Japan in 1690–1692: *Kaempfer’s Japan: Tokagawa Culture Observed*, ed. Beatrice M. Bodart-Bailey (U Hawaii, 1999) 146–47, 171, 191, 279. Cf. Susan B. Hanley, *Everyday Things in Premodern Japan* (UC, 1997) esp. 93–94 on tea-drinking (which, if frequent, may reduce thiamine levels and in the longterm reduce hearing acuity); Jeff Humphries, “Images of the Floating World: the idea of Japan,” *Antioch R* 53 (Autumn 1995) 389–410.

43. On the Opium War: Peter W. Fay, *The Opium War, 1840–42* (U North Carolina, 1975) esp. ch. 4; J. Y. Wong, *Deadly Dreams: Opium, Imperialism, and the Arrow War (1856–1860) in China* (Camb U, 1998); Lydia H. Liu, “Legislating the universal: the circulation of international law in the nineteenth century,” in *Tokens of Exchange: The Problem of Translation in Global Circulations*, ed. Liu (Duke U, 1999) esp. 131–34 on the diplomatic origins of the War, which hinged on a stubborn British mistranslation of the Chinese term *yi* (“foreigner”) as “barbarian,” a word that rang sour in British imperial ears. On opium use: Martin Booth, *Opium: A History* (NY: St. Martin’s, 1998) esp. 51, 58–63, 72–73, 75 on Gladstone; Barbara Hodgson, *In the Arms of Morpheus: The Tragic History of Laudanum, Morphine, and Patent Medicines* (Buffalo: Firefly, 2001) q. 8 for Browning, 12, 49, 67–70, 92, 109; C. Vann Woodward and Elisabeth Muhlenfeld, eds., *The Private Mary Chesnut* (Oxford U, 1984) 41–43; Michael A. Flannery, *Civil War Pharmacy* (NY: Pharmaceutical Products, 2004) 117, 291; Aletha Hayter, *Opium and the Romantic Imagination* (UC, 1970); David T. Courtwright, *Dark Paradise: Opiate Addiction in America before 1940* (Harvard U, 1982) 46–48, 55, 88–90, 93; Virginia Berridge, “Opium over the counter in nineteenth-century England,” *Pharmacy in H* 20 (1978) 91–100, q. 93 from *Pharmaceutical J* n.s. 10 (1868–1869) 500–502; Dormandy, *Worst of Evils* (→ n.22) 128–35, 251–53.

44. Hodgson, *In the Arms of Morpheus*, 82, 92, 117–18, 125; Dormandy, *Worst of Evils* (→ n.22) 255–59; Martha Saxton, *Louisa May Alcott* (NY: Farrar, Straus, Giroux, 1995) 252–57, 267–68, 369–74, amended by Norbert Hirschhorn and Ian A. Greaves, “Louisa May Alcott, her mysterious illness,” *Perspectives in Biology and Med* 50 (2007) 243–59; Courtwright, *Dark Paradise*, 40–52, 56–57; Silas Weir Mitchell, “The evolution of the rest treatment,” *J Nervous and Mental Disease* 31 (1904) 368–73; idem, *Doctor and Patient* (Phila, 1887) q. 118, 121; George M. Beard, “Jumpers of Maine,” *Pop Sci Mo* 18 (Dec. 1880) 170–78; Barbara Will, “Nervous systems, 1880–1915,” in *American Bodies: Cultural Histories of the Physique*, ed. Tim Armstrong (NYU, 1996) 86–100, 89 on Beard; Gillian Brown, “The empire of agoraphobia,” *Representations* 20 (1987) 134–57; Ellen L. Bassuk, “The rest cure: repetition or resolution of Victorian women’s conflicts?” in *The Female Body in Western Culture*, ed. Susan R. Suleiman (Harvard U, 1985) 139–51; David G. Schuster, “Personalizing illness and modernity: S. Weir Mitchell, literary women, and neurasthenia, 1870–1914,” *Bull H Med* 79 (2005) 695–722. The gravity of being startled was emphasized at law as well: *Copley v. New Haven and Northhampton Co.*, 136 Mass 6 (1883). As early as

the 2nd century, phrenitis had been treated similarly, *sans milk*: Abraham Goldstein, “The moral psychiatry of imperial Rome as practiced by Soranus of Ephesus,” *Psychiatric Q* 43,3 (1969) 535–54. For links between Jumpers and *ticqueurs* with Tourette Syndrome (who, like Mlle. de C., “reacted to unexpected clock chimes and other sounds with ‘noisy and prolonged outcries’ and ‘loud howling’”): Howard I. Kushner, *A Cursing Brain: The Histories of Tourette Syndrome* (Harvard U, 1999) q. 15, 22–23. Gilles de la Tourette also studied tympanic sensitivities and hysterical deafness: *Traité clinique et thérapeutique de l’hystérie* (P, 1892), quoted by J. Th. Boland and M. Coosemans, “De l’hystérie auriculaire,” *R Intl de rhinologie, otologie, laryngologie et ophthalmologie* 9 (1898) 340–44.

45. S. Weir Mitchell, “Evolution of the rest treatment”; idem, *Fat and Blood*, ed. Michael S. Kimmel (Lanham: Rowman & Littlefield, 2004 [from 2nd ed., 1882; 1st ed. 1877]); idem, “The treatment by rest, seclusion, etc., in relation to psychotherapy,” *JAMA* 50 (1908) 2033–37, q. 2033 Playfair; Gwen J. Broude, “Rethinking the *couvade*,” *Amer Anthropologist* 90 (1988) 902–11; Hilary Marland, “‘Uterine mischief’: W. S. Playfair and his neurasthenic patients,” in *Cultures of Neurasthenia from Beard to the First World War*, eds. M. Gijswijt and R. Porter (Amsterdam: Rodopi, 2001) 117–39, and entire volume, esp. Michael Neve, “Public views of neurasthenia: Britain, 1880–1930,” 141–59, and Doris Kaufmann, “Neurasthenia in Wilhelmine Germany: culture, sexuality, and the demands of nature,” 161–76. In the same volume, Jessica Slijkhuis describes Dutch psychiatry’s emphasis in 1900 on better childrearing as a remedy for neuropsychiatric problems: “Neurasthenia as Pandora’s Box: ‘Zenuwachtigheid’ and Dutch psychiatry around 1900,” 257–78.

On the German regime of silence, rest, fresh air, and altitude: Monika Öchsner-Pischel, “Erfinder der Freiluftliegekur—Peter Dettweiler und die Lungenheilstadt in Falkenstein im Taunus,” *Pneumologie* 59,5 (2005) 349–53; J. H. Pratt, “The evolution of the rest treatment of pulmonary tuberculosis,” *Amer Rev Tuberculosis* 50 (1944) 185–201; John F. Murray, “Bill Dock and the location of pulmonary tuberculosis: How bed rest might have helped consumption,” *Amer J Respiratory and Critical Care Med* 168 (2003) 1029–33; Margaret Campbell, “What tuberculosis did for modernism,” *Med H* 49,4 (2005) 463–88 at n.10, *cure de silence*; Nils Aschenbeck, “Nackt der Sonne entgegen” on the popularity of Nietzsche, at www.societyofcontrol.com/ppmwiki/pmwiki.php/Main/MonteAschenbeck quoting Gustav Pauli; Friedrich Nietzsche, *Thus Spake Zarathustra*, tr. Thomas Common (1891) ch. 12, “The Flies in the Market-Place,” and cf. “On Redemption,” where the ear takes over the man, leading Jacques Derrida to *The Ear of the Other: Otobiography Transference Translation*, tr. Peggy Kanuf, ed. Christine V. McDonald (NY: Schocken, 1985). Listen also to Joachim Köhler, *Zarathustra’s Secret: The Interior Life of Friedrich Nietzsche*, tr. Ronald Taylor (Yale U, 2002) 82–83 on Nietzsche’s experience as a nurse to wounded soldiers during the Franco-Prussian War, from which he came away with “a continuous wailing sound in his ears.”

On Gilman: Ann J. Lane, *To Herland and Beyond: The Life and Work of Charlotte Perkins Gilman* (U Press of Virginia, 1997) 101–32; Judith A. Allen, *The Feminism of Charlotte Perkins Gilman: Sexualities, Histories, Progressivism* (U Chicago, 2009) 32–36, 41, and throughout; Cynthia J. Davis, *Charlotte Perkins Gilman: A Biography* (Stanford U, 2010) esp. 95–103

(and p. 99 on noisy rest-cure nurses who “chatter like merry magpies” in the invalids’ bedchambers); Denise D. Knight, ed., *The Diaries of Charlotte Perkins Gilman* (U Virginia, 1994) I, q. 83, q. 91, 108, q. 247, 369–75, 378–80, 383, q. 385; Jane Lancaster, “‘I could easily have been an acrobat’: Charlotte Perkins Gilman and the Providence Ladies’ Sanitary Gymnasium,” *Amer Transcendental Qn.s.* 8 (March 1994) 33–52; Charlotte Perkins Gilman, *The Living of Charlotte Perkins Gilman: An Autobiography* (NY, 1935) 90–106, q. 91; eadem, *The Yellow Wallpaper*, ed. Dale M. Bauer (B: Bedford, 1998 [1892]); Suzanne Poirier, “The Weir Mitchell cure: doctor and patients,” *Women’s Studies* 10 (1983) 15–40.

On the advent of the buzzer: A. A. Knudson, “Peculiar sound effects,” *Pop Sci Mo* 45 (1894) 76, in offices; D. Appleton & Co., *Artistic Houses* (NY: Blom, 1971 [1883]) 52, on elevators; *OED*, s.v. “buzzer” (1870). As for electric bells and fire alarms, read on.

46. S. Weir Mitchell, *Injuries of Nerves and Their Consequences* (NY: Dover, 1965 [1872]); idem, *A Psalm of Deaths and Other Poems* (U Michigan, 2005 [1890]) 60; idem, *Westways* (NY, 1913) q. 373, 417; Anna R. Burr, *Weir Mitchell: His Life and Letters* (NY, 1929) q. 195 from Roland Blake, q. 388 dying words; Lisa A. Long, *Rehabilitating Bodies: Health, History, and the American Civil War* (U Penn, 2004) esp. 57, the war “a gnawing wound, a persistent ghost, an incurable disease.” Kay F. Ryals reconsiders Mitchell’s corpus in the context of notions about civic virtue, moral courage, and the quest for heroism in a banal, commercial world: “Bedside Manners and the Social Body: S. Weir Mitchell and the Virtues of Medical Practice,” Ph.D. thesis, UC Irvine, 2002, from which I draw, pp. 150–51, the examples from *Characteristics* and *Lectures on the Conduct of the Medical Life* (1893). For yet more on the trauma of the Civil War, its “howling acres” and “the rumbling, grinding sound that cannot be described”: Eric T. Dean, Jr., *Shook Over Hell: Post-Traumatic Stress, Vietnam, and the Civil War* (Harvard U, 1997) 57 and throughout.

47. Burr, *Weir Mitchell*, 107, 122–23; Mitchell, *Doctors and Patients*, 65; idem, “Treatment by rest,” 2035; George M. Beard, *American Nervousness* (NY: Arno, 1972 [1882]) vi, 106–15; Charles Rosenberg, “The place of George M. Beard in nineteenth-century psychiatry,” in his *No Other Gods: On Science and American Social Thought* (Johns Hopkins U, 1976) 98–108; Barbara Sicherman, “The uses of a diagnosis: doctors, patients, and neurasthenia,” *J H Med and Allied Sci* 32 (1977) 33–54. Cf. Tsung-Yi Lin, “Neurasthenia revisited: its place in modern psychiatry,” *Culture, Med, and Psychiatry* 13 (1989) 105–29, restoring the diagnosis, and the Cure, for modern Asians. Kristin Ruggiero, *Modernity in the Flesh: Medicine, Law, and Society in Turn-of-the-Century Argentina* (Stanford U, 2004) 123–24, describes an 1899 study in Buenos Aires which claimed that children of European ancestry had better voices than indigenous children, who had no more than a four-note range and sounded like animals, “hoarse and strident.” On newsboys and their antecedents: Vincent DiGirolamo, “‘Heralds of a noisy world’: carrier boys, post-riders, and the print revolution in Early America,” in *The Worlds of Children, 1620–1920*, ed. Peter Benes (Boston U, 2004) 171–84.

48. Beard, *American Nervousness* vi, 23, 101–104, q. 74, 88, 95, q. 313; idem, *A Practical Treatise on Nervous Exhaustion (Neurasthenia)*, ed. A. D. Rockwell (NY: Kraus, 1971 [repr. from 5th ed., 1905; 1st ed. 1869]) 36–117 for the symptoms, 183 for cork; Rosenberg, “George M. Beard,” 101–102; William A. Hammond, *Sleep and Its Derangements* (Phila,

1869) ch. 8 on the “pathology of wakefulness.” The blurb is included in Series II, Box 1, f. 1 of the Papers of George Miller Beard, Dept. of Manuscripts and Archives, Sterling Lib, Yale U. For neurasthenia and perceptions of physical energy: Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (NY: Basic, 1990). On neurasthenia as a mediating discourse: Tom Lutz, *American Nervousness, 1903* (Cornell U, 1991) q. 19. Given Beard’s criticism of a ferociously time-bound modernity, it was ironic that the most widely used test for degrees of deafness involved hearing the ticking of a watch from some standard distances.

49. David R. Roediger and Philip S. Foner, *Our Own Time: A History of American Labor and the Working Day* (NY: Greenwood, 1989) 19–140, q. 135; Jérôme Bourdieu and Bénédicte Reynaud, “Discipline d’atelier et externalités dans la réduction de la durée du travail au XIXe siècle,” in *La France et le temps de travail (1814–2004)*, eds. P. Fridenson and B. Reynaud (P: Odile Jacob, 2004) 15–53; Mark Erlich and David Goldberg, *With Our Hands: The Story of Carpenters in Massachusetts* (Temple U, 1986) 22–23 on masters’ resistance to the Ten-Hour Movement, ch. 4 on the Eight-Hour strikes of 1886 and 1890; Steven J. Ross, *Workers on the Edge: Work, Leisure, and Politics in Industrializing Cincinnati, 1788–1890* (Columbia U, 1985) 27 off.; Roy Rosenzweig, *Eight Hours for What We Will: Workers and Leisure in an Industrial City, 1870–1920* (Camb U, 1983) 39–40, 179, 223–25; Kathy Peiss, *Cheap Amusements: Working Women and Leisure in Turn-of-the-Century New York* (Temple U, 1986) 43 on workday, ch. 4 on dance halls; Eileen Yeo and Stephen Yeo, “Ways of seeing: control and leisure versus class and struggle,” in their co-edited volume, *Popular Culture and Class Conflict 1590–1914* (Sussex: Harvester, 1981) 128–54, and cf. Paul Boyer, *Urban Masses and Moral Order in America, 1820–1920* (Harvard U, 1978); Nead, *Victorian Babylon*, 135 ff.; J. C. Drummond and Anne Wilbraham, *The Englishman’s Food* (L, 1958) 385–87; F. B. Smith, *The People’s Health, 1830–1910* (NY: Holmes and Meier, 1979). Beard’s obituary appears in *NY Times* (Jan. 24, 1883) 5:3.

50. George V. Poore, *The Dwelling House* (L, 1908 [1887 lectures]) 103, lungs; Hugh Conway, *People’s Parks: The Design and Development of Victorian Parks in Britain* (Camb U, 1991) 30–31, 34–36, 125–31 on bandstands, q. 55 “pulmonary,” q. 83 skittles; Winter, *London’s Teeming Streets* (→ n.37) ch. 9; Roy Rosenzweig and Elizabeth Blackmar, *The Park and the People: A History of Central Park* (Cornell U, 1992) esp. sects. III–IV, and pp. 246–48 for signage; Bonj Szczygiel and Robert Hewitt, “Nineteenth-century medical landscapes: John H. Rauch, Frederick Law Olmsted, and the search for salubrity,” *Bull H Med* 74 (2000) 708–34; Peter C. Baldwin, *Domesticating the Street: The Reform of Public Space in Hartford, 1850–1930* (Ohio State U, 1999) q. 28 Olmsted, and ch. 5; Charles E. Beveridge and David Schuyler, eds., *The Papers of Frederick Law Olmsted. III. Creating Central Park* (Johns Hopkins U, 1983) esp. 279, “Regulations for the Use of the Central Park” (Nov. 3, 1860), and cf. his much later leaflet for the American Civic Association’s Department of Nuisances, *Nuisances: Prospectus of the Department* no. 2 (1905) 4, on noise as one of the “Offenses to the Mind through the Senses.” On battles over the music appropriate to civic parks and settlement houses: Derek Vaillant, *Sounds of Reform: Progressivism and Music in Chicago, 1873–1935* (U North Carolina, 2003). For context: Karen R. Jones and John Wills, *The Invention of the Park* (Camb: Polity, 2005) esp. 37–63 on city parks. For larger context: Pierre Hadot, *The*

Veil of Isis: An Essay on the History of the Idea of Nature (Camb, Mass: Belknap, 2006) ch. 6.

51. Richard Watson Gilder, *The Poems* (B, 1908) 286–87 (“The Night Pasture”), 380 (“The Day Began As Other Days Begin”); Donald Worster, *A River Running West: The Life of John Wesley Powell* (Oxford U, 2001) 92–94, 101, 104, q. 193; Darwin Payne, *Owen Wister, Chronicler of the West, Gentleman of the East* (Southern Methodist U, 1985) 72, 75, q. 81; Fanny Kemble Wister, ed., *Owen Wister Out West: His Journals and Letters* (U Chicago, 1958) 35–36, 39, q. 59; John Muir, *Our National Parks* (B, 1902) q. 3, 4, q. 47, q. 272; Robert McCullough, *The Landscape of Community: A History of Communal Forests in New England* (U Presses of New England, 1994) q. 237 from an essay by Muir in *Scribner’s Mo* (1878). Cf. Peter A. Coates, “The strange stillness of the past: toward an environmental history of sound and noise,” *Env H* 10,4 (Oct. 2005) 636–55, esp. on Muir; John T. Cumbler, *Reasonable Use: The People, the Environment, and the State. New England, 1790–1830* (Oxford U, 2001) on the decline of (sound-cushioning) forests with the spread of woodpulp papermills, leading to greater pollution of the air and groundwater (both with ototoxic consequences for the ear).

52. Theodore Hamerow, *The Birth of a New Europe: State and Society in the Nineteenth Century* (U North Carolina, 1983) 142–43 on British and European workweeks; Joseph Zeisel, “The workweek in American industry, 1850–1956,” *Mo Labor R* 79 (Jan. 1958) 23–29, fifty-six hours for non-agricultural workers; Roediger and Foner, *Our Own Time*, x, fifty-nine hours for manufacturing industries; Gregg Mitman, “Hay fever holiday: health, leisure, and place in Gilded-Age America,” *Bull H Med* 77 (2003) 600–35; William H. Allen, “Fresh air work,” *Annals Amer Acad Political Social Sci* 23 (1904) 464–71, q. 468; “Fresh Air Fund work,” *NY Daily Trib* (Nov. 13, 1906) 5:1, revealing that 7,504 poor children were sent for two weeks in the summer of 1906 to 199 different country towns in seven states.

53. Salem Town and Nelson M. Holbrook, *The Progressive Third Reader* (B, 1857) 244, 262, as also William H. McGuffey, *McGuffey’s Fifth Eclectic Reader* (NY, 1879) 316–18 on pigeons; William H. Cole, *The Institute Reader and Normal Class-Book* (Cincinnati, 1870) 209 for the trolley; Barnet Baskerville, *The People’s Voice: The Orator in American Society* (U Press Kentucky, 1979) 33, 52, 59–61, 66 on long speeches; Kimberly K. Smith, *The Dominion of Voice: Riot, Reason, and Romance in Antebellum Politics* (U Press of Kansas, 1999) on style and oratory; Benjamin Perley Poore, *Perley’s Reminiscences of Sixty Years in the National Metropolis* (Phila, 1886) II,322 on Pelton; Anne C. Coon, ed., *Hear Me Patiently: The Reform Speeches of Amelia Jenks Bloomer* (Westport: Greenwood, 1994) 7, 14, 19, 89, 132–33, 178–80; Kenneth Cmiel, *Democratic Eloquence: The Fight over Popular Speech in Nineteenth-Century America* (NY: Morrow, 1990) 132–37; “At Willow Grove,” *Washington Times* (1906?) clipping in Box 1, f. 1, of the Patrick Conway Collection, Special Collections, Performing Arts Lib, U Maryland; Mary Evelyn Durden Teal, “Musical Activities in Detroit from 1701 through 1870,” Ph.D. thesis, U Michigan, 1964, I,232, critic of 1857; Frederick Anderson et al., eds., *Mark Twain’s Notebooks and Journals* (UC, 1975–1979) II,92, q. 93, q. 138, 139–40.

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Open U, 1991); Margaret Hazen Hindle and Robert M. Hazen, *The Music Men: An Illustrated History of Brass Bands in America, 1800–1920* (DC: Smithsonian Inst, 1987); George McKay, “A soundtrack to the insurrection: street music, marching bands and popular protest,” *parallax* 13,1 (2007) 20–31.

54. Baskerville, *People’s Voice*, 36; Dorothy D. Volo and James M. Volo, eds., *Daily Life in Civil War America* (Westport: Greenwood, 1998) 179, Bayly; Edward Everett, *Orations and Speeches on Various Occasions* (B, 1885) IV,622–59; Garry Wills, *Lincoln at Gettysburg* (NY: Touchstone, 1992) 24, 32, 35–36, 63–76; Harold Holzer, *Lincoln Seen and Heard* (U Press of Kansas, 2000) q. 194 on Lincoln’s voice.

55. Cypress Hills Cemetery, [*Prospectus*] (NY, 1863) and a hymn by Rev. Dr. John C. Lord, in *Forest Lawn Cemetery* (Buffalo, 1855) 44 (“Place for the dead!”), both in the Warshaw Collection, “Cemeteries,” Box 1; Henry Kirke White, “Lines on Recovery from Sickness, Written in Wilford Church-yard,” *The Poetical Works and Remains, with Life by Robert Southey* (NY, 1881) 40–42; Silas Weir Mitchell, “The Quaker Grave-Yard,” *Atlantic Mo* 41 (1878) 217; Bill Arp, *From the Uncivil War to Date, 1861–1903* (Atlanta, 1903) 16 on yellow fever in antebellum Charleston (“all night long the hearses and dead carts were rumbling over the cobblestones, their tires bound in bagging to smother the noise”); Michel Dansel, *Au Père-Lachaise* (P: Fayard, 1973).

56. James S. Curl, *Death and Architecture*, rev. ed. (Phoenix Mill: Sutton, 2002) ch. 5 on European beginnings, ch. 8 on garden cemeteries; Dell Upton, “The urban cemetery and the urban community: the origin of the New Orleans cemetery,” in *Exploring Everyday Landscapes*, eds. A. Adams and S. McMurry (U Tennessee, 1997) 131–45; Gunther P. Barth, *Fleeting Moments: Nature and Culture in American History* (Oxford U, 1990) 129–43; Thomas Bender, “The ‘rural’ cemetery movement: urban travail and the appeal of nature,” in *Material Life in America, 1600–1860*, ed. Robert B. St. George (Northeastern U, 1988) esp. 511–16; Rev. Noah Hunt Schenck, *Oration* (Chicago, 1859), in the Warshaw Collection, as above; Wills, *Lincoln at Gettysburg*, 66–67; Gabor Boritt, *The Gettysburg Gospel: The Lincoln Speech That Nobody Knows* (NY: Simon and Schuster, 2006) 37–45, 50, 81 on Saunders and preparing the Gettysburg cemetery; Annie Parker, “Rural cemeteries,” *Frederick Douglass’ Paper* (Aug. 13, 1852). The artillery battery on Cemetery Hill, critical to Union victory at Gettysburg, had been emplaced in the town’s new garden cemetery, but this would not serve as the National Cemetery; Margaret S. Creighton, *The Colors of Courage: Gettysburg’s Forgotten History; Immigrants, Women and African Americans in the Civil War’s Defining Battle* (NY: Basic, 2005) 23–24; Mark S. Schantz, *Awaiting the Heavenly Country: The Civil War and America’s Culture of Death* (Cornell U, 2008) 93–95 for the “first Gettysburg address,” at Ever-Green Cemetery in 1854, and pp. 70–81 on rural cemeteries.

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David E. Stannard, “Where all our steps are tending,” in *A Time to Mourn: Expressions of Grief in Nineteenth-Century America*, eds. M. V. Pike and J. G. Armstrong (Stony Brook: Museums, 1980) q. 28, quiet resignation. Cemetery rules: *Allegheny Cemetery* (Pittsburgh, 1873) 117–18, and *By-Laws and Rules of River View Cemetery Association* (Portland, OR, 1882) 23, both in Warshaw Collection, as above. I have benefitted here from a visit to the National Museum of Funeral History, Houston, Texas.

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59. T. J. Jackson Lears, *No Place of Grace: Antimodernism and the Transformation of American Culture* (NY: Pantheon, 1981) esp. 47–58; Thomas G. Connors, “The Romantic landscape: Washington Irving, Sleepy Hollow, and the rural cemetery movement,” in *Mortal Remains: Death in Early America*, eds. N. Isenberg and A. Burstein (U Penn, 2003) 187–203; Fritzsche, *Stranded in the Present* (→ n.39) 5, 202–203; James Mellon, ed., *The Face of Lincoln* (NY: Viking, 1979); Ronald S. Fishman and Adriana Da Silveira, “Lincoln’s craniofacial microcosmia,” *Archives of Ophthalmology* 125 (2007) 1126–30; Charles Hamilton and Lloyd Ostendorf, *Lincoln in Photographs* (U Oklahoma, 1963) ix; Schwartz, *Abraham Lincoln*, q. 40; Kunhardt, *Twenty Days*, 95, 124, 141, 144, 161, 237.

60. Caroline W. Bynum, *The Resurrection of the Body in Western Christianity, 200–1336* (Columbia U, 1995); Tamara C. Eskenazi et al., eds., *The Sabbath in Jewish and Christian Traditions* (NY: Crossroads, 1991) esp. essays by Heather A. McKay, Robert Goldenberg, and Samuele Bacchiocchi; Kenneth A. Strand, ed., *The Sabbath in Scripture and History* (DC: Review and Herald, 1982), esp. Bacchiocchi, “The rise of Sunday observance in early Christianity,” 132–50; Hutton Webster, *Rest Days* (NY, 1916) 79–80, 218–20, 237.

61. Winton U. Solberg, *Redeem the Time: The Puritan Sabbath in Early America* (Harvard U, 1977) ch. 1; Stephen D. O’Leary, *Arguing the Apocalypse: A Theory of Millennial Rhetoric* (Oxford U, 1994) 93–133, q. 114; Douglas Morgan, *Adventism and the American Republic: The Public Involvement of a Major Apocalyptic Movement* (U Tennessee, 2001).

62. Solberg, *Redeem the Time*, q. 2 Charles I; Paul V. Marshall, “Sunday, socialism, and sorcery,” *Time and Community*, ed. J. Neil Alexander (DC: Pastoral, 1990) 203–16 on English Sabbatarians; John H. Primus, “Sunday: the Lord’s Day as a Sabbath—Protestant perspectives on the Sabbath,” in Eskenazi et al., *The Sabbath*, 98–121. Kenneth L. Parker,

The English Sabbath: A Study of Doctrine and Discipline from the Reformation to the Civil War (Camb U, 1988) 115, arguing that precisionists and Anglican leaders agreed on Sunday observance (as evidenced by the stern Sabbath code implemented in non-Puritan Virginia in 1610) until Archbishop Laud declared Sunday a human convention, not a divine institution.

63. Francis H. Underwood, *Quabbin: The Story of a Small Town with Outlooks upon Puritan Life* (NY, 1893) 72, intoning; Jeremiah Dummer, *Discourse on the Holiness of the Sabbath-Day* (B, 1704) 34, q. 41 on dozing, 45; Alice M. Earle, *The Sabbath in Puritan New England* (Detroit: Singing Tree, 1968) 16–17, 26–28, 57, 63–68, 203, q. 205 on the Medley, from Thomas Walter, a reformer; Thomas Shepard, *Theses Sabbaticae* (L, 1649) Thesis 17.

64. Abram H. Lewis, *A Critical History of Sunday Legislation from 321 to 1888 A.D.* (NY, 1888) q. 19, 35, q. 47, 64–65, 82, 92, 116, 120, 126, 166, 175–76, 180, 187, q. 193; Solberg, *Redeem the Time*, ch. 5 on New England, 283 on Willard, 113 on the Blue Laws, as also J. Hammond Turnbull, *The True-Blue Laws of Connecticut and New Haven and the False Blue-Laws Invented by the Rev. Samuel Peters* (Hartford, 1876) q. 215, 281, 303–306; John Owen, *Exercitations concerning the Name, Original, Nature, Use and Continuance of a Day of Sacred Rest* (L, 1671) 7, q. 442.

65. Bruce Daniels, *Puritans at Play: Leisure and Recreation in Colonial New England* (NY: St. Martin's, 1995) 76–80; Wilfred B. Whitaker, *The Eighteenth-Century English Sunday* (L, 1940); [Anon.], *Blue Laws Revived, Or an Inside View of the Inquisition* (Worcester, 1805) 2; Gordon Donald, ed., *The Diary of Ellen Birdseye Wheaton* (B, 1923) 84–85. For “sermons in stones”: John S. Gilkeson, Jr., “The rise and decline of the ‘Puritan Sunday’ in Providence, Rhode Island, 1810–1926,” *New England Q* 59 (1986) 75–91, q. 79 from Henry A. Barker, father of Providence’s public park system.

66. John C. Power, *The Rise and Progress of Sunday Schools: A Biography of Robert Raikes and William Fox* (NY, 1863) 34; Edwin W. Rice, *The Sunday-School Movement, 1780–1917, and the American Sunday-School Union, 1817–1917* (NY: Arno, 1971 [1917]) 14–16, 25–27, 149; K. D. M. Snell, “The Sunday-School movement in England and Wales: child labor, denominational control, and working-class culture,” *Past & Present* 164 (Aug. 1999) 122–68, amending the study by Thomas W. Laqueur, *Religion and Respectability: Sunday Schools and Working Class Culture, 1780–1850* (Yale U, 1979), who stressed the Sunday School’s role in creating mass literacy; Massachusetts Sabbath School Society, *The School of Good Manners* (B, 1837) 18, 21, 22, 30, 31; “Social entertainments for Sunday-Schools,” *The Christian Recorder* (Dec. 7, 1861).

67. Sarah J. Hale, *Manners; or, Happy Homes and Good Society All the Year Round* (NY: Arno, 1972 [1868]) 107, 182, 254; Sherbrooke Rogers, *Sarah Josepha Hale* (Grantham: Tompson & Rutter, 1985) 96–102, 123; Mrs. A. H. L. Phelps, “The influence of women on society,” *Amer Ladies Mag* 9 (1836) 558–59; “Sabbath observance,” *Harper’s Weekly* (Nov. 29, 1862) 755, Lincoln’s Order; Cheryl A. Wells, *Civil War Time: Temporality and Identity in America, 1861–1865* (U Georgia, 2006) 62–66; Kunhardt, *Twenty Days*, 149–50; Darrel M. Robertson, *The Chicago Revivals, 1876* (Metuchen: Scarecrow, 1989) 115–17; Alexis McCrossen, *Holy Day, Holiday: The American Sunday* (Cornell U, 2000) 27, 46.

68. Bertram Wyatt-Brown, “Prelude to abolitionism: Sabbatarian politics and the rise

of the second-party system,” *J Amer H* 58 (1971) 316–41; “Henry Ward Beecher [review, with excerpts, of *Life Thoughts, gathered from the Extemporaneous Discourses of Henry Ward Beecher* by a Member of his Congregation . . . 1858],” *Atlantic Mo* 1 (May 1858) 862–71; Harriet Beecher Stowe, “The Sabbath: sketches from a note-book of an elderly gentleman” (1853) in her *Writings* (Camb, Mass, 1896) XV, 273; McCrossen, *Holy Day, Holiday*, 36, 41–45, 138–40; Lackland/Hill, *Homespun* (n.13) 49–50; Thomas Wright, *Some Habits and Customs of the Working Classes by a Journeyman Engineer* (NY: Kelley, 1967 [1867]) 205–47; Snell, “The Sunday-School movement.”

69. Matthew Hale Smith, *Sunshine and Shadow in New York* (Hartford, 1869) 144–45, quoted in David Ward, *Poverty, Ethnicity, and the American City, 1840–1925* (Camb U, 1989) 44; Morgan, *Adventism and the American Republic*, 46–50; McCrossen, *Holy Day, Holiday*, 146–49; “The Blair Sunday Bill,” *Advent R and Sabbath Herald* 65 (May 29, 1888) and “Petitions for religious liberty,” *ibid.* 65 (Dec. 4, 1888) 760–61, both online at http://members.tripod.com/~csdachurch/sun_law.html. Cf. Paul Langford, *Englishness Identified: Manners and Character, 1650–1850* (Oxford U, 2000) 62–63 on the comparative “deadness” of the English Sabbath, which horrified Continental visitors.

70. Town of Argo, Board of Trustees, Ordinances 1884–1902 (Aug. 7, 1900), in Mss 22075F, Colorado State Archives, Denver; Alan Raucher, “Sunday business and the decline of Sunday closing laws,” *J Church and State* 36 (1994) 13–33, q. 18 from 113 US 703 (1885); Michael O’Malley, *Keeping Watch: A History of American Time* (NY: Viking, 1990) 44–54, q. 48 on awakening; Rosenzweig, *Eight Hours for What We Will*, 140–43; James C. Whorton, *Crusaders for Fitness: The History of American Health Reformers* (Princeton U, 1982). In the next Round, I will explore the laws of nuisance and disturbances of the peace.

71. Witold Rybczynski, *Waiting for the Weekend* (NY: Penguin, 1991) 109–31 on Saint Monday, 122–24 on Early Closing and the paradox, 132–61 on the development of a two-day weekend; Raucher, “Sunday business,” 21; James Greenwood, *Low-Life Deeps* (L, 1881) 71–72; Irving E. Campbell, “Should the Sunday laws of our country be changed to meet the demands of our cosmopolitan population?” *Virginia Law R* 10,8 (1904) 682–89. Cf. Stephen Miller, *The Peculiar Life of Sundays* (Harvard U, 2008) 1–5, 148–58, 165, on the perpetuation of a “Gloomy Sunday” motif in 20th-century art and music, through to the 1947 film, *It Always Rains on Sunday*, and the strength of anti-Sabbatarian societies.

72. Jean-Baptiste Thiers, *Traité des cloches* (P, 1781); Jean-Daniel Blavignac, *La Cloche: études sur son histoire et sur ses rapports avec la société aux différents âges* (Geneva, 1877) 139 for masses, 191–98 for hangings; Satis N. Coleman, *Bells: Their History, Legends, Making, and Uses* (Chicago, 1928) esp. 75; Eric Hatch, *The Little Book of Bells* (NY, 1964) 24 the Latin, 59 legends; Gerhard Dohrn-van Rossum, *History of the Hour: Clocks and Modern Temporal Orders*, tr. Thomas Dunlap (U Chicago, 1996) 98–103, 197–213; Scott Brewster, “Tinternabulation: poetry ringing in the ears,” in *Sensual Reading*, eds. M. Syrotinski and I. Maclachlan (Bucknell U, 2002) 69–82, q. 76 from Coleridge’s “Frost at Midnight”; Friedrich von Schiller, “The Lay of the Bell” (1800), in *Poems and Ballads of Schiller*, tr. Edward Bulwer Lytton (NY, 1844) 216–33; Henry W. Longfellow, “The Belfry of Bruges,” in *Poetical Works* (B, 1891) 77 and his widely taught “The Bell of Atri,” 272ff.; Walter C. Meller, *Old Times* (Detroit: Singing Tree, 1968 [1925]) 91–142; David Cressy, *Bonfires and*

Bells: National Memory and the Protestant Calendar in Elizabethan and Stuart England (UC, 1989) 50–52, 67–79, q. 69 from Hugh Latimer; E. H. Goss, “Bells,” *New England Mag* n.s. 3,5 (1891) 562; Edgar Allan Poe, *Complete Works*, ed. Thomas O. Mabbott (Harvard U, 1969) I,429–38, noting that “The Bells” (wr. 1848) arose during an evening conversation with Marie Houghton in a part of Manhattan within hearing distance of six church steeples, Poe grumbling, “I so dislike the noise of bells to-night.”

73. Arthur T. Jones, “The ‘strike notes’ from bells,” *JASA* 1 (1930) 373; [Antoine Jean Baptiste Fournier?], *La Campanomanie, poème sur l’abus des cloches*, ed. Henri Jadart (Arcis-sur-Aube, 1899) 2, 8, 9, 13; Hatch, *Little Book of Bells*, 17 on Huddlestone; Hugh R. Haweis, *Music and Morals*, 18th ed. (L, 1898 [1871]) 441–44, 455–56; McShane Bell Foundry leaflet (Baltimore, 1870s) and newsclip of 1896, both in clippings collection, F.P. 789.5 C69, Phillips Lib, Peabody Essex Museum, Salem, Mass.

74. Victor Hugo, *The Hunchback of Notre Dame*, tr. Catherine Liu (NY: Modern Lib, 2002) bk. IV, ch. 3, 140–42; Citron, *La Poésie de Paris* (→n.38) I,235ff., poetic figure of the tocsin inspired by 1830 Revolution; Aimée Boutin, “‘Ring out the old, ring in the new’: the symbolism of bells in 19th-century French poetry,” *Nineteenth-Century French Studies* 20, 3–4 (2002) 267–81, q. 272 from Nadar’s “Le Cas des clochers” (1882, my translation), and cf. Jean-Pierre Gutton, *Bruits et sons dans notre histoire* (P: PUF, 2000) 143–47, as also earlier protests against churchbells, 28–42.

75. Alain Corbin, *Village Bells: Sound and Meaning in the Nineteenth-Century French Countryside*, tr. Martin Thom (Columbia U, 1998) 5–11, 95–97, 259, 270 on Chateaubriand, and q. 383 n.7; Citron, *La Poésie de Paris* (→n.38) 412n. for Bernardin de St.-Pierre; Philippe Boutry, “Le Clocher,” in *Les Lieux de mémoire*, ed. Pierre Nora (P: Gallimard, 1992) III, pt. 2, 56–89, q. 79; Thomas Paine, *Lettre . . . sur les cultes* (P, 1797), tr. and abbreviated by Paine himself as “A Letter to Camille Jordans,” with inclusions from the French, at www.infidels.org/library/historical/thomas_paine/worship_and_church.html; Blavignac, *La Cloche*, q. 443 from an 1832 article by Chateaubriand in *Le Fantastique*, and cf. Ghislain de Diesbach, *Chateaubriand* (P: Perrin, 1995) 461–87. On workingmen’s concern with definitions of charivari in Lyon and the survival of churchbells there: Marius Ch.g, “Des charivaris,” *L’Écho de la fabrique: journal industriel et littéraire de Lyon*, no. 23 (1 avril 1832) 7, continued in no. 25 (15 avril) 7 and no. 28 (6 mai) 7; Olivier Balaÿ, *L’espace sonore de la ville au XIXe siècle* (Lyon: À la croisée, 2003) 32–36. For Russian bells: Richard L. Hernandez, “Sacred sound and sacred substance: church bells and the auditory culture of Russian villages during the Bolshevik *Veliki Perelom*,” *Amer H R* 109 (2004) 1475–1504.

76. Henry David Thoreau, *Journal: I. 1837–1844*, eds. E. H. Witherell et al. (Princeton U, 1981) 51, entry for Aug. 19, 1838; Nathaniel Hawthorne, *Tales and Sketches*, ed. Roy Harvey Pearce (NY: Lib Amer Civilization, 1982) 352–57, 414, q. 416, 480–83; “Tolling of the bells,” *Portland Advertiser* (Aug. 2, 1833) 2:3; X. Y. Z., “Tolling bells,” *ibid.* (Nov. 3, 1834) 2:1. Tyack, *Book About Bells*, 191–205, notes an early modern decline in the use of “passing bells” or “soul bells.” These examples all come from the North; for the South, where most bells were melted down for artillery during the Civil War and which afterwards had a greater nostalgia for churchbells, begin with Smith, *Listening to Nineteenth-Century America* (→n.36) esp. 57–58, 86–87, 177–81, 253, 255.

77. Michael Freeman, *Victorians and the Prehistoric: Tracks to a Lost World* (Yale U, 2004); F. B. Smith, *The People's Health* (→ n.48) 13–18, 65–68, 85–87, 114–16, dubious about major changes in English mortality rates before 1900.

78. David Landes, *Revolution in Time: Clocks and the Making of the Modern World* (Harvard U, 1983) 287–89, 308–20; O'Malley, *Keeping Watch*, 145–99; Delta, “Song of the bell,” *The Knickerbocker, or NY Mo Mag* 40 (Sept. 1852) 211; Walter Blunt, *The Use and Abuse of Church Bells* (L, 1846) 3–5, 10–11; Barbara Lambert, ed., *Music in Colonial Massachusetts, 1630–1820* (B: Colonial Soc of Mass, 1985) II, Appendix B, 906. Cf. Ann F. Withington, *Toward a More Perfect Union: Virtue and the Formation of American Republics* (Oxford U, 1991) 105–106; David Cressy, *Birth, Marriage, and Death: Ritual, Religion, and the Life-Cycle in Tudor and Stuart England* (Oxford U, 1997) esp. chs. 18–19.

79. Hillel Schwartz, “Sacred time,” *Ency of Religion: Second Edition*, ed.-in-chief Lindsay Jones (Detroit: Macmillan/Gale, 2005) XII,7986–97; Carroll Pursell, *The Machine in America: A Social History of Technology* (Johns Hopkins U, 1993) 90–93. Cf. Mark M. Smith, “Old South time in comparative perspective,” *Amer H R* 101 (1996) 1432–69.

80. On pitch: Aniruddh D. Patel, “Human pitch perception is reflected in the timing of stimulus-related cortical activity,” *Nature Neurosci* 4 (Aug. 2001) 839–44; A. B. Chase Co., “‘Voicing’ a piano,” *Century Mag* 72,5 (1906) back advertising section; G. C. Rankin, *The Story of My Life* (Nashville, 1912) 85, use of a pitch-pipe at a revival; Arthur Mendel, “Pitch in the sixteenth and early seventeenth centuries,” *Musical Q* 34 (1948) 28–45, 199–221, 336–57, 575–93; Hector Berlioz, “The rise in concert pitch” (1858), *The Art of Music and Other Essays*, tr. Elizabeth Csicsery-Rónay (Indiana U, 1994) 192–96; Charles R. Cross, “Historical notes relating to musical pitch in the United States,” *Proc Amer Acad Arts and Sci* 35 (1900) 451–67; Myles W. Jackson, *Harmonious Triads: Physicists, Musicians, and Instrument Makers in Nineteenth-Century Germany* (MIT, 2006) 197–230. Anthony Burr tells me that current pitch-standards are around 445 in Europe and 441 for concert pianos in the United States, with a tendency for wind soloists to move higher still. On tuning forks: Edwin G. Boring, *Sensation and Perception in the History of Experimental Psychology* (NY, 1942) 319–20, 329–31; Jackson, *Harmonious Triads*, 158–72, 204–12, 224–29; John B. Booth, “Alfred Gardiner Brown... His contribution to the history of the development of the tuning fork,” *JLO* 113 (April 1999) 304–13; Paolo Brenni, “The triumph of experimental acoustics: Albert Marloye (1795–1874) and Rudolph Koenig (1832–1901),” *Bull Sci Instrument Soc* 44 (1995) 13–17. For the anonymous commentator: “On sound as a nuisance,” *Mo J Sci* 17 (1880) 570–73.

81. Alfred Smee, *Instinct and Reason* (L, 1850) 32; George S. Tyack, *A Book About Bells* (Ann Arbor: Gryphon, 1971 [1898]) q. 231 from “Spanish Vistas,” *Harper's Mag* (Aug. 1882); “Mr. Bell objects to a bell,” *NY Times* (May 14, 1882) 10, with editorial, “Church bells” (May 16) 4, and follow-up, “That bell once more” (May 17) 2, and “Investigating a church bell” (May 24) 2. Meneely Bell Company, *Catalogue* (Troy, 1912) 20, from Warshaw Collection, Bells, 1/22, explains that “The noise, which the action of the clapper upon the bare spring would produce, is obviated by the use of leathers riveted upon the end of its arms.”

82. Charles V. Chapin, *Municipal Sanitation in the United States* (Providence, 1901) 151, 154, q. 158, 159–60, 168–70, 176, 214–16, 438, 789, 823–25; James H. Cassedy, *Charles V.*

Chapin and the Public Health Movement (Harvard U, 1962) 7, 27, 88, 102; J. M. McWharf, "Noise: its relation to health, disease, and longevity," *Trans Kansas Acad Sci* 20 (Dec. 1906) 237-40, q. 237, q. 238. On the distinct bark of rabid dogs: William Youatt, *The Dog* (Phila, 1852) 213; Kathleen Kete, "La Rage and the bourgeoisie: the cultural context of rabies in the French nineteenth century," *Representations* 22 (1988) 89-107.

83. "Are too many noises," *Milwaukee Sentinel* (Sept. 13, 1896) 22:4; Robert W. Hastings, "Noise as a factor in the causation of disease," *JAMA* 31 (1898) 1522-23, q. 1522 high walls; Sigmund Freud, *The Interpretation of Dreams*, tr. A. A. Brill (NY, 1950 [1900]) 132-33; F. P. Lotz, "The founding of church bells, chime and peal bells," *Intl Molders' J* 43 (1907) 189—"metal monsters" used fondly; Augustus P. Clarke, "Importance of state government control of artificial agencies that may be productive of noises," *JAMA* 25 (1895) q. 442, trolleycars; [Joseph] A. Guthrie, "The unhealthfulness of noise," *NY Med J* (May 9, 1904) 60-62, q. 61 towboats. Alain Muzet, *Le Bruit: un exposé pour comprendre, un essai pour réfléchir* (P: Flammarion, 1999) 51, notes that the first investigation of the depth of sleep, by Ernst Kohlschütter in 1862, was prosecuted by waking subjects with varying sound intensities produced by a Fechner pendulum striking against a slate slab. For more on his work: Thomas Fuchs and Jeffrey Burgdorf, "Replication and pedagogy in the history of psychology IV: Patrick and Gilbert (1896) on sleep deprivation," *Sci & Education* 17 (2008) 511-524 at 520.

84. George L. Harrison, *Report of Harrison et al. vs. St. Mark's Protestant Episcopal Church, Philadelphia: A Bill to Restrain the Ringing of Bells . . . Court of Common Pleas, No. 2. In Equity* (Phila, 1877) 1-5, 20, 41, 49, 57, 59-60, 73, 97, 102, 104, 113, 140. Cf. John H. Hepp, IV, *The Middle-Class City: Transforming Space and Time in Philadelphia, 1876-1926* (U Penn, 2003). Anthony Burr observes that bells are "notoriously inharmonic (their partials are not integer multiples of a fundamental) and Harrison's description in particular comes close to the beating of mistuned intervals."

85. Harrison, *Report of Harrison*, 9n., 10, 14, 20, 163, 191, 211, 218, 225, 227, 229.

86. *Ibid.*, 487-89.

87. Most of what follows is drawn from the Arthur H. Nichols Papers (henceforth Nichols Papers), Box II, "Custom House Bells," in the Library of the Boston Athenaeum, Boston, Mass, esp. file 1, letters of: Arthur T. Lyman, Dec. 9, 1908; Mrs. Andrew C. Wheelwright, Feb. 9, 1910; A. Lawrence Lowell, Feb. 17, 1910; Peabody & Stearns, Architects, June 14, 1910; also file 2: letters of unknown lawyer, 1910, and of Mrs. Wheelwright, May 6, 1910; also file 4, letter of AHN to Samuel W. McCall, 1910, and article by AHN, "Bells for the Custom House" (May 1910); also file 5, newsclip, Musician, "The Custom House Bells," *B Herald* (May 3, 1910). For the present sound of the Revere bell, listen to Jackson Braider, "Edward Barrett rings the Chapel bell" (Nov. 15, 2004) at www.prx.org/pieces/2760.

88. "The cries of Old London," *Illustrated L News* (Jan. 8, 1848) 111; Nichols Papers, Box II, file 1, letter of Mrs. Andrew C. Wainwright, Feb. 9, 1910; Nichols Papers, Box IV, "Mss of Arthur H. Nichols concerning bells," newsclips: p. 192, "Bells—their making, ringing, and tuning, a chat with Arthur Hughes," *The Church Newspaper* (Aug. 19, 1904); p. 106, "Battle of bells: attempt to silence Fulham's famous peal," *Daily Chronicle* (Sept. 19,

1905); p. 309, C. E. Ridler, “Richard Taylor, curfew ringer,” *B Transcript* (Nov. 25, 1898). Cf. also E. B. Osborn, “Carillon music,” *Living Age*, ser. 7, 50 (1911) 332–39 at 334, on many bells out of tune “because of the detestable practice [called ‘clocking’] of sounding them by means of ropes tied to the clappers, which causes the same spot to be struck repeatedly and prevents the vibrations spreading freely.” For the McShane Bell Foundry: *Chimes and Peals* (Baltimore, 1888) 20–21, in the Warshaw Collection, Bells, 1/17. For John Donne: his *Devotions upon Emergent Occasions* (L, 1623) Meditation XVII: *Nunc Lento Sonitu Dicunt, Morieris*—“Now, this bell tolling softly for another, says to me: Thou must die.”

89. Herbert Spencer, *Principle of Ethics* (Indianapolis: Liberty, 1978 [1892–1893]) II, 154; David Duncan, *Life and Letters of Herbert Spencer* (L, 1908) 79, q. 314; C. J. McNaspy, tr. and ed., *The Motu Proprio of Church Music of Pope Pius X* (Toledo, 1950 [1903]) §19–20; Nichols Papers, Box II, file 2, letter of Sarah Wheelwright to Nichols, Sept. 19, 1910, and file 3, on American bell manufacturers’ opposition to the installation of Wheelwright’s (English-cast) bells. Cf. also, “Would stop bell ringing on Sunday,” *B Herald* (April 15, 1907). On conches and philanthropy: Sarah Cabot Wheelwright, “Reminiscences of Sarah Cabot Wheelwright,” April 20, 1904, pp. 28, 53, 55, 64–65 in the George Cheever Shattuck Papers, Carton 20, Massachusetts Historical Society, Boston, in which Papers and carton also find Caroline G. Curtis, Extracts from “Memories of Fifty Years in the Last Century,” undated, p. 5. On the 1912 gift: B. L. McGinnity et al., “Campus Place Names,” History Museum, Perkins School for the Blind, Watertown, Mass (2004), at www.perkins.org/museum/section.php?id=212.

90. Dorothy Herrmann, *Helen Keller* (NY: Knopf, 1998) 24–26, 77, q. 90 Niagara Falls, q. 180 tinny voice, 173 Wobblies, 183; Helen Keller, letter to Mabel Hubbard Bell, Aug. 20, 1893, in Alexander Graham Bell Papers, General Corr., Division of Manuscripts, Lib of Congress, also at <http://memory.loc.gov/ammem/bellhtml/bellhome.html>; eadem, “A new chime for the Christmas bells,” *Out of the Dark* (Garden City, 1913) 274–82 and cf. L. Elsinore Springer, *That Vanishing Sound* (NY: Crown, 1976) 202–203, Edwin H. Blashfield’s famous painting, “The [Christmas] Bells.” On the sense of political urgency in 1912: Shelton Stromquist, *Reinventing “The People”: The Progressive Movement, the Class Problem, and the Origins of Modern Liberalism* (U Illinois, 2006) 99, 127–28; Gerald Sider, “Cleansing history: Lawrence, Massachusetts, the strike for four loaves of bread and no roses, and the anthropology of working-class consciousness,” *Radical H R* 65 (1996) 48–83; Center for the Historical Study of Women and Gender, SUNY Binghamton, “Women and Social Movements in the U.S., 1775–2000,” with a mini-monograph on the strike, at <http://web.archive.org/web/20030821073721/womhist.binghamton.edu/law/biblio.htm>, including primary documents; Kim E. Nielsen, *The Radical Lives of Helen Keller* (NYU, 2004) 15–46, esp. 20–21 on her Swedenborgian conviction that inside the material body lay a spiritual body “with perfect senses” to which a deaf-blind person has unique access. Cf. Justin Leiber, “Nature’s experiments, society’s closures,” *J for the Theory of Social Behaviour* 27 (1997) 325–43 on oralist myths regarding Keller.

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of the Sanfilippo Foundation (Barrington Hills, Illin), for my most direct experience of the historical materiality of sound—in the presence (Oct. 25, 2010) of Jasper Sanfilippo's enormous working collection of 19th and 20th-century theater organs, street organs, barrel organs, mechanical players, phonographs, jukeboxes, sirens, and steam whistles.

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93. David Mountfield, *The Coaching Age* (L: Hale, 1976) 27, 107 on post horns; Thomas De Quincey, *The English Mail-Coach, and Other Essays*, ed. John E. Jordan (L: 1961) 12, 18; J. B. Hearnshaw, “The Doppler effect,” *The Analysis of Starlight: One Hundred and Fifty Years of Astronomical Spectroscopy* (Camb U, 1986) 143–50; E. J. Jonkman, “Doppler research in the nineteenth century,” *Ultrasound in Med and Biology* 6 (1980) 1–5 on the experiments of Christophorus Buys Ballot. For more on Doppler: Peter Schuster, *Moving the Stars: Christian Doppler, His Life, His Works and Principles, and the World After*, tr. Lily Wilmes (Atascadero: Living Edition, 2005) esp. 104 on his study of sirens as potential alarms for steam boiler explosions, and 152–54 on his anticipation of conical shockwaves. For a broader view: Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (MIT, 1990).

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95. Swenson, *Ethereal Aether*, 60–61 on Fizeau's apparatus for measuring the speed of light, and 74–97; Holton, “Einstein, Michelson, and the ‘crucial’ experiment”; Jean M. Bennett et al., “Albert A. Michelson, dean of American optics,” *Applied Optics* 12 (1973) 2253–79; Albert A. Michelson and Edward W. Morley, “On the relative motion of the Earth and the luminiferous ether,” *Amer J Sci* 34 (1887) rept. in Swenson, 273–85.

96. Swenson, *Ethereal Aether*, 98–245; Holton, “Einstein, Michelson, and the ‘crucial’ experiment,” 132–37; Harvey R. Brown, “The origin of length contraction: 1. the FitzGerald-Lorentz deformation hypothesis,” *Amer J Physics* 69 (2001) 1044–54; Mark A. Handschy, “Re-examination of the 1887 Michelson-Morley experiment,” *ibid.* 50 (1982) 987–90; Hector A. Múnera, “Michelson-Morley experiments revisited: systematic errors, consistency among different experiments, and compatibility with absolute space,” *Apeiron* 5 (1998) 37–54; Claus Lämmerzahl and Mark P. Haugan, “On the interpretation of the Michelson-Morley experiments,” *Physics Letters A* 282 (2001) 223–29. For the resurrection of “[a]ether” by process physics: Reginald T. Cahill and Kristy Kitto, “Michelson-Morley experiments revisited and the cosmic background radiation preferred frame,” at www.arXiv:physics/0205065 (May 23, 2002). On Muybridge, see his *Animal Locomotion* (Phila,

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97. Michel Meulders, *Helmholtz: From Enlightenment to Neuroscience*, tr. Laurence Garey (MIT, 2010) 94–100; Thomas Schestag, tr. C. Jouanlanne, “Retrouvé: du temps perdu; note sur l’origine du *temps perdu* dans la *Recherche* de Marcel Proust,” *Philosophia Scientiae* 7 (2003) 115–27, springboard for Marco Piccolino, “A ‘lost time’ between science and literature: the ‘*temps perdu*’ from Hermann von Helmholtz to Marcel Proust,” *Audiological Med* 1 (2003) 261–70; Ronald Hayman, *Proust* (L: Heinemann, 1990) 337; John Durham Peters, “Helmholtz, Edison, and sound history,” in *Memory Bytes: History, Technology, and Digital Culture*, eds. L. Rabinovitz and A. Geil (Duke U, 2004) 177–98, q. 181; Jimena Canales, *A Tenth of a Second: A History* (U Chicago, 2009), esp. ch. 2. For technical context: Timothy Lenoir, “Modes and instruments in the development of electrophysiology,” *H Studies Physical and Biological Sci* 17 (1986) 20.

98. Judy L. Klein, *Statistical Visions in Time: A History of Time Series Analysis, 1662–1938* (Camb U, 1997) 148–56; Edmund C. Sanford, “Personal equation I, II, III,” *Amer J Psych* 2 (1888/1889) 3–38, 271–98, 403–30; Walter Fricke, “Bessel, Friedrich Wilhelm,” *DSB* II, 97–102; Jimena Canales, “Exit the frog, enter the human: physiology and experimental psychology in nineteenth-century astronomy,” *British J H Sci* 34 (2001) 173–97, n.59; idem, *A Tenth of a Second*, 31–34. Helmholtz used the astronomers’ method of least squares to show that the neurological delay was no artefact of his equipment or of his personal equation or his wife Olga’s, who assisted him: Kathryn M. Olesko and Frederic L. Holmes, “Experiment, quantification, and discovery: Helmholtz’s early physiological researches, 1843–50,” in *Hermann von Helmholtz and the Foundations of Nineteenth-Century Science*, ed. David Cahan (UC, 1993) 83–108. Simon Schaffer argues that astronomers did not look beyond their own discipline to solve the problem of the personal equation; rather, they adopted a “new chronometric regime of vigilant surveillance” that included observatory networks and mechanization: “Astronomers mark time: discipline and the personal equation,” *Sci in Context* 2 (1988) 115–45. Although I use masculine pronouns here, as did Bessel, women performed vital roles in 19th-century astronomy: Peggy A. Kidwell, “Women astronomers in Britain, 1780–1903,” in *History of Women in the Sciences*, ed. Sally G. Kohlstedt (U Chicago, 1999) 221–33.

99. Richard J. Stachurski, “Longitude by wire: the American method,” *Professional Surveyor* 23 (Nov. 2003) at www.profsurv.com/archive.php?issue=82&article=1147; Sanford, “Personal equation,” 26–27, 293; Canales, *A Tenth of a Second*, 36 n.49, 40 n.62; Trudy E. Bell, “The Victorian global positioning system,” *The Bent* (Spring 2002) 14–21 at www.tb.org/pages/publications/BENTFeatures; Albert E. Theberge, “Southern California and the Channel Islands,” in his *The Coast Survey 1807–1867: History of the Commissioned Corps of the NOAA, I* (DC: NOAA, 1998), quoting Ord’s journal, at www.lib.noaa.gov/docos/BACHE6.htm.

100. James M. Cattell, “The time taken up by cerebral operations, Parts 1 and 2,” *Mind*

11 (1886) 220–42 at 235–38; Canales “Exit the frog,” 184–89, using Henning Schmidgen, “Of frogs and men: the origins of psychophysiological time experiments, 1850–1865,” *Endeavour* 26,4 (2002) 142–48, who has followed up with “Leerstellen des Denkens: Die Entdeckung der physiologischen Zeit,” in *Parasiten und Sirenen*, eds. B. Dotzler and H. Schmidgen (Bielefeld: Transcript, 2008) 107–24; Claude Debru, “Helmholtz and the psychophysiology of time,” *Sci in Context* 14 (2001) 471–92, 475 on Mach; F. C. Donders, “On the speed of mental processes” (1868/1869, ed. and tr. W. G. Koster), *Acta Psychologica* 30 (1969) 412–31; Ruth Benschop and Douwe Draaisma, “In pursuit of precision: the calibration of minds and machines in late nineteenth-century psychology,” *Annals of Sci* 57 (2000) 1–25, esp. 16 on the state of relaxed readiness required of subjects in experiments on reaction times. Henning Schmidgen, “Time and noise: the stable surroundings of reaction experiments, 1860–1890,” *Studies in H and Phil of Biological and Biomedical Sci* 34 (2003) 237–75, shows how noise, and concerns about noise, affected the experiments.

101. Robert W. Rieber and David K. Robinson, eds., *Wilhelm Wundt in History* (NY: Plenum, 1980), esp. ch. 1 by Solomon Diamond, “Wundt before Leipzig” and ch. 6 by Robinson, “Reaction-time experiments in Wundt’s Institute and beyond”; Boring, *Sensation and Perception*, 330, 342; Benschop and Draaisma, “In pursuit of precision,” 13–14; Wilhelm Wundt, *Grundzüge der physiologischen Psychologie* (Leipzig, 1874) 355ff. On the centrality of Wundt’s laboratory: Kurt Danziger, *Constructing the Subject: Historical Origins of Psychological Research* (Camb U, 1990) 28–67.

102. For this and next paragraph: Hermann Helmholtz, “On the physiological causes of harmony in music (1857),” in *Science and Culture*, ed. David Cahan (U Chicago, 1995) 46–75; James Tenney, *A History of “Consonance” and “Dissonance”* (NY: Excelsior, 1988) 87–94; Ian Johnston, *Measured Tones: The Interplay of Physics and Music* (NY: Taylor and Francis, 2002) 221–44. For a later assessment of Helmholtz’s theory: Patrice Bailhache, “Valeur actuelle de l’acoustique musicale de Helmholtz,” *Revue d’histoire des sci* 39,4 (1986) 301–24. Benjamin A. Steege, “Material Ears: Hermann von Helmholtz, Attention, and Modern Aurality,” Ph.D. thesis, Harvard U, 2007, discusses the intentionality and potency of Helmholtz’s project of popularization of a theory of acoustics that was also and not incidentally a theory of social negotiation and philosophical progress among barely distinct positions. By emphasizing the resonator functions of the ear, writes Steege, Helmholtz could elude the subjectivities of “tone” as well as the “radical interiority” of hearing while making the ear itself a teachable instrument, accountable to theories of attention, but cf. Julia Kursell and Armin Schäfer, tr. Stephanie Morris, “Spaces beyond tonality,” *OASE Architectural J* 7–8 (2009) 82–103; Veit Erlmann, “The labyrinth of reason: Hermann von Helmholtz’s physiological acoustics and the loss of certainty,” in his *Reason and Resonance: A History of Modern Aurality* (NY: Zone, 2010) 217–70.

103. Hermann Helmholtz, *On the Sensations of Tone*, 2nd ed., tr. Alexander J. Ellis (NY, 1954, from the 4th German ed. [1877]) q. 2, 5, 150, q. 151, q. 172, 226, 330–39; Peters, “Helmholtz, Edison, and sound history.” Julia Kursell notes how Helmholtz not only detoured all noise processing to an acoustic space in the brain separate from the cochlea, but sidestepped issues of the auditory spatialization of sound: “Thinking with one ear: on the role of music in Hermann von Helmholtz’s epistemological writings,” *Conference on*

Thinking Hearing: The Auditory Turn in the Humanities (U Texas at Austin, Oct. 2, 2009). In his intro. to *Sensations of Tone*, Ellis (p. 24n.) discusses the misunderstanding of one of Helmholtz's key terms, *Klang* (a compound musical tone), too often translated as "clang," implying a harshness and noisiness that Helmholtz meant to exclude. On this and the influence of Helmholtz's theories on poetic metrics: Gillian Beer, "Helmholtz, Tyndall, Gerard Manley Hopkins: leaps of the prepared imagination," in *Open Fields: Science in Cultural Encounter* (Oxford: Clarendon, 1996) 242–72.

104. Robinson, "Reaction-time experiments," 174 on Exner and Wundt; Sanford, "Personal Equation III," 408; Canales, "Exit the frog," 190–91; Stephen Crane, *The Red Badge of Courage* (NY, 1895) ch. 6, and cf. Rafael Klorman et al., "Acoustic startle in maltreated children," *J Abnormal Child Psych* 31,4 (2003) 359–70; Helmholtz, *On the Sensations of Tone*, q. 49, 58; Steege, "Material Ears," ch. 1; G. B. Vicario, "Temporal displacement," in *The Nature of Time: Geometry, Physics and Perception*, eds. Rosolino Buccheri et al. (Dordrecht: Kluwer, 2003) 53–55. On the buzzing of Helmholtzian apparatus: Alfred G. Compton, "Illustrations of Lectures on Acoustics and Optics," in his Papers, 1853–1965, Notebook A2, p. 2, in CUNY Archives, NY City. Cf. Cyrus C. M. Mody, "The sounds of science: listening to laboratory practice," *Sci, Tech and Human Values* 30,2 (2005) 175–98. More recent research suggests that people do listen to, and value, the transients produced by symphonic instruments.

105. John Black, "Ragtime: an appreciation," *Jacob's Band Mo* 1 (Oct. 1916) clipping in Lynn L. Sams Papers, Box 53, Special Collections, Performing Arts Lib, U Maryland; Menahem Blondheim, *News over the Wires: The Telegraph and the Flow of Public Information in America, 1844–1897* (Harvard U, 1994) esp. 67, an editor predicting that "The wires of the telegraph will be the nerves of the press, vibrating with every impression received at the remotest extremities of the country"; Timothy Lenoir, "Helmholtz and the materialities of communication," *Osiris* 9 (1994) 185–207; Laura Otis, *Networking: Communicating with Bodies and Machines in the Nineteenth Century* (U Michigan, 2001) 10, 68, 75, 84, 121, 129; Wolfgang Schivelbusch, *The Railway Journey: Trains and Travel in the Nineteenth Century*, tr. Anselm Hollo (NY: Urizen, 1979); Samuel Hickson, "'News' and 'noise,'" *Notes and Queries* 1 (May 4, 1850) 428–29, with rejoinders at 487–88, and 2 (1850) 81–82, 107, 137–39, 218; Henry David Thoreau, *Journal. Vol. I. 1837–1844*, eds. E. H. Witherell et al. (Princeton U, 1981) 34–35; D. S. L. Cardwell, *From Watt to Clausius: The Rise of Modern Thermodynamics in the Early Industrial Age* (Cornell U, 1971) ch. 8; Rick Rylance, *Victorian Psychology and British Culture, 1850–1880* (Oxford U, 2000) 6–12; Gilles Deleuze, *Bergsonism*, tr. H. Tomlinson and B. Habberjam (NY: Zone, 1988) ch. 2; Erasmus Wilson, *Quiet Observations on the Ways of the World* (NY, 1886) 33; Henry Mills Alden, "Personal and pertinent," *Harper's Weekly Mag* (July 20, 1907) 1049, discussed by Michael O'Malley, "That busyness that is not business: nervousness and character at the turn of the last century," *Social Research* 72 (Summer 2005) 378.

106. A Pilgrim, "Pilgrim's progress in a telephone exchange," *Life and Labor* (1921), anthologized in *America's Working Women*, eds. Rosalyn Baxandall et al. (NY: Random House, 1976) 238, q. 239; Smith, *Listening to Nineteenth-Century America* (→ n.35) q. 46 from *De Bow's Review*; Michele Martin, "Hello, Central?" *Gender, Technology, and Culture in*

the Formation of Telephone Systems (McGill-Queen's U, 1991) 59, 67, 69, pass.; Bernhard Siegert, *Relays: Literature as an Epoch of the Postal System*, tr. Kevin Repp (Stanford U, 1999) 195 on women's voices; Otis, *Networking*, 154–62; C. E. McCluer, "Telephone operatives and operating room management," *Amer Tel J* 6 (July 12, 1902) 31–32; Susie Wiegler, "Operating: by an operator," *ibid.* 6 (July 19, 1902) 41; Leland Home, "The line is busy," *ibid.* 9 (Jan. 2, 1904) 9; Editorial, "Some remarks about the telephone," *ibid.* 10 (Oct. 1, 1904) 234; Anna G. Richardson, "Telephone operating: a study of its medical aspects," *J Industrial Hygiene* 1,1 (1919) 54–68, 61 on attentiveness and the steel band holding the receiver over the ear. For an early telephone harness, see Nathaniel G. Warth, "Telephone-support," US Patent No. 299,300 (May 27, 1884).

107. Audrey B. Davis and Uta C. Merzbach, *Early Auditory Studies: Activities in the Psychology Labs of American Universities* (DC: Smithsonian, 1975) 11–19; Boring, *Sensation and Perception*, 342–44; Herbert N. Casson, *The History of the Telephone* (Chicago, 1910) 12–13, at www.gutenberg.org/dirs/etext97/thott10.txt and cf. John Brooks, *Telephone: The First Hundred Years* (NY: Harper and Row, 1975) 44–49. For the record, the 1875 "birth" was not the first time a "complete sound" had been transmitted through wires. Philip Reis and Amos Dolbear had earlier claims, and Asa Gray had sent music through wires for the prior three years. Indeed, had not Bell been illegally furnished with details of Gray's "caveat" filed with the Patent Office a month before he filed his own telephone patent application, he would not have tried out Gray's "liquid transmitter" (running the current through a beaker of diluted sulphuric acid) and his urgent cry would have been unintelligible: Lloyd W. Taylor, "Untold story of the telephone," *Amer J Physics* 5 (1937) 243–51, repr. in *The Telephone: An Historical Anthology* (NY: Arno, 1977), along with Watson's 1915 article, "How Bell invented the telephone," which does not mention the sulphuric acid, as Bell did not until 1879–1880.

108. Thomas A. Watson, *Exploring Life* (NY, 1926) 6, 16, 32, q. 42, q. 67, 77, q. 81, 82, q. 83; Susan Cheever, *Treetops: A Family Memoir* (NY: Bantam, 1991) 3–15 on her great-grandfather. Cf. Anthony Enns, "Voices of the dead: transmission/translation/transgression," *Culture Theory & Critique* 46,1 (2005) 11–27, at 15–18.

109. Robert V. Bruce, *Alexander Graham Bell and the Conquest of Solitude* (NY: 1973) 20, 66–67, 104, 320; Alexander Bell, "The Tongue" (1861) and "Lecture on Stammering," in Bell Family Papers, Box 2, Division of Manuscripts, Lib of Congress, DC, and Alexander Graham Bell, letters of 1874, in Box 4, f. 4; Alexander Graham Bell, "Prehistoric telephone days," *Natl Geographic* 41 (March 1933) 223–41; Avital Ronell, *The Telephone Book: Technology-Schizophrenia-Electric Speech* (U Nebraska, 1989) 315. For more on stuttering: Benson Bobrick, *Knotted Tongues: Stuttering in History and the Quest for a Cure* (NY: Simon and Schuster, 1995); Marc Shell, *Stutter* (Harvard U, 2005).

On shorthand and later species of phonography: Lisa Gitelman, *Scripts, Grooves, and Writing Machines: Representing Technology in the Edison Era* (Stanford U, 1999). Edison himself had less interest in the musical applications of sound recording than in office machines that would solve the acoustic difficulties of shorthand, as emphasized by the Columbia Graphophone Company's Dictaphone Girl: "I don't have to risk my life any more by asking him to repeat—you know how Mr. Smith hates to be interrupted. It always makes

him forget what he was going to say and then he goes right up in the air”: advertisement in 100% (July 1914) 55.

For a popular account of singing flames: W. F. Barrett, “Sympathetic vibration,” *Good Words* 32 (1891) 41-46, esp. 45: “If we hiss, or tear a piece of paper, or rattle a bunch of keys, or shake a few coins in our hand, even at a distance of thirty or forty feet, the flame will instantly respond, bobbing and curtsying at the slightest noise.” Barrett extended the principle to “Psychical research,” *ibid.*, 467-71, recognizing as he did, p. 42, the “important part which other forms of sympathetic vibration may play in the phenomena of the universe, and in the transference of terrestrial and cosmic energy.”

110. Clarence J. Blake, letter of Feb. 21, 1869, in f. 12 of Papers, H MS C19.1, Harvard Medical Library Collection, Center for the History of Medicine, Francis A. Countway Library of Medicine, Harvard U; Charles Snyder, “Clarence John Blake and Alexander Graham Bell: otology and the telephone,” *AORL* 83,4, pt. 2, suppl. 13 (July-Aug 1974); Stanley Coren, “The talking dog,” in his *The Pawprints of History* (NY: Free Press, 2002) 120-24; Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Duke U, 2003) 66ff.; Brooks, *Telephone*, 35-36; Silvanus P. Thompson, *Philipp Reis: Inventor of the Telephone* (L, 1883) esp. 123-27, amended by Wolfgang Mache, “Reis-Telefon (1861/64) und Bell-Telefon (1875/77),” in *Telefonieren [Hessische Blätter für Volks- und Kulturforschung, v. 24]*, ed. Jörg Becker (Marburg: Jonas, 1989) 45-62, and complemented by W. Bernard Carlson, “Electrical inventions and cultural traumas: the telephone in Germany and America, 1860-1880,” in *Elektrizität in Geistesgeschichte*, ed. Klaus Plitzner (Bassum: Verlag für Geschichte der Naturwissenschaft und der Technik, 1998) 143-54; Basilio Catania, *Antonio Meucci: l’inventore e il suo tempo* (Torino: Seat, 1994-96) esp. II, 120-29, 152-73. For an early overview: T. du Moncel, *Telephone, Microphone, and Phonograph* (NY, 1879); for modern overviews: Jacques Perriault, *Mémoires de l’ombre et du son: une archéologie de l’audio-visuel* (P: Flammarion, 1981); Daniel P. McVeigh, “An Early History of the Telephone, 1664-1865” at www.ilt.columbia.edu/projects/bluetelephone/html/part5.html. On the subsequent improvement of transmission using repeaters and two-wire metallic circuits: Lillian Hoddeson, “The emergence of basic research in the Bell Telephone System, 1875-1915,” *Technology and Culture* 22 (1981) 512-44.

111. Quiet George [= George F. Pardon], *Parlour Pastimes* (L, 1868) 76; John M. Picker, *Victorian Soundscapes* (Oxford U, 2003) 100-101; Arthur S. Davis, “Acoustics and the telephone,” *Brit Almanac and Companion* 61 (1888) 65-80, esp. 76; Mark Twain House, Hartford, CT, visited Oct. 18, 1996; T. P. Lockwood, *Practical Information for Telephonists* (NY, 1895) 67-69; C. H. Haskins et al., “Electrical disturbances,” *Proc [Second] Convention of the Natl Telephone Exchange Assoc* (Saratoga Springs, 1882) q. 59; “Biblical texts for telephone users,” *Amer Telephone J* 14 (Aug. 4, 1906) 70.

112. Clarence J. Blake, “Sound and the telephone” (1878), *Trans Amer Otological Soc* (1892); *idem*, “The use of the membrana tympani as a phonograph and logograph,” *Archives of Ophthalmology and Otology* 5 (1878) 108-13; George A. Campbell, letter of June 12, 1944 to Lloyd Espenscheid on telephone lines before 1914, in Box 6, f. 2 of Papers of Edward L. Bowles, Division of Manuscripts, Lib of Congress; Walter Benjamin, “A Berlin Chronicle” (1932), *Reflections*, ed. Peter Demetz, tr. Edmund Jephcott (NY: Schocken,

1978) 38; Gerhart Richter, “Benjamin’s ear: noise, mnemonics, and the Berlin Chronicle,” *Walter Benjamin and the Corpus of Autobiography* (Wayne State U, 2000) 163–98; Steven Connor, “The modern auditory I,” in *Rewriting the Self*, ed. Roy Porter (L: Routledge, 1997) 203–23, q. 205; James A. Campbell, *Helps to Hear* (Chicago, 1882) q. 87, 89; Peter Allen, *Lectures on Aural Catarrh* (NY, 1872) q. 28, 33–35; Ronell, *Telephone Book*, 6–8.

113. Rudyard Kipling, *The Man Who Would Be King* (NY, 1899 [1888]) 22; Charles Amber, “A new howler circuit,” *Amer Telephone J* 8 (1903) 425; Frederick A. Wegner, “A howler call circuit,” *ibid.* 9 (1904) 21; Bruce V. Hall, “The measurement of sound intensities [of ringers],” *ibid.* 18 (July 11, 1908) 29–30; “The correct way to talk,” *ibid.* 8 (1903) 184; Claude S. Fischer, *America Calling: A Social History of the Telephone to 1940* (UC, 1992) 53 on households with phones; Bruce, *Alexander Graham Bell*, 327–28; Martin, *Hello, Central?*, 96; Carolyn Marvin, *When Old Technologies Were New* (Oxford U, 1988) 28, q. 90 from *St. Louis Globe-Democrat* (circa 1891); Stern, *Audible Past*, 265–66; Lockwood, *Practical Information*, 51, and cf. Mary B. Mullett, “How we behave when we telephone,” *Amer Mag* 86 (Nov. 1918) 44–45 on loudness continuing into the new century.

114. Editorial, “Some remarks about the telephone,” *Amer Telephone J* 10 (1904) 234; Fischer, *America Calling*, 70 for Canadian notice; Edouard Gélinau, *Hygiène de l’oreille et des sourds* (P, 1897) 101–102, citing Dr. Marie-Ernest Gellé on “la maladie du téléphone.”

115. “Telephones have made people left-eared,” *Amer Telephone J* 9 (1904) 250; Editorial, “Some remarks about the telephone,” *ibid.* 10 (1904) 234; Brooks, *Telephone*, 52; Don Gifford, *The Farther Shore: A Natural History of Perception, 1798–1984* (NY: Atlantic Monthly, 1990) 59–62; C. N. Fay, [a talk], *Proc [First] Convention of the Natl Telephone Exchange Assoc* (New Haven, 1881) 67; Colin Cherry, *The Age of Access: Information Technology and Social Revolution*, ed. William Edmondson (L: Croom Helm, 1985) 62, quoting an 1878 article in *J Telegraph Electrical Soc of Melbourne*.

116. “Silence booths at public stations,” *Amer Telephone J* 6 (Nov. 15, 1902) 282; G. B. Van Sickle, “Telephone booths as dividend payers,” *ibid.* 9 (Jan. 9, 1904) 17; Fort Wayne Electric Works advertisement, “Can You Hear,” *ibid.* 15 (1907) opp. 302.

117. James Mark Baldwin, “The Psychological Laboratory in the University of Toronto,” *Sci* 19 (1892) 143–44; John C. Blue, “Nearly suffocated in telephone booth,” *Amer Telephone J* 11 (1905) 318; F. L. Tufts, “Transmission of sound through solid walls,” *Amer J Sci*, 4th ser., 13 (1902) 449–55; James K. Colling, “How to prevent the passage of sound through floors and walls,” *Amer Architect and Building News* 11 (1882) 260–61, citing Joseph Gwilt, *Ency of Architecture, Historical, Theoretical, and Practical*, ed. Wyatt Papworth (NY: Bonanza, 1981 [1867, orig. ed. 1851]) §2247, 2287a on pugging, as also Theodore H. M. Prudon, “Deafening: an early form of sound insulation,” *Assoc for Preservation of Tech Bull* 7 (1975) 5–13; Sara E. Wermiel, *The Fireproof Building: Technology and Public Safety in the Nineteenth-Century American City* (Johns Hopkins U, 2000) 34–51; [Andrew Wynter], “Fires and fire-insurance,” *Quarterly R* 96 (Dec. 1854) 1–43.

118. Paul Ditzel, *Fire Alarm!* (New Albany: Fire Buff, 1990); Union Fire Company No. 2, Minutes 1840–1851, entry for June 23, 1842, in St. Louis Volunteer Firemen Collection, Ser. I, v.14, at Missouri Historical Soc, St. Louis; “The fire alarm telegraph: its origin, history and anniversary,” *Fireman’s Herald* 43 (April 3, 1902) 253–56, in the William F.

Channing Papers, N-2123.5, Box 2, as also a folder on “Fire Alarm Controversy” and letters to and from Moses Farmer, in Massachusetts Historical Soc, Boston; Sidney G. Gamble, *A Practical Treatise on Outbreaks of Fire* (L, 1942) 238ff.; Gamewell Fire-Alarm Telegraph Co., *Catalog* (B, 1884) 6–7, “non-interfering” repeater; L. E. Lowry, “Development of the electric fire alarm system,” *Amer City* 5 (Aug. 1911) 88–90; “The fire-alarm telegraph of New York City” *J Franklin Inst* 89 (1870) 345–51, 413–16; Augustine E. Costello, *Our Firemen: The History of the New York Fire Departments* (NY: Knickerbocker, 1997 [1887]) 852, 854, 868, 879, 890–903; “The Fire Department,” *NY Times* (Sept. 13, 1859) 4. On the transformation of firefighting: Amy S. Greenberg, *Cause for Alarm: The Volunteer Fire Department in the Nineteenth-Century City* (Princeton U, 1998) esp. ch. 5 on the advent of firefighting steam engines, promoted as more powerful and (p. 140) much quieter than companies of volunteers. I have also benefitted from a tour of the NYC Fire Museum’s display of 19th-century megaphones and photographs of companies posed in front of two- and three-foot-long ceremonial megaphones.

119. Asa Greene, *A Glance at New York* (1937) in *A Mirror for Americans. I: Life in the East* (Chicago, 1952) 179–81; Chester Wilkes, letter to Mayor of Boston, Dec. 3, 1852, in Wilkes Family Corresp, Rare Book, Manuscript, and Special Coll Lib, Duke U; John F. Hennard, *Journal of the St. Louis Fire Alarm Telegraph Company*, 1 vol. (mss A0681), Feb. 27, 1858 and March 2, 1858, at Missouri Historical Museum Archives, St. Louis; Costello, *Our Firemen*, 879; Gamble, *Practical Treatise*, 246–47; Frank C. Mason, “[President’s notices],” *Proc Sixth Annual Convention of the Intl Assn of Municipal Electricians* (Corning, 1901) 72, Tyndale; Adam Bosch, “The limitations of the telephone for fire alarm purposes,” *Proc Ninth Annual Convention . . .* (Corning, 1904) 16–24, preferring telegraphic signals to telephonic words for fire alarms, since excited voices are confusing when street names are homophonous (e.g., Henry, Hendrie), and operators may take odd-sounding shouting as crank calls or false alarms.

120. Augustus R. Pope, “Improvement in Electro-Magnetic Alarms,” US Patent No. 9802 (June 21, 1853); Eric Partridge, *A Dictionary of the Underworld*, new ed. (NY, 1961) 473; Edwin T. Holmes, *A Wonderful Fifty Years* (NY, 1917); William Greer, *A History of Alarm Security* (Bethesda: National Burglar and Fire Alarm Association, 1991) 13–42; Ian R. Bartley, *Selling the True Time: Nineteenth-Century Timekeeping in America* (Stanford U, 2000) 50–58; John F. Kennard & Co., *The American Fire Alarm and Police Telegraph* (B, 1864) 4, 6, q. 10.

121. Paul Sébillot, “Le Folk-lore des oreilles,” *L’Homme* 4 (1887) 528–29; St. Teresa of Avila, *The Interior Castle*, trs. K. Kavanaugh and O. Rodriguez (NY: Paulist, 1979) 33, q. 71; H. Macnaughton Jones, *Subjective Noises in the Head and Ears* (L, 1891) q. iii, 2, 5, 7, 14, 20, 24, 50, 108, 127–28; Ben G. Giles, “Ringings in the ears,” *Lit Digest* 53 (July 15, 1916) 129; Laurence Turnbull, *Tinnitus Aurium, or, Noises in the Ears*, 2nd ed. (Phila, 1875) q. 5, 19 on snake hissing and ear wax.

122. Jones, *Subjective Noises*, 10, 13. On neuroanatomy: Robert M. Young, *Mind, Brain, and Adaptation in the Nineteenth Century: Cerebral Localization and Its Biological Context from Gall to Ferrier* (Oxford U, 1990); Sidney Ochs, *A History of Nerve Functions: From Animal Spirits to Molecular Mechanisms* (Camb U, 2004) esp. 130–48; Francis Schiller, *Paul*

Broca (UC, 1979) ch. 10; Franz Seitelberger, “Theodor Meynert (1833–1892), pioneer and visionary of brain research,” *J H Neurosci* 6,3 (1997) 264–74; Mario H. Lanczik et al., “Wernicke,” *A History of Clinical Psychology*, ed. German Berrios (NYU, 1995) 302–304; Gerald Wiest and Robert W. Baloh, “Sigmund Freud and the VIIIth cranial nerve,” *Otology and Neurology* 23,2 (2002) 228–32; Lynn Gamwell and Mark Solms, *From Neurology to Psychoanalysis: Sigmund Freud’s Neurological Drawings and Diagrams of the Mind* (Binghamton: Art Museum, 2006) 44, 68, 91; Marco Catani and Dominic H. ffytche, “The rises and falls of disconnection syndromes,” *Brain* 128 (2005) 2224–39.

123. Health Specialist Sproule of Boston, letters of April 26, 1911 and May 18, 1911, in the Meriwether Jones Corresp, Rare Book, Manuscript and Special Collections Library, Duke U; Jacques Boyer, “Head noises and how one scientist studies them: Dr. Marage’s wonderful machine,” *Sci Amer* 104 (March 25, 1911) 307; G.-R.-M. Marage, *Rôle de la chaîne des osselets dans l’audition, application au traitement de la surdité et des bourdonnements* (P, 1901).

124. Theophilus[?] B. Hyslop, *Mental Physiology, Especially in its Relations to Mental Disorders* (L, 1895) 100, 215, 236, q. 240, 273, q. 275. Hyslop also read a paper on “Noise In Its Sanitary Aspect” to the British Sanitary Inspectors’ Association, but I have not been able to locate this. Cf. David Toop, *Sinister Resonance: The Mediumship of the Listener* (NY: Continuum, 2010) pt. III.

125. George F. Shrady, “Unnecessary noises,” *Med Record* 48 (July 13, 1895) 125; Partridge, *Dictionary*, 157, 207, 287, 584; [Ernest A. Hart], “London noise,” *Sanitary Record* 5 (Oct. 28, 1876) 277–78; G. K. Behlmer, “Ernest Hart and the social thrust of Victorian medicine,” *Brit Med J* 301 (1990) 711–13; Hugo Münsterberg, *Psychology and Industrial Efficiency* (B, 1913) 210–11.

126. Karl Marx, *Capital: A Critique of Political Economy. I. The Process of Capitalist Production*, trs. S. Moore and E. Aveling from 3rd German ed. of 1883–1884, ed. Frederick Engels from 4th German ed. of 1890 (NY, 1906 [1867]) 447–57, q. 446; Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (MIT, 1999) q. 16 Nordau, and throughout; Andreas Killen, *Berlin Electropolis: Shock, Nerves, and German Modernity* (UC, 2006) 27, 43, 84–85 on Hellpach. On Marx’s analysis of the laboring body and industrial capitalism: David Harvey, *Spaces of Hope* (UC, 2000) 97–116. Cf. Claude Quigier, *Femmes et machines de 1900* (P: Klincksieck, 1979) 209–15, on the decadent acoustics and aesthetics of *orages d’acier* and locomotives tearing apart the air.

127. William James, “Instinct,” *The Principles of Psychology*, eds. Frederick H. Burkhardt et al. (Harvard U, 1981 [1890]) II, ch. xxiv, 1034–35, his translation of Bernard Pérez, *Les trois premières années de l’enfant* (1878), differently translated in *The First Three Years of Childhood*, tr. Alice M. Christie (Chicago, 1885) 64–65, where see 42–43 on how quickly children become habituated to noise, and 263ff. on their “musical sense”; James Mark Baldwin, “Attention,” *Dict of Phil and Psych* (Gloucester, Mass, 1960 [1901–1905]) I, 86–88; John Dewey, “The reflex arc concept in psychology,” *Psych R* 3 (1896) 357–70. Cf. Crary, *Suspensions of Perception*, 40–41 on Darwin, 60–64, 311–15 on the resistance of James and Dewey to the reflex arc concept, in the name of the unity of consciousness.

128. Crary, *Suspensions of Perception*, q. 16 Külpe; James Mark Baldwin, “Fluctuations

of attention," *The Mental Development of the Child and the Race*, 3rd ed. (NY, 1906) 472-73; Knight Dunlap, "Some peculiarities of fluctuating and inaudible sounds," *Psych R* 11 (1904) 308-18, and cf. Nigel J. T. Thomas, "Experience and theory as determinants of attitude toward mental representation: the case of Knight Dunlap and the vanishing images of J. B. Watson," *Amer J Psych* 102 (1989) 395-412.

129. John Tyndall, *Sound: A Course of Eight Lectures delivered at the Royal Institution of Great Britain* (L, 1867) 4, 49, 55n.; Charles A. Taylor, "John Tyndall's demonstrations on sound, 1854-1882," *Proc Royal Inst Great Britain* 48 (1975) 37-62; Beer, "Helmholtz, Tyndall, Gerard Manley Hopkins" (→n.103) on Tyndall's influence; J. W. S. Rayleigh, *The Theory of Sound*, 2nd ed., ed. Robert B. Lindsay (NY, 1945 [1894]) I,vii, q. 1, q. 4, 393-94; J. J. O'Connor and E. F. Robertson, "John William Strutt (Lord Rayleigh)," online (2003) at www-history.mcs.st-andrews.ac.uk/Biographies/Rayleigh.html in in the MacTutor History of Mathematics Archive; Ja Hon Ku, "British acoustics and its transformation from the 1860s to the 1910s," *Annals of Sci* 63,4 (2006) 395-423. On inhaling hydrogen: J.-C. Yernault et al., "How the measurement of residual volume developed after Davy (1800)," *European Respiratory J* 16 (2000) 561-64. Inhaling helium to raise the frequency of one's voice had to wait upon the discovery of terrestrial helium (1895) and its use in balloons (1930s).

130. Harriet Prescott Spofford, "Newburyport and its neighborhood," *Harper's New Mo Mag* 300 (July 1875) q. 162-63 from Tennyson's *Maud* (1855) I,iii,12, as also Rudyard Kipling, "My Sunday at home," *The Day's Work* (L, 1923 [1899]) 349—an essay attentive to many other sounds, as, e.g., the "rustle of horse-chestnuts." For Smee: *Instinct and Reason* (→n.80) 32; E. M. Odling, *Memoir of the Late Alfred Smee* (L, 1878) q. 45, 127.

131. Jeffrey A. Gray, *Ivan Pavlov* (NY: Viking, 1979) 11-12; Boris P. Babkin, *Pavlov* (L, 1951) 9, 48, 96, 99; Ivan P. Pavlov, *Lectures on Conditioned Reflexes*, trs. and eds. W. Horsley Gantt and G. Volborth (NY, 1928), biographical preface, 25; idem, *Conditioned Reflexes*, tr. G. V. Anrep (NY: Dover, 1960 [1927]) 7, q. 8, 9-11, q. 12. Descartes, whose early work broached acoustics, awaits his cue in Round Three, but consider Stephen Gaukroger, *Descartes: An Intellectual Biography* (Oxford U, 1995) 198-200, 336-37.

132. Rayleigh, *Theory of Sound*, 15; Gray, *Ivan Pavlov*, 42, 47; Pavlov, *Conditioned Reflexes*, q. 8, q. 20, 28, 129; idem, *Lectures*, 89; Peter Pesic, "The bell and the buzzer: on the meaning of science," *Daedalus* 132,4 (2003) 35-44, at 43. Cf. W. G. Smith, "The relation of attention to memory," *Mind* n.s. 4, 13 (1895) 47-73 on aural/oral distraction; Edna E. Casel and K. M. Dallenbach, "The effect of auditory distraction upon the sensory reaction," *Amer J Psych* 29,2 (1918) 129-43, slowed reaction times due to intermittent or continuous sounds from metronomes, electric bells, tuning forks. On the street, a "buzz" was a pickpocket (from the "buzz" of small talk used by pickpockets to distract their victims?): Partridge, *Dictionary*, 94-95.

133. Babkin, *Pavlov*, 48; Karl Marx, *Economic and Philosophical Manuscripts of 1844*, ed. Dirk J. Struik, tr. Martin Milligan (NY, 1964) 138-41; idem, *Capital*, q. 465; David Howes, "The material body of the commodity: sensing Marx," in his *Sensual Relations: Engaging the Senses in Culture and Social Theory* (U Michigan, 2003) ch. 8; Leonard P. Wessell, Jr., *Karl Marx, Romantic Irony and the Proletariat: The Mythopoetic Origins of Marxism* (Louisiana

State U, 1979) 74, q. 79, q. 235; Regula B. Quereshi, ed., *Music and Marx* (NY: Routledge, 2002). Conditioning by bells could also occur in schools where students were governed by bells for class, prayer, meals, and dismissal: Walter F. Peterson, “Student life and thought in 1851,” *Historical Messenger [Milwaukee County H Soc]* 21,3 (1965) 76–78.

134. David N. Johnson, *Sketches of Lynn, or the Changes of Fifty Years* (Westport: Greenwood, 1970 [1880]) 19, 340, 342 on sewing and stitching machines; William E. H. Lecky, *Democracy and Liberty* (NY, 1896) II,411; Killen, *Berlin Electropolis*, 32–38; Mark Aldrich, *Death Rode the Rails: American Railroad Accidents and Safety, 1828–1965* (Johns Hopkins U, 2006) esp. ch. 6. For an historical review of definitions of fatigue: S. Howard Bartley and Eloise Chute, *Fatigue and Impairment in Man* (NY, 1947), dubious about mental (CNS) fatigue and distinguishing muscle fatigue from emotional fatigue.

135. Killen, *Berlin Electropolis*, 7, 51 on Beard’s tinnitus, 68, 73–80; N. G. Coley, “The collateral sciences in the work of Golding Bird (1814–1854),” *Med H* 13,4 (1969) 363–76; Beard, *Practical Treatise* (→ n.47) 44; George M. Beard and A. D. Rockwell, *A Practical Treatise on the Medical and Surgical Uses of Electricity* (NY, 1875); Boericke & Tafel, *Physicians’ Catalogue* (NY, 1879) 26; Horace R. Bigelow, “Static electricity as a therapeutic agent,” *J Electro-Therapeutics* 11 (1893) as reproduced in *Technology and American Medical Practice, 1880–1930*, ed. Joel D. Howell (NY: Garland, 1989); Carolyn Thomas de la Peña, *The Body Electric: How Strange Machines Built the Modern American* (NYU, 2003) ch. 3; James Carey, with John J. Quirk, “The mythos of the electronic revolution,” in *Communication as Culture*, ed. Carey (NY: Routledge, 1992) 122ff., “electrical sublime.”

136. Baldwin Locomotive Works, *Noiseless Motors and Steam Street Cars for City and Suburban Railways*, 3rd ed. (Phila, 1890) 5; H. W. Jones, “Trials of the telegraph,” *Amherst Collegiate Mag* 4 (1856–1857) 325–27, in the 1861 diary of Donald M. McNicol, Papers 1861–1948, Box 1, Division of Manuscripts and Archives, NY Public Lib; Killen, *Berlin Electropolis*, q. 27–28, q. 34; Karl Beck and F. Holtzmann, *Lärmarbeit und Ohr* (Berlin, 1929) 9–10, early telephonists.

137. Théodule Ribot, *The Psychology of Attention* (L, 1890) on muscles, motion, and fatigue; I. B. Kristian Moustgaard, “Perception and tonus,” *Scandinavian J Psych* 16 (1975) 55–64, earlier definitions and theories of muscle tone; Rabinbach, *Human Motor* (→ n.48) 121–28; Crary, *Suspensions of Perception*, q. 18, 19–21, q. 30 Helmholtz, 290–91, 297–99.

138. John H. Girdner, “On the detecting and locating of metallic masses in the human body by means of the induction balance and the telephonic probe,” *NY Med J* 45 (April 9, 1887) 393–99; idem, “A telephonic probe improvised from the telephone receiver,” *Med Record* 39 (Jan. 10, 1891) 61–62; idem, “The death of President Garfield,” *Munsey’s Mag* 26 (1902) 546–49; idem, “Healing by electricity,” *ibid.* 29 (1903) 85–87; David S. Reynolds, *Walt Whitman’s America* (NY: Knopf, 1995) 259ff. on the “body electric.” Cf. James McCabe, *The Life and Public Services of General James A. Garfield* (Cincinnati, 1880) 595, failure of Bell’s telephonic probe; William R. Balch, *The Life of James Abram Garfield* (Phila, 1881) 646–47. For modern stethoscopy: Tim Rice, “‘Beautiful murmurs’: stethoscopic listening and acoustic objectification,” *The Senses & Society* 3 (Nov. 2008) 293–316.

139. Crary, *Suspensions of Perception*, 38–39, 43–46, 290–91; Marc Jeannerod, *The Brain Machine: The Development of Neurophysiological Thought*, tr. David Urion (Harvard U,

1985) ch. 6; Fothergill, *The Town Dweller* (→ n.33) 25; Laurence Turnbull, *Imperfect Hearing and the Hygiene of the Ear*, 3rd ed. (Phila, 1881) 99; Henry M. Lyman, *Insomnia, and Other Disorders of Sleep* (Chicago, 1885) 11, 41–42, 179; C. L. Barnes, *Lessons in Elementary Practical Physics. Volume III. Pt. I. Practical Acoustics* (L, 1897) 193; Edwin Aldrich, Lecture Notes [from George Chase's course] on physiology, 14 May 1860, in Ms 1M, pp. 132, 135, in Brown University Archives, John Hay Library, Brown U; William Hammond, *Sleep and Its Derangements* (Phila, 1869) 51, 62.

140. Boring, *Sensation and Perception* (→ n.97) 386–88; Crary, *Suspensions of Perception*, q. 47 Ribot; Robert W. Baloh, “Prosper Menière and his disease,” *Archives of Neurology* 58 (2001) 1151–56; I. K. Arenberg et al., “Vincent's violent vertigo,” *Acta Otolaryngologica Suppl* 485 (1991) 84–103; idem, “Van Gogh had Menière's disease and not epilepsy,” *JAMA* 264 (1990) 491–93, with six counterproposals, in “Van Gogh: Menière's disease? Epilepsy? Psychosis?” *ibid.* 265 (1991) 722–24; C. R. Pfaltz and J. Thomsen, “Symptomatology and definition of Menière's disease,” *Controversial Aspects of Menière's Disease*, ed. C. R. Pfaltz (Stuttgart: Thieme, 1986) 2–7, on shifting diagnoses; Albert H. Buck, *Diagnosis and Treatment of Ear Diseases* (NY, 1880) 391 on 1872.

141. Charles Darwin, *The Descent of Man*, 2nd ed. (NY, 1902 [1874]) 31–34; George Combe, *A System of Phrenology*, 4th ed. (NY, 1842) frontispieces, 139, 141–42, 146, 149, 273; J. G. Spurzheim, *Outlines of Phrenology* (1832) in *Significant Contributions to the History of Psychology, 1750–1920*, ed. Daniel N. Robinson (U Publishers of America, 1978) 25–27; Orlando S. Fowler and Lydia N. Fowler, *Phrenology Proved, Illustrated, and Applied* (NY, 1836) 86.

142. Sébillot, “Le Folk-Lore des oreilles” (→ n.120) 524–37; Martin Porter, *Windows of the Soul: Physiognomy in European Culture, 1470–1780* (Oxford: Clarendon, 2005) 215, 218; Giambattista della Porta, *De Humana Physiognomia* (Naples, 1602) 69–71, 91–92, 201; Thomas Hill, *A Pleasant History Declaring the Whole Art of Physiognomy* (L, 1613) 109–13; Mark Jackson, *The Borderland of Imbecility: Medicine, Society and the Fabrication of the Feeble Mind in Later Victorian and Edwardian England* (Manchester U, 2000) 94, 103, who cites Charles Paget Lepage, *Feeble-mindedness in Children of School-Age*, ed. Mary Dendy (Manchester, 1911) 52–54, and cf. 133 on difficulty of assessing hearing of “idiots”; Lucy Hartley, *Physiognomy and the Meaning of Expression in Nineteenth-Century Culture* (Camb U, 2001) 17ff. on physiognomical theory, as also Richard T. Gray, *About Face: German Physiognomic Thought from Lavater to Auschwitz* (Wayne State U, 2004) esp. 152ff. on psychic and somatic; Joseph Simms, *Physiognomy Illustrated*, 6th ed. (NY, 1889) 134, 152–54, 198–99; Miriam Anne Ellis, *The Human Ear, Its Identification and Physiognomy* (L, 1900) 5; Wolfgang Pirsig, “Ear-nose-throat diseases in the visual arts,” in *Ear, Nose and Throat in Culture*, eds. W. Pirsig and J. Willemot (Oostende: Schmidt, 2001) 22–23, boxers; Ann Charles and Roger DeAnfrasio, *The History of Hair* (NY: Bonanza, 1970).

143. American Academy of Otolaryngology–Head and Neck Surgery, Virtual Museum, at www.entnet.org/museum/Jonathan-Swift.cfm; Richard Corson, *Fashions in Hair: The First Five Thousand Years* (L: Peter Owen, 2001) ch. 9 on wigs, as also Wendy Cooper, *Hair: Sex, Society, Symbolism* (NY: Stein and Day, 1971) 121ff., and William Andrews, *At the Sign of the Barber's Pole* (Detroit: Singing Tree, 1969 [1904]) 71–93; Robin Bryer, *The History of*

Hair (L: Wilson, 2000) 96–110 and esp. fig. 81, visibility of ears in photo of Princess Beatrice and Queen Elizabeth; Daniela Mascetti and Amanda Triossi, *Earrings: From Antiquity to the Present* (NY: Rizzoli, 1980) 82ff.; William Wilde, *Aural Surgery* (Phila, 1853) 410–11, chairs with fitted hearing aids; John H. Curtis, *Observations on the Preservation of Hearing and on the Choice, Use, and Abuse of Hearing Trumpets* (L, 1839) 53–55, 56n., 58, 61–63, and consider the material posted by Jaiprit Virdi concerning Curtis and his stethoscope for the ear in her weblog “From the Hands of Quacks” (May 27, 2010) at <http://jaivirdi.wordpress.com/john-harrison-curtis-1778-1856/>; [F. M. Blodgett], “A convenient ear trumpet,” *Sci Amer* 63 (NY, 1890) 370, a small device that wrapped around above the ear with a tube that fit within the meatus. On trumpet mediums, see esp. Hamlin Garland, *Forty Years of Psychic Research* (Freeport: Books for Libraries, 1970 [1936]) ch. 3. Turnbull, *Imperfect Hearing*, 102–103, argued that the “Frequent cutting of the hair very short is one of the causes of catarrhal inflammation of the ear.”

144. Johann C. Lavater, *The Pocket Lavater, or the Science of Physiognomy* (Hartford, 1832) esp. 97–98, 102; Mary Cowling, *The Artist as Anthropologist: The Representation of Type and Character in Victorian Art* (Oxford U, 1989) ch. 2, figs. 37, 43; Giovanni Morelli, *Italian Painters*, tr. Constance J. Ffolkes (L, 1900 [1883, wr. 1870s]) 1, 55, 59, 74, 78–82, 90, 93; [Arthur Conan Doyle?], “A chapter on ears,” *Strand Mag* 6 (1893) 388–91, 525–27, q. 388; Arthur Conan Doyle, *The Complete Sherlock Holmes* (NY, 1930) II, 888–901, q. 896, contextualized by Ronald R. Thomas, “The fingerprint of the foreigner: colonizing the criminal body in the 1890s,” *ELH* 61,3 (1994) 655–83.

145. Alphonse Bertillon, *Signaletic Instructions*, tr. and ed. R. W. McClaughy (Chicago, 1896) 48–51, 162–77, q. 161; Henry T. F. Rhodes, *Alphonse Bertillon, Father of Scientific Detection* (NY, 1956) 104; R. Imhofer, “Die Bedeutung der Ohrmuschel für die Feststellung der Identität,” *Archiv für Kriminal-Anthropologie und Kriminalistik* 26 (1906) 150–63, quoting Joux from *Gazette des hôpitaux de Paris* (1854); Gina Lombroso-Ferrero, *Criminal Man According to the Classification of Cesare Lombroso* (Montclair: Patterson Smith, 1972 [1911]) xxv, 14, 224 fig. 28, 235; Salvatore Ottolenghi, *Trattato di polizia scientifica. I. Identificazione fisica applicata alla medicina e alle funzioni della polizia* (Milan, 1910); idem (et al.), *Duecento criminal e prostitute studiate nei laboratori* (Torino, 1897) esp. 70. For earlier perspectives on ear shape and size: Robert Jütte, *A History of the Senses: From Antiquity to Cyberspace*, tr. James Lynn (Camb: Polity, 2005) 91–92.

146. Louis Frigerio, “L’oreille externe,” *Archives de l’anthropologie criminelle* 3 (1888) 438–81. Cf. Richard F. Wetzell, *Inventing the Criminal: A History of German Criminology, 1880–1945* (U North Carolina, 2000) on debates between Italian, French, and German schools concerning the physiological and racial markers of criminality.

147. Bénédicte A. Morel, *De la formation du type dans les variétés dégénérées* (P, 1864) 36; Daniel Pick, *Faces of Degeneration: A European Disorder, c.1848–c.1918* (Camb U, 1989) 44–54; Havelock Ellis, *The Criminal*, 3rd ed. (L, 1910) q. 70, 71–76; Lapage, *Feeble-mindedness*, 52, 54, as quoted in Jackson, *Borderland of Imbecility*, 103.

148. Reese V. Jenkins, ed., *Papers of Thomas A. Edison* (Johns Hopkins U, 1987) I, 7, 23, and III, 692–93; Thomas A. Edison, *Diary and Sundry Observations*, ed. Dagobert D. Runes (NY, 1948) q. 29, q. 38, 44, q. 48, 49, 54; Frank L. Dyer and Thomas C. Martin, *Edison:*

His Life and Inventions (NY, 1929); Paul Israel, *Edison: A Life of Invention* (NY: Wiley, 1998) 17–18, 152, and 436–37 on recording, as also John Harviths and Susan E. Harviths, eds., their “Introduction,” *Edison, Musicians, and the Phonograph* (NY: Greenwood, 1987) 4, 8–9, and interview with Ernest Stevens, 26–28; Francis Jehl, *Menlo Park Reminiscences* (Dearborn, 1937) 138–39, deafness intensified by mastoiditis; Matthew Josephson, *Edison* (NY, 1959) 30–33, doubting Edison’s ear stories and attributing his deafness to childhood scarlatina with recurrent middle-ear infections; Rhodes & McClure, *The Audiphone: A New Invention* (Chicago, 1879), a bone-conducting hearing aid Edison sometimes used, and cf. Steven Connor, “Edison’s teeth: touching hearing,” in *Hearing Cultures: Essays on Sound, Listening and Modernity*, ed. Veit Erlmann (Oxford: Berg, 2004), 153–172, and cf. the physical experience of playing vibrato as described by Richard Sennett, “Resistance,” in *The Auditory Culture Reader*, eds. M. Bull and L. Back (Oxford: Berg, 2003) 481–84. For ear abuse: Warren Burton, *The District School As It Was by One Who Went to It*, rev. ed. (B, 1850) 43, 66 (ears twisted, pinched, boxed, and snapped with rubber by teachers demanding quiet). Consider also Greg Milner, *Perfecting Sound Forever: An Aural History of Recorded Music* (NY: Faber and Faber, 2009) 4–6, 11, 39–49 on Edison tone tests and his own skewed hearing; Mark Katz, *Capturing Sound: How Technology Has Changed Music* (UC, 2004) ch. 4, how early recording technologies, and the associated noise, affected performance and composition, including a preference for violin vibrato, which also lay behind the success of the first black recording artist, George W. Johnson, whose “low-pitched and fruity” whistling was featured in many of his early records: Tim Brooks, *Lost Sounds: Blacks and the Birth of the American Recording Industry, 1890–1919* (U Illinois, 2004) q. 16, 26–48. As for the noise of the elevated trains, this was considerably reduced when the Metropolitan Railway bought the rights to an invention by Mary E. Walton of 63 W. 12th Street, U.S. Patent 327,422 (Feb. 8, 1881): “Lessening the Sixth Avenue noise,” *NY Daily Trib* (Jan. 18, 1879) 3:1.

149. Sébillot, “Le Folk-lore des oreilles,” 534–36 on earwigs and ear wax; Adair Dighton, *On the Prevention of Deafness* (L, 1913) 9–10, boot buttons and beans; Samuel Sexton et al., *The Classification and Treatment of Over 2000 Consecutive Cases of Ear Diseases at Dr. Sexton’s Aural Clinic* (Detroit, 1890) 14 for cockroach and cherry pit, 16 on boxing the ears, 19 and 49 on autophonia; Seth S. Bishop, *The Ear and Its Diseases* (Phila, 1906) 104–105 on burning ears, 133 on “winglike” ears, 177 against pulling ears; Catherine M. Buckton, *Health in the House: Twenty-Five Lectures on Elementary Physiology in its Application to the Daily Wants of Man and Animals, Delivered to the Working Wives and Children of Working-Men in Leeds and Saltaire* (Toronto, 1877) 163; [Editorial], “A word and a blow,” *Brit Med J* 2 (1882) 1167–68, blood poisoning and meningitis; W.B. Dalby, “Blows on the ear,” *ibid.* 2 (1882) 1249, inflammation and abscess; Charles A. Todd, “Prevalence of deafness explained by the anatomy of the ear,” *St. Louis Courier of Med* 13 (1885) 397–400 against boxing the ear; Samuel Sexton, “Aural hallucinations and false hearing in musical people due to the autophonia of diseases of the ear,” *ibid.*, 289–98, q. 291–92; W.R.H. Stewart, “Boxing the ears, and its results,” *Illustrated Med News* [London] 5 (1889) 76–78; [O.F. Baerens], “Boxing the ears,” *Tri-State Med J* 3 (Aug. 1896) 344–45, autophonia; Milwaukee Dept. of Health, *Annual Report of the Commissioner of Health* 22 (1899) 34. Blows to the

ear may also harm the temporal pole, a part of the brain located just below the ears and charged with encoding semantic meaning: Elli Leadbeater, “Strange ducks shape brain science,” *BBC News* (Sept. 6, 2006) at <http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/5321054.stm>.

150. Ellis, *The Human Ear*, 193, and cf. Francis Warner’s data on frequent “defective-ness” of boys’ external ears, in “Deviations from normal development among 50,000 children,” *J Anthropol Inst of Great Britain and Ireland* 23 (Feb. 1894) 206–15, at 208; Leonard de Vries, comp., *Victorian Advertisements* (L: Murray, 1968) 15 for Claxton, ca. 1884; Mrs. Robert E. Robinson postcard, Jan. 16, 1915, in National Archives, RG 102, Records of the Children’s Bureau, CF 1914–20, Box 30, File 4–9–2–2; Sander L. Gilman, *Making the Body Beautiful: A Cultural History of Aesthetic Surgery* (Princeton U, 1999) 97–98, 124–28; idem, *Creating Beauty to Cure the Soul: Race and Psychology in the Shaping of Aesthetic Surgery* (Duke U, 1998) 57–71; Ray A. Elliott, “Otoplasty,” *Aesthetic Plastic Surgery*, eds. P. Regnault and R. K. Daniel (B: Little, Brown, 1984) 245 on ear development, and cf. Blair O. Rogers, “History of the development of aesthetic surgery,” *ibid.*, 5ff.; Charles H. May, “A résumé of experience at the aural clinic of Prof. Hermann Schwartze, in Halle,” *NY Med J* 49 (1889) 565–70, on the “boldness” of the new otology and devices for mastoid operations; Robert S. J. Briggs and William M. Luxford, “Chronic ear surgery: a historical review,” *Amer J Otolaryngology* 15,4 (1994) 558–67; Edward T. Ely, “An operation for prominence of the auricles,” *Archives of Otolaryngology* 10 (1881) 97; Bruce W. Taylor, *Plastic Surgery: Origins and Innovators* (Australia: privately printed, 2000) 141ff.; Jack E. Davis and Horacio H. Hernandez, “History of the aesthetic surgery of the ear,” *Aesthetic Plastic Surgery* 2 (1978) 75–94.

151. Charles C. Miller, *The Correction of Featural Imperfections* (Chicago, 1907) 5–39; John B. Mullikan, “Biographical sketch of Charles Conrad Miller, ‘featural surgeon,’” *Plastic and Reconstructive Surgery* 59,2 (1977) 175–84.

152. On the visual complexity of urban spaces, see David M. Henkin, *City Reading: Written Words and Public Spaces in Antebellum New York* (Columbia U, 1998), esp. 48, citing John F. Watson, *Annals and Occurrences of New York City and State in the Olden Time* (Phila, 1846) 355–56 on the abundance of advertisements, which seemed self-defeating, “for the glare of them was so uniform as to lose the power of discrimination. It is not unlike the perpetual din of their own carriage-wheels along Broadway, unnoticed by themselves, though astounding to others.” As for Reid: [Editorial], “Noise and nerves,” *NY Daily Trib* (Dec. 19, 1878) 4:4, responding to a widely cited essay by James Sully (→ n.322); Bingham Duncan, *Whitelaw Reid: Journalist, Politician, Diplomat* (U Georgia, 1975); David R. Contosta and Jessica R. Hawthorne, eds., “Rise to World Power: Selected Letters of Whitelaw Reid, 1895–1912,” *Trans Amer Phil Soc* 76,2 (1986) 124, letter of May 24, 1907, to Theodore Roosevelt on the effectiveness of noisy demands made during international arbitration; Richard Kluger, *The Paper: The Life and Death of the New York Herald Tribune* (NY: Knopf, 1986) 122ff., 134 for the *Tribune* tower, photos of which, with notes by Stephen Wolf, can be seen at www.nyc-architecture.com/GON/GON021.htm.

153. Leonard J. Goldwater, “From Hippocrates to Ramazzini: early history of industrial medicine,” *Annals Med H* 8 (1936) 27–32, and cf. John F. Nunn, *Ancient Egyptian*

Medicine (U Oklahoma, 1996) 45-46, 94 on ear treatments; Herbert K. Abrams, "A short history of occupational health," *J Public Health Policy* 22 (2001) 34-80; William F. Ashe, "Ulrich Ellenbog, one of Ramazzini's predecessors," *J Occup Med* 9,6 (1967) 311-14; Bernardino Ramazzini, *De Morbis Artificum Diatribe = Diseases of Workers*, 2nd ed., tr. Wilmer C. Wright (NY: Hafner, 1964 [1713]) 289, q. 437; G. Franco, "Ramazzini and workers' health," *Lancet* 354 (Sept. 4, 1999) 858-61.

154. Pre-modern: I. Epstein et al., tr., *The Babylonian Talmud* (L, 1935-), *Baba Bathra* 20b-21a, pp. 103-105 on millstones; Ludwig Teleky, *History of Factory and Mine Hygiene* (NY, 1948) 5; Allard E. Dembe, *Occupation and Disease: How Social Factors Affect the Conception of Work-Related Disorders* (Yale U, 1996) 161-62; Peter Poulussen, *Van Burenlast tot Milieuhinder: Het stedelijk Leefmilieu, 1500-1800* (Kapellen: DNB/Uitgeverij Pelckmans, 1987) 70, 79, 102, 107, 114—for which reference I thank Karen Bijsterveld and for translation of pages thereof I thank my brother, Jordan Schwartz. On aging and the decline of the senses, cf. esp. François Emmanuel Foderé, *Traité de médecine légale et d'hygiène publique* (P, 1813) I,26-27, a six-volume text that reviewed the occupational diseases of civilians and soldiers and found no connection between work and deafness, all the while looking for evidence of malingering; Harry Friedenwald, "Injurious effects of loud noises on the organ of hearing," *Bull Med Chirurgical Faculty of Maryland* 5 (1913) 103-106. On the miners: Oz Frankel, *States of Inquiry: Social Investigations and Print Cultures in Nineteenth-Century Britain and the United States* (Johns Hopkins U, 2006) 158-72.

155. John Fosbroke, "Practical observations on the pathology and treatment of deafness," *Lancet* 1 (1831) 533-35, 645-48, 740-43, 777-79, 823-29, q. 648; Gordon Atherley and William Noble, "Occupational deafness: the continuing challenge of early German and Scottish research," *Amer J Ind Med* 8 (1985) 101-17 at 101-102 for Nils Skragge's thesis of 1765; Thackrah, *The Effects of Arts, Trades and Professions* (→ n.10) 17, 49, 199. Cf. Benjamin W. McCready, *On the Influence of Trades, Professions, and Occupations in the United States, in the Production of Diseases* (Albany, 1837), devoted to the problems of exposure, either to sea air (sailors), cold air (night watchmen), or miasmatic air (factory girls and workers living in tenements), with no mention of noise.

156. August P. Lighthill, *A Popular Treatise on Deafness*, ed. E. Bunford Lighthill (NY, 1862) q. 14-15, 39, and contrast P. Gaskell, *Artisans and Machinery: The Moral and Physical Condition of the Manufacturing Population Considered with Reference to Mechanical Substitutes for Human Labour* (NY: Kelley, 1968 [1836]) ch. 9, "Peculiar Diseases," no references to deafness; Douglas C. Baynton, "Laura Bridgman and the history of disability," *Rs in Amer H* 30,2 (2002) 227-35, 231 on preferring the blind to the deaf; Charles Lever, *The Dodd Family Abroad* (NY, 1854) 44; Walter A. Wyckoff, *The Workers* (NY, 1898-1899) q. 29, 58, q. 187, q. 188; Bessie Van Vorst and Marie Van Vorst, *The Woman Who Toils: Being the Experiences of Two Gentlewomen as Factory Girls* (NY, 1903) 23-25, 27, 73, 90, 221; Seth Koven, *Slumming: Sexual and Social Politics in Victorian London* (Princeton U, 2004) ch. 3 on contemporary English investigations of working-class life and work. Cf. New York State, *Fourth Report of the Factory Investigating Commission* (Albany, 1915) 310, on a hemp mill: "The clatter of the machinery here is so frightful that a voice can hardly be heard below a shriek." Mark Aldrich has no index entry for noise in his *Safety First: Technology, Labor, and Business in*

the *Building of American Work Safety, 1870-1939* (Johns Hopkins U, 1997), but his book was inspired (p. xviii) by a great-aunt and a friend who both worked in woolen mills and became almost completely deaf as a result.

157. John F. Witt, *The Accidental Republic: Crippled Workingmen, Destitute Widows, and the Remaking of American Law* (Harvard U, 2004) 2-4, 26-27, 30, 58-59, 65; W. H. King, *Lessons and Practical Notes on Steam, the Steam Engine, Propellers, etc. for Young Engineers, Students, and Others*, rev. J. W. King (NY, 1870) 83; "Deadening noises of workshops," *Manufacturer and Builder* 12,6 (1880) 132; John Burnett, ed., *Useful Toil: Autobiographies of Working People from the 1820s to the 1920s* (L: Routledge, 1994) 103, 113, on coal-cutting machines so noisy that miners (already hard of hearing) could not hear the roof cracking; Aldrich, *Death Rode the Rails* (→ n.134) 2-3, 21, 23, 28, 44, 124-26; David O. Stowell, *Streets, Railroads, and the Great Strike of 1877* (U Chicago, 1999) 10, 26-31, 91, 135 on pedestrians, horses, railroad crossings and engine whistles, and 18 for Chicago deaths; George Rosen, *Preventive Medicine in the United States, 1900-1975* (NY: Science History, 1975) 9, accident statistics, as compared to the horse-and-buggy data in Joel W. Eastman, *Styling vs. Safety: The American Automobile Industry and the Development of Automotive Safety, 1900-1966* (U Presses of Amer, 1984) 22 n.68, and in "Transportation Secretary Mineta calls highway fatalities national tragedy," NHTSA Research, April 20, 2006 at f2www.nhtsa.gov; Roger Cooter, "The moment of the accident: culture, militarism, and modernity in late-Victorian Britain," *Accidents in History: Injuries, Fatalities and Social Relations*, eds. R. Cooter and B. Luckin (Amsterdam: Rodopi, 1997) 107-57 at 119-23; Ralph Harrington, "The railway accident: trains, trauma, and technological crises in nineteenth-century Britain," *Traumatic Pasts: History, Psychiatry and Trauma in the Modern Age, 1870-1930*, eds. M. S. Micale and P. Lerner (Camb U, 2001) 31-56; Julie Wosk, *Breaking Frame: Technology and the Visual Arts in the Nineteenth Century* (Rutgers U, 1992) 15-17; Aldrich, *Safety First*, 13 on engine whistles, chs. 2 and 6 on coal mining; Richard Sachs, "Untersuchungen über die Gehörorgane des Betriebspersonals den Eisenbahn," *Archiv für Ohrenheilkunde* 65 (1905) 7-25 for German statistics, as also Siegfried Krömer, "Lärm als medizinisches Problem im 19. Jahrhundert," Inaugural Dissertation, Johannes Gutenberg Universität, Mainz, 1981, pp. 25-37; Dagobert Schwabach and Hermann Pollnow, "Diseases of the ear in locomotive engineers and firemen," *Archives of Otolaryngology* 10 (1881) 257-65, esp. 262-63, wondering whether hearing loss (80 percent of those with 25+ years of service were "very deaf") might lead to rail accidents due to inability to hear auditory signals; Editorial [on the deafness of engine drivers and stokers], *Lancet* 2 (1881) 1092-93; Joseph A. White, "The physical fitness of the railway employee from the oculist's and aurist's standpoint," *Medico-Legal J NY* 17 (1899-1900) 303-11; Hugh L. Murray, "Examination of Victorian railway employes in vision, colour sense, and hearing," *Intercolonial Med J* (Oct. 20, 1902) 466-86 at 466; William G. Thompson, *The Occupational Diseases* (NY, 1914) 572, rail engineers; Killen, *Berlin Electropolis*, on social insurance, accidents, and prognosis.

158. Witt, *Accidental Republic*, 73, insurance; Aldrich, *Safety First*, 129, steelworkers; E. Eugene Holt, "Boiler-maker's deafness and hearing in a noise," *Trans Amer Otolaryng Soc* 3 (1882) 34-44, followed up by D. B. St. John Roosa, "The effects of noise upon diseased and healthy ears," *Archives of Otolaryngology* 12 (1883) 103-21, where Roosa notes (pp. 110-11)

that boilermakers had developed a sign language to cope with the noise; Thomas Barr, "Enquiry into the effects of loud sounds upon the hearing of boilermakers and others who work amid noisy surroundings," *Proc Phil Soc Glasgow* 17 (1884) 223-39; idem, "Injurious effects of loud sounds on the hearing," *Brit Med J* 2 (Sept. 20, 1890) 675; idem, *Manual of Diseases of the Ear*, 2nd ed. (Glasgow, 1896) 61, 367, followed up by his student, T. Ritchie Rodger, as recounted in "Noise in industry," *Labour Management* 16 (Oct. 1934) 171-74; Thomas Oliver, ed., *Dangerous Trades: The Historical, Social, and Legal Aspects of Industrial Occupations as Affecting Health* (L, 1902) 752-55, editor's section on "Effects of concussion of the air"; Dembe, *Occupation and Disease*, 167-68; Wood C. Justus, "Are trade unions necessary?" *J Brotherhood of Boiler Makers and Iron Ship Builders* 12 (1900) 99; "He didn't know," *ibid.* 8 (1896) 5; A Boiler Maker, "A movement that is just and needful—the short hour day," *ibid.* 8 (1896) 54-56; Richard Caverly, "Noise legislation needed," *ibid.* 13 (1901) 196-97. For techno-historical context on boilermakers and other shipbuilding trades: J. F. Wollaston, "Shipbuilding," *Occup Med* 42 (1992) 203-12, esp. on the "fiendishly noisy" pneumatic chipping. Cf. Edison, *Diary*, 49: "A man talking in a boiler-shop multiplies the volume of his voice by four or five times and yet finds it difficult to make the man of normal hearing understand. But," with his own deafness acting as a filter, "I can hear talk in such noisy places without much difficulty." Research suggests that cochlear hair cells may be "strengthened" by exposure to constant noise if below the level that would cause auditory threshold shifts (not the case with boilermakers): Barbara Canlon, "The effects of sound conditioning on the cochlea," in *Auditory System Plasticity and Regeneration*, eds. Richard Salvi et al. (NY: Thieme, 1996) 118-27.

159. Chronologically: D. B. St. John Roosa, "A contribution to the etiology of diseases of the inner ear," *Amer J Med Sci* 68 (1874) 377-400, telegraphers, boilermakers; Alexandre Layet, *Hygiène des professions et des industries* (P, 1875) 78, 94, 209-12, 215, 419-20, balloonists, miners, gunners, mechanics; S. Moos, "Sur les maladies de l'oreille des chauffeurs et conducteurs de locomotive," *Comptes rendus, Congrès périodique international d'otologie, 1880* (Trieste, 1882) 2nd sess., 23-38; Laurence Turnbull, "Report on the diseases of the ear in locomotive and other engineers, firemen, and conductors," *JAMA* 3 (1884) 590-95; D. M. Lévi, *Manuel pratique des maladies de l'oreille* (P, 1885) 423, sailors; Maurice Lannois, "Le téléphone et les affections de l'oreille," *Comptes rendus, 4e Congrès international d'otologie et de laryngologie*, ed. A. Cartaz (P, 1889) 265-71; Eusèbe Ferrand, "L'oreille et le bruit, ou les accidents de l'organe de l'ouïe dans les professions bruyants et de leur prophylaxie," *Comptes rendus, Congrès international d'hygiène et de démographie 1889* (P, 1890) 782-91, gun noise and noise at war; Karrel Lichtenberg, "Defects of hearing in railway servants," *Brit Med J* 1 (1893) 212; Gélineau, *Hygiène de l'oreille* (→n.113) 81-103, shoemakers, tunnelers, musicians; J. F. Pritchard, "Diseases of railway men caused by their occupations," *JAMA* 28 (June 19, 1897) 1169-71; Arthur H. Cheatle, "Gun deafness and its prevention," *Royal United Service Inst J* 51 (1907) 840-53, and cf. Ahmes L. Pahor, "Blast injuries to the ear: an historical and literary review," *JLO* 93 (1979) 225-51. For these and other occupations: Friedrich Röpke, *Berufskrankheiten des Ohres und der Oberen Luftwege* (Wiesbaden, 1902); Alfred Peyser, "Die gewerblichen Erkrankungen und Verletzungen des Gehörs bei den Industriearbeiten," *Archiv für Soziale Hygiene und Demographie* 6 (1911)

143-64; Anna G. Richardson, "Telephone operating: a study of its medical aspects with statistics of sickness disability reports," *J Industrial Hygiene* 1 (1919) 54-68; D. J. Glibert, tr. S. A. Henry, "L'influence des bruits industriels" (1914), *ibid.* 3 (1921-1922) 264-75. For more on German telephone operators: Killen, *Berlin Electropolis*, ch. 5.

160. D. B. St. John Roosa, "Statistical report of five hundred cases of aural disease," *NY Med J* (Aug. 1869), pamphlet reprint at NY Acad of Med; Wilhelm Kramer, *Aural Surgery of the Present Day*, tr. Henry Power (L, 1863) 12, 21, cold air, cold water; Clarence J. Blake, "Occupational injuries and diseases of the ear," in *Diseases of Occupation and Vocational Hygiene*, eds. G. M. Kober and W. C. Hanson (Phila, 1916) 339-50, at 339 for cold, heat, air pressure; <http://www.henriettesherbal.com/eclectic/thomas/lead-pois.html>. Ritchie Rodger, "Noise deafness: a review of recent experimental work, and a clinical investigation into the effect of loud noise upon the labyrinth of boilermakers," *JLO* 30 (1915) 91-105 at 91. On lead poisoning and levels of ototoxicity: English, *Old Paint* (n.9); Carolyn Malone, *Women's Bodies and Dangerous Trades in England, 1880-1914* (Bury St. Edmunds: Boydell, 2003) chs. 3-4; Rolla L. Thomas, *The Eclectic Practice of Medicine* (Cincinnati, 1907) pt. X, "Plumbism," at www.henriettesherbal.com/eclectic/thomas/lead-pois.html; Jerome O. Nriagu, "Saturnine drugs and medicinal exposure to lead: an historical outline," in *Human Lead Exposure*, ed. Herbert L. Needleman (Boca Raton: CRC, 1991), 4-22, as also Jane S. Lin-Fu, "Modern history of lead poisoning," 23-44; Christian Warren, *Brush with Death: A Social History of Lead Poisoning* (Johns Hopkins U, 2000); Cece Saunders and Susan R. Chandler, "Get the lead out," in *Dangerous Places: Health, Safety, and Archaeology*, eds. David A. Poirier and Kenneth L. Feder (Westport: Bergin and Garvey, 2001) 189-204; Robert Bornschein et al., "Behavioral effects of moderate lead exposure in children and animal models," *CRC Critical Rs in Toxicology* 8 (1980) 43-99 at 94; Joel Schwartz and David Otto, "Blood level, hearing thresholds, and neurobiological developments in children and youth," *Archives of Env Health* 12,21 (1987) 153-60; Trong-Neng Wu et al., "Effects of lead and noise exposure on hearing ability," *ibid.* 55,2 (2000) 109-14; Herbert L. Needleman and David C. Bellinger, "The health effects of low-level exposure to lead," *Annual R Public Health* 12 (1991) 11-40; Kevin C. Staudinger and Victor S. Roth, "Occupational lead poisoning," *Amer Family Physician* 57 (Feb. 15, 1998) 719-26, at 723; Y.H. Hwang et al., "The association between low levels of lead in blood and occupational noise-induced hearing loss in steel workers," *Sci Total Env* 408 (Dec. 2009) 43-49. And aside from the novel noises of cans kicked down the street, the advent of tin cans likely also affected the hearing of children, since they were soldered with lead that leaked into food: Sue Shepard, *Pickled, Potted and Canned: The Story of Food Preserving* (L: Headline, 2000) 227-36. One Iowa physician around 1908 would make a direct connection between canned food, condensed urban life, and noise: Edward S. Martin, "Noise and canned food," in his *In a New Century* (NY, 1908) 162-76.

161. On mercury poisoning, which spread with amalgamation mining: Zoltan Annau and Christine U. Eccles, "Sensory deficits caused by exposure to methyl mercury," in *The Toxicity of Methyl Mercury*, eds. Eccles and Annau (Johns Hopkins U, 1987) 104-109; H. Satoh, "Occupational and environmental toxicology of mercury and its compounds," *Ind Health* 38,2 (2000) 153-64; Jerome O. Nriagu and Henry K. T. Wong, "Gold rushes and

mercury pollution,” in *Mercury and Its Effects on Environment and Biology*, eds. A. Sigel and H. Sigel (NY: Dekker, 1997) 131-60; Norbert Hirschhorn et al., “Abraham Lincoln’s blue pills,” *Perspectives on Biology and Med* 44,3 (2001) 315-32. On arsenic poisoning: James C. Whorton, *The Arsenic Century: How Victorian Britain Was Poisoned at Home, Work and Play* (Oxford U, 2010); B. D. Haseltine, “Arsenic iodide in otology,” *The Clinique* 23 (1902) 191-94; John L. Konefes and Michael K. McGee, “Old cemeteries, arsenic, and health safety,” in *Dangerous Places: Health, Safety, and Archaeology*, eds. D. A. Poirier and K. L. Feder (Westport: Bergin & Garvey, 2001) 127-35, noting that, after arsenical embalming was introduced during the American Civil War, a cemetery with a thousand corpses could release as much as a ton of arsenic into the soil; Commission on Life Sciences, *Arsenic: Medical and Biological Effects of Environmental Pollutants* (DC: Natl Acad of Sci, 1977) esp. 173-215; M. Anniko and L. Sarkady, “Morphological changes of labyrinthine blood vessels following metal poisoning,” *Acta Otolaryngologica* 83 (1977) 441-48. Yet another industrial metal, chromium, was being implicated in chronic otitis media: NY State Dept. of Labor, *The Reporting of Industrial Diseases* (Albany, 1912) 15.

162. Laurence D. Fechter, “Combined effects of noise and chemicals,” in *Occup Hearing Loss* (special issue of *Occup Med*), eds. T. C. Morata and D. E. Dunn (Phila: Hanley and Belfus, 1995) 609-22; Ann-Christin Johnson and Per R. Nylén, “Effects of industrial solvents on hearing,” *ibid.*, 623-40; Michael S. Bisesi and Allan M. Rubin, “Chemical air pollutants and otorhino-laryngeal toxicity,” in *Environmentally Induced Disorders Sourcebook*, ed. Allan R. Cook (Detroit: Omnigraphics, 1997) 105-15; Irma Åstrand, “Work load and uptake of solvents in the tissues of man,” in *Occupational Health Hazards of Solvents*, eds. Anders Englund et al. (Princeton Scientific, 1982) 141-52; John R. Franks and Thais C. Morata, “Ototoxic effects of chemicals alone or in concert with noise,” in *Scientific Basis of Noise-Induced Hearing Loss*, eds. Alf Axelsson et al. (NY: Thieme, 1996) 437-46; P. Campo and R. Lataye, “Noise and solvent, alcohol and solvent: two dangerous interactions on auditory fuction,” *Noise Health* 3,9 (2000) 49-57; W. J. Sulkowski et al., “Effects of occupational exposure to a mixture of solvents on the inner ear,” *Intl J Occup Med and Env Health* 15,3 (2002) 247-56; S. J. Chang et al., “Hearing loss in workers exposed to carbon disulfide and noise,” *Env Health Persp* 111 (2003) 1620-24; F. Gagnaire and C. Langlais, “Relative ototoxicity of 21 aromatic solvents,” *Archives of Toxicology* 79,6 (2005) 346-54.

163. Roosa, “A contribution,” 390-95; “Causes of deafness,” *Amer Annals of the Deaf and Dumb* 1 (1848) 30-31; H. P. Peet, “New York Institution for the Deaf and Dumb,” *ibid.* 6 (1854) 239; Baynton, “Laura Bridgman,” 227; Smith, *The People’s Health* (→n.76) 136-41, suggesting that the presumed decline in scarlet fever’s virulence was due to a diagnostic shift toward diphtheria; John Morris, “Scarlatina,” *The Sanitarian* 1 (Feb. 1874) 500-501; John Duffy, *Epidemics in Colonial America* (Louisiana State U, 1953) ch. 3 on diphtheria and scarlet fever, updated and extended by Gerald N. Grob, *The Deadly Truth: A History of Disease in America* (Harvard U, 2002) esp. 192-95 on mortality and morbidity of infectious diseases in 1900; Hardy, *Epidemic Streets* (→n.9) 56-77; Floyd W. Denny, Jr., “History of hemolytic streptococci and associated diseases,” in *Streptococcal Infections*, eds. D. L. Stevens and E. L. Kaplan (Oxford U, 2000) 1-18; Job Lewis Smith, *A Treatise on the Diseases of Infancy and Childhood* (Phila, 1886) 182, 197, 199 on Eklund, 255, and cf. Alfred

Yankauer, "Job Lewis Smith and the germ theory of disease," *Pediatrics* 93,6 (June, 1994) 936-38; John T. Sullivan et al., "Medical inspection of schools from the standpoint of the medical inspector," *B Med Surgical J* 159 (1908) 819; A. R. Baker, "Should life insurance companies refuse to insure the lives of persons suffering from chronic suppuration of the middle ear?" *Cleveland Med Gazette* 3 (1887) 97-105, the insurance aspect confirmed by Wendell C. Phillips, "Ear manifestations in general diseases," *Albany Med Annals* 19 (1898) 300, and cf. William A. Dayton, "The duty of vigilance as to aural complications in acute infectious diseases," *Post-Graduate: J NY Post-Graduate Med School and Hospital* 3 (1888) 1-11. By 1912, meningitis was listed as the most frequent origin of non-congenital deafness (followed by whooping cough, scarlet fever, and measles) of students enrolled at the Michigan School for the Deaf, *Thirtieth Biennial Report* (Flint, 1912) at www.livgenmi.com/1912MIdeafschool~history.htm.

164. C. R. C. Borden, "Diseases of the middle ear and mastoid cells, based upon a study of 454 autopsies and 2232 cases of diphtheria, scarlet fever, and measles," *Trans 9th Intl Otological Congress*, ed. H. O. Reik (Baltimore, 1912) 98-112; Don M. Campbell, "The aural complications of scarlet fever," *Physician and Surgeon* 10 (1888) 193-200; Seth S. Bishop, "A clinical study of 21,000 cases of diseases of the ear, nose and throat," *JAMA* 27 (1896) esp. 701-702 on patients not seeking treatment until ear infections had reached a chronic stage. On epidemiology: Andrew D. Cliff et al., *Measles: An Historical Geography of a Major Human Viral Disease from Global Expansion to Local Retreat, 1840-1990* (Oxford: Blackwell, 1993) esp. 22-26 on complications, 319 on decline of mortality rates; Hardy, *Epidemic Streets*, ch. 2 on measles and public schools, ch. 4 on diphtheria (not recognized clinically until the 1850s), ch. 6 on typhoid; Wesley W. Spink, *Infectious Diseases: Prevention and Treatment in the Nineteenth and Twentieth Centuries* (U Minnesota, 1978) 183 on measles epidemics in wartime, 287-88 on epidemics of meningitis; Smith, *The People's Health*, 136-37 scarlet fever, 142-47 measles, 146-48 diphtheria, 237-43 typhus (a.k.a. jail fever, ship fever), 244-47 typhoid fever; Brent Hoff and Carter Smith III, *Mapping Epidemics: A Historical Atlas of Disease* (NY: Franklin Watts, 2000) 96-99; I. Friedmann et al., "Epidemic typhus fever and hearing loss: a histological study," *JLO* 107 (1993) 275-83. On mumps: M. M. Paparella, "Otological manifestations of viral disease," *Advances in Oto-Rhino-Laryngology* 20 (1973) 144-54; H. F. Maassab, "Role of viruses in sudden deafness," *ibid.*, 229-35; F. Comacchio et al., "MRI evidence of labyrinthine and eighth-nerve bundle involvement in mumps virus sudden deafness and vertigo," *J Oto-Rhino-Laryngology* 58 (1996) 295-97. Although the auditory brainstem is fully developed at birth, some aspects of hearing take years to mature (low-frequency resolution, temporal resolution, detection of tones in noise), so ototoxic childhood diseases may disrupt auditory development: Robert-Benjamin Illing, "Maturation and plasticity of the central auditory system," *Acta Otolaryngologica*, Suppl 552 (May 2004) 6-10. Finally, consider Udi Katzenell and Samuel Segal, "Hyperacusis: review and clinical guidelines," *Otology and Neurology* 22 (2001) 321-27, with retort by Pawel J. Jastreboff, who claims that hyperacusis is not as rare as Katzenell and Segal contend, a claim refined by A. G. Gordon, "'Hyperacusis' and origins of lowered sound tolerance," *J Neuropsychiatry and Clinical Neurosci* 12 (Feb. 2000) 117-20.

165. Albert H. Beck, "Goutiness in its relations to diseases of the ear," *Med Record* (May

22, 1897) 726-33; Charles H. Burnett, "The supposed connection between ear disease and kidney disease," *Polyclinic* 1 (1883-1884) 115-17; Phillips, "Ear manifestations in general diseases," 302 on enlarged adenoids; Charles H. Burnett, "Dependence of disease of the ear upon catarrhal disease of the nose," *Med News* 49 (July 10, 1886) 29-35, and recent discussion by Per Cayé-Thomasen et al., "Goblet cell density in acute otitis media caused by *Moraxella catarrhalis*," *Otology and Neurology* 22 (2001) 11-14. In each of these cases, permanent hearing loss is unlikely. Otologists in 1900 did not suspect the impact of Paget's disease or of diabetes and knew nothing of such ototoxic disorders as Tay-Sachs syndrome, cytomegalovirus, Rh incompatibility, or herpes zoster oticus. They may have encountered cases of deafness from chicken pox (another herpes virus, often mistaken for smallpox): Philip H. Beales, *Noise, Hearing, and Deafness* (L: Joseph, 1965) 48 pass.; Peter S. Roland et al., *Hearing Loss* (NY: Thieme, 1997) 203 on Ramsey-Hunt Syndrome.

166. Gunnar Alván et al., "Hearing impairment related to quinine plasma concentrations in healthy volunteers," *Brit J Clinical Pharmacology* 31 (1991) 409-12; A. K. Oh et al., "Deafness associated with abuse of hydrocodone/acetaminophen," *Neurology* 54 (2000) 2345 on morphine; Mary Anne Tan-Laxa et al., "Abnormal auditory brainstem response among infants with prenatal cocaine exposure," *Pediatrics* 113,2 (2004) 357-60; Susan L. Garetz and Jochen Schacht, "Ototoxicity: of mice and men," in *Clinical Aspects of Hearing*, eds. T. R. Van de Water et al. (NY: Springer, 1996) 116-54 on salicylates, as also Robert M. Raphael and Yong Zhou, "Effect of salicylate on the elasticity, bending stiffness, and strength of SOPC membranes," *Biophysical J* 89 (2005) 1789-1801. A few provisos here: Thomsonians and homeopathic doctors would have prescribed fewer ototoxic treatments; many drugs were adulterated and contained little of their "active" agent; aspirin is now being touted for antioxidant properties that may protect hair cells against damage by noise. For more on cocaine and aspirin: Dormandy, *The Worst of Evils* (→ n.22) ch. 35.

167. M. L. Duran-Reynals, *The Fever Bark Tree* (Garden City, 1946) 212, 215; Calvin Jones, *A Treatise on the Scarlatina Anginosa: or What Is Vulgarly Called the Scarlet Fever* (Catskill, 1794) 17, use of quinine; Proper Lemaistre, *Des effets physiologiques du sulfate de quinine* (P, 1850); Otis F. Manson, *A Treatise on the Physiological and Therapeutic Action of the Sulphate of Quinine* (Phila, 1882) throughout, q. 154 on dosages; Steven M. Stowe, *Doctoring the South: Southern Physicians and Everyday Medicine in the Mid-Nineteenth Century* (U North Carolina, 2004) 183, buzz; Margaret Humphreys, *Malaria: Poverty, Race, and Public Health in the United States* (Johns Hopkins U, 2001); Dundas Grant et al., "The use of quinine in the treatment of aural vertigo, with discussion," *Trans 9th Intl Otological Congress* (1912) 567-73; Y. Ishii et al., "Palatability, food intake and the behavioural satiety sequence in male rats," *Physiological Behavior* 80 (Oct. 2003) 37-47, effects of quinine.

168. A. Vicentic and D. C. Jones, "The CART system in appetite and drug addiction," *J Pharmacology and Experimental Therapeutics* (July 13, 2000); Seth S. Bishop, "Cocaine and other anodynes in otology," *JAMA* 6 (1886) 200-203; Joseph F. Spillane, *Cocaine: From Medical Marvel to Modern Menace in the United States, 1884-1920* (Johns Hopkins U, 2000) 7-24, 33-35, 53-62, 73-87.

169. Jørgen Falbe-Hansen, tr. Hans Andersen, *Clinical and Experimental Histological Studies on Effects of Salicylate and Quinine on the Ear* (Copenhagen, 1941); Charles H.

Burnett, "The permanent alterations in hearing produced by quinine and salicylic acid," *Polyclinic* 3 (1885-1886) 54-55; Dennis Mcfadden et al., "Aspirin-induced hearing loss as a model of sensorineural hearing loss," *Hearing Research* 15,3 (1984) 251-60.

170. Gustav Brühl, with Adam Politzer, *Atlas and Epitome of Otology*, ed. S. M. Smith (Phila, 1902) 71; Walter Hoffmann-Axthelm, *History of Dentistry*, tr. H. M. Koehler (Chicago: Quintessence, 1981) 400-406; Phillips, "Ear manifestations in general diseases" (→ n.162) 300; Thomas Howard, *On the Loss of Teeth and Loose Teeth and on the Best Means of Restoring Them* (L, 1861) q. 7, 13; Helene Whitbread, ed., *I Know My Own Heart: The Diaries of Anne Lister (1791-1840)* (L: Virago, 1988) 132 on mixture; advertisements in *Dental Cosmos* 2 (1861) 238 and 17 (1875) 51; Robert T. Cooper, "The wisdom-teeth and deafness," *ibid.* 24 (1882) 159; Edward Woakes, "Ear affections in childhood from dentition of a carious tooth," *ibid.*, 274; [J. T. Codman], "Noises by the movement of the condyloid processes," *ibid.* 21 (1879) 407; D. M. Watt and P. M. McPhee, "An analysis of temporo-mandibular joint sounds," *J Dentistry* 11,4 (1983) 346-55. Among the causes of mouth problems was the use of calomel, the most frequently prescribed medication (1800-1860); used against constipation or indigestion, calomel was essentially chromic mercury, which increased salivation and attacked the teeth and jawbone: James C. Whorton, *Inner Hygiene: Constipation and the Pursuit of Health in Modern Society* (Oxford U, 2000) 48.

171. Sarah Nettleton, "Inventing mouths: disciplinary power and dentistry," *Reassessing Foucault: Power, Medicine, and the Body*, eds. C. Jones and R. Porter (L: Routledge, 1994) 73-90; Alyssa Picard, *Making the American Mouth: Dentists and Public Health in the Twentieth Century* (Rutgers U, 2009) ch. 1; Manson, *A Treatise*, 39-41; "Speed of Drill" display, Historical Museum of Medicine and Dentistry, Hartford, CT; White (S.S.) Dental Mfg Co, Papers, 1847-1970, Box 174, Scrapbook, "The S.S. White Dental Manufacturing Company and its relation to electricity in dentistry," esp. advertisement no. 22 for a "quiet-running" Dental Engine Speed Regulator, and Box 114, patent 317,023 (March 11, 1890) improvement upon the Arwed Retter Dental Drill, at Hagley Museum and Library, Wilmington, DE; Ritter Dental Mfg Co., *A Catalogue of Ritter Dental Equipment* (Rochester, 1919) 25, motors running "with practically no noise"; W. H. Dwinelle, "Rapid operations," *Dental Cosmos* 19 (1877) 12-18; [Responses to E. H. Neill in *re* mechanical dentistry], *ibid.* 24 (1882) 40; S. H. Guilford, "Burrs in their relation to pain," *ibid.*, 506, dentists abandoning dentistry because they feel the "intense nervous strain" of their patients' pain; http://en.wikipedia.org/wiki/Dental_amalgam_controversy; Maury Massler and Isaac Schour, "Dental diseases of occupational origin," *Atlas of the Mouth in Health and Disease* (Chicago, 1958) unpaginated chart; Wendy A. Woloson, *Refined Tastes: Sugar, Confectionary and Consumers in Nineteenth-Century America* (Johns Hopkins U, 2002) 6, noting that Americans by 1909 were consuming 75 percent more sugar per capita than in 1879, ten times as much as in the 1790s; Bill Albert and Adrian Graves, eds., *Crisis and Change in the International Sugar Economy, 1860-1914* (Norwich: ISC, 1984) editors' intro. and the essay by Philippe Chalmin, "The world sugar economy before 1914," 1-19; Whorton, *Inner Hygiene*, 48; Turnbull, *Imperfect Hearing* (→ n.138) xxi; John Woodforde, *The Strange Story of False Teeth* (L: Routledge & Kegan Paul, 1968) 33-34, 51, 58, 62-63, 67, 73, 76, 78, q. 87, 88; Hoffmann-Axthelm, *History of Dentistry*, 264 rubber base, 276 porcelain teeth,

287–92 amalgam fillings, 344 cocaine, and 299–310 for the history of the dental drill and its electrification.

172. Frances Wheen, *Karl Marx: A Life* (L: Fourth Estate, 1999) 376.

173. Arthur G. Webster, “Absolute measurements of sound,” *Proc Royal Inst Great Britain* 23 (June 10, 1921) 1–7 on efforts to devise a portable instrument to measure “the intensity or loudness of any sound,” prior to electrical audiometry; Curtis, *Observations* (→ n.142) 41; Dr. [W. E.] Horner, “Diseases of the ear—(continued),” [*Phila*] *Med Examiner and Retrospect of the Med Sci* 2 (Feb. 23, 1839) 123–27, q. 127; Clarence J. Blake, “Report on the progress of otology,” offprint of talk before Amer Otological Soc (July 17, 1872) p. 43 on Dr. J. S. Prout’s 1869 proposal for a formula; Barr, *Manual* (→ n.157) 27; B. Alexander Randall, draft for first chapter of a book (*American Text-book of Diseases of the Eye, Ear, Nose, and Throat* [1899]?), pp. 1–3, in Burton Alexander Randall Collection, Box 2, f. 7, Lib of the John Q. Adams Center for the History of Otolaryngology—Head and Neck Surgery, Alexandria, Virginia; Buck, *Diagnosis and Treatment of Ear Diseases* (n.139) 18, critique of tests using spoken words; D. B. St. John Roosa, “The disproportion between the power of hearing the tick of a watch and the human voice,” *Amer J Mental Sci* 73 (1877) 50–58.

174. Turnbull, *Imperfect Hearing* (→ n.138) xvii, visit to Politzer’s offices in 1879; Sylvan Stool et al., “Adam Politzer, otology, and the Centennial Exhibition of 1876,” *Laryngoscope* 85 (Nov. 1975) 1898–1904; Barr, *Manual*, 27, sharp click; Charles S. Myers, *A Text-Book of Experimental Psychology with Laboratory Exercises* (Camb, 1911) 74–75; Byron J. Bailey, “The dawn of audiology and modern otology,” *Laryngoscope* 107,4 (1997) 431–40, q. 431; H[erman Jacob] Knapp, “On the desirability of adopting a uniform method of expressing the results of testing the acuteness of hearing,” *Trans Amer Otological Soc* 3 (1882–1886) 349–59; E. W. Johnson, “Tuning forks to audiometers and back again,” *ibid.* 80 (Jan. 1970) 49–68; Fred W. Kranz, “Audiometer: principles and history,” *Sound* 2,2 (1963) 20–25, at 22; Robert S. Stevenson and Douglas J. Guthrie, *A History of Oto-Laryngology* (Edinburgh, 1949) 125; Edgar H. Holmes, “Aural complications of typhoid fever,” *Med Communications Mass Med Soc* 17,2 (1897) 475–502. On the whistle, which produces tones at and above human auditory thresholds: Francis Galton, *Inquiries into Human Faculty and Its Development*, 2nd ed. (L, 1907) 26–28, 252–54. On making tuning forks and tonometers more precise: Jackson, *Harmonious Triads* (→ n.80) 111–82.

175. Frederick W. Taylor, *The Principles of Scientific Management* (NY: Norton, 1967 [1911]) 60 n.1; Daniel Nelson, *Frederick W. Taylor and the Rise of Scientific Management* (U Wisconsin, 1980) esp. 8–9, 11, 41–43, 73; Frank B. Gilbreth, *The Field System* (1911) and *Fatigue Study* (1916) in William R. Spriegel and Clark E. Myers, eds., *The Writings of the Gilbreths* (Homewood, 1953) 11, 308–10.

176. “Brooklyn a noisy town and the reasons why,” *Brooklyn Eagle* (June 26, 1901) 20; “Redfield’s novel argument,” *ibid.* (March 2, 1902) 40; Steven J. Diner, *A Very Different Age: Americans of the Progressive Era* (NY: Hill and Wang, 1997) 94–98; Randolph S. Bourne, *The Gary Schools* (B, 1916) as excerpted in Robert H. Bremner, ed., *Children and Youth in America: A Documentary History. Vol. II. 1866–1932. Parts 7–8* (Harvard U, 1971) 1140–43, q. 1142 on “alley time”; Mike Dillon, “Buildings and betterment: influences on the design of [Australian] state school buildings, 1900–1920,” *Intl Educ J* 2,2 (2001) 109–15; William

G. Bruce, *School Architecture* (Milwaukee, 1906) 23; William W. Cutler, III, "Cathedral of culture: the schoolhouse in American educational thought and practice since 1820," *H Educ Q* 29,1 (Spring 1989) 25-26 on auditoriums; T. Roger Smith, *Acoustics in Relation to Architecture and Building* (L, 1895) 133-34; John S. Hart, "Methods of hearing recitations," in *American Pedagogy*, ed. Henry Barnard (Hartford, 1876) 415-16. Later studies of city schools encountered the same problems: Frederick L. Devereux, "Better acoustics for the school," *Architectural Record* 79 (1936) 499-502; Italia Boninelli et al., *Classroom Acoustics and Auditory Figure-Ground Discrimination* (Pretoria, 1981) 5, young children in school require a higher signal-to-noise ratio than do adults. Cf. Colleen F. Moore, *Silent Scourge: Children, Pollution, and Why Scientists Disagree* (Oxford U, 2003) ch. 5, "Noise and children's development."

177. Richard Müller, tr. J. A. Spalding, "Effect of artillery practice on the ears," *Archives of Otolology* 28 (1899) 264-71, q. 264; Arthur Jaehne, "Untersuchungen über Hörstörungen bei Fussartilleristen," *Z für Ohrenheilkunde* . . . 62 (1911) 111-34; J. Ward Cousins, "New ear-protection for the prevention of the injurious effects of cold and noise," *Brit Med J* 2 (1881) 1050; John G. Liversidge, *Engine-Room Practice: A Handbook for the Royal Navy and Mercantile Marine*, 11th ed. (L, 1923) 221 on voice pipes. On Maxim's silencers, see pp. 614-18 (TK).

178. Joseph A. Guthrie, "The unhealthfulness of noise," *NY Med J* (July 9, 1904) 60-62, q. 61 on towboats; Capt. Ernest L. Bennett, Papers, "Journal/Log 1894-99," pp. 35-38 on bells and whistles, 56 on St. Thomas, 89-99 (June 1895) on the canal, in Operational Archives Branch, Naval Historical Center, DC; Charles Taze Russell, *Studies in the Scriptures: IV. The Battle of Armageddon* (Brooklyn, 1897) 155, citing the "Pageant of oppression," a *Minneapolis Times* editorial, at www.nsbible.org/sites_v4/v4s5.htm; "Palisades echo to roar of guns as Secretary of Navy inspects nation's greatest show of naval power," *NY Herald* (Nov. 2, 1911), in George von Lengerke Meyer Papers, Scrapbook 1909-1913, vol. 60, Massachusetts Historical Soc, Boston, as also his Naval Papers (1), Box 34, f. 6 on firing speeds and scientific management; "War on noise to start here," *B Evening Record* (Aug. 6, 1912), reference to work being done "by Secretary Meyer to abate noise on battleships by the laying down of thick linoleum"; Wayne A. Wiegand, *Patrician in the Progressive Era: A Biography of George Von Lengerke Meyer* (NY: Garland, 1988) 15, his campaigns against street peddlers and trolleys; G. B. Tribble, "Ear protection," *US Naval Med Bulls* 20,13 (1919) 48-60 on naval deafness, with an analysis of the ear stoppers used by American and British navies at the start of the Great War.

179. Audrey B. Davis, "Life insurance and the physical examination," *Bull H Med* 55,3 (1981) 392-406; John L. Davis, "Practical life insurance examinations," *JAMA* 25 (1895) 524-26; John Collie, *Malingering and Feigned Sickness* (L, 1913).

180. George M. Gould, "A system of periodic biologic examinations," *JAMA* 35 (1900) 134-37; Rosen, *Preventive Medicine* (→ n.156) 58; Paul K. J. Han, "Historical changes in the objectives of the periodic health examination," *Annals Internal Med* 127 (Nov. 15, 1997) 910-17; Stanley J. Reiser, "The emergence of the concept of screening for disease," *Milbank Memorial Fund Q: Health and Soc* 56 (1978) 403-25. Among the first to insist on yearly family check-ups was Taylor: Robert Kanigel, *The One Best Way: Frederick Winslow Taylor*

and *the Enigma of Efficiency* (NY: Viking, 1997) 421.

181. Hans Gross, *Criminal Psychology: A Manual for Judges, Practitioners and Students*, tr. H. M. Kallen from 4th ed. (Montclair: Patterson Smith, 1968 [1911]) 211–12 on poor hearing among adults over fifty, due to years at “manual labor and other noisy occupations of men.” On early hearing aids, I am grateful for the opportunity to listen through the collection at the Volta Bureau, DC, and the Goldstein Collection at the Central Institute for the Deaf, St. Louis, the latter described in Mary Lou Koelkebeck et al., *Historic Devices for Hearing* (St. Louis: Central Inst for the Deaf, 1984). Little work has been done on attitudes toward those with partial hearing loss; cf. Martha S. Holmes, *Fictions of Affliction: Physical Disability in Victorian Culture* (U Michigan, 2004) ch. 5 on Harriet Martineau; Lennard Davis, *Enforcing Normalcy: Disability, Deafness, and the Body* (L: Verso, 1995). For a more modern fiction interweaving Victorian, surreal, and postmodern motifs: Leonora Carington, *The Hearing Trumpet* (NY: St. Martin’s, 1976).

182. B. Alex Randall, “The hygienic and scientific value of examination of the eyes and ears of school children,” *JAMA* 25 (1895) 400–402, six minutes or less; Chapin, *Municipal Sanitation* (→ n.81) 784, 789, 791 on Boston and Chicago; J. T. Sullivan et al., “Medical inspection of schools from the standpoint of the medical inspector,” *B Med Surgical J* 159 (1908) 815–20; Irving Fisher, *A Report on National Vitality* (DC, 1909) 73, 75 (by 1908 over 100 U.S. cities had school medical inspections); Sara J. Baker, *Fighting for Life* (NY, 1939) 51–57, 153; Joseph Schneider, “Influence of ear diseases upon the mental and physical development of a child,” *Trans Wisconsin Med Soc* 26 (1892) 48–59, German statistics, as also [Gustav Brühl], “Der Hörfähigkeit der Schulkinder,” *Z für Schulgesundheitspflege* 16 (1903) 240–41; Smith, *The People’s Health* (→ n.48) 182; Samuel Sexton, *Causes of Deafness among School Children and Its Influences on Education*, Bureau of Education Circular #5 (DC, 1881) 11, 17. For projections using prewar and postwar data: Edward P. Fowler and Harvey Fletcher, “Three million deafened children,” *JAMA* 87 (1926) 1877–82. More recently: David J. Lee et al., “Prevalence of unilateral hearing loss in children. The National Health and Nutrition Examination Survey (HANES) II and Hispanic Health and Nutrition Examination Survey (HHANES),” *Ear and Hearing* 19 (1998) 329–33.

183. Maurice Lannois, *Précis des maladies de l’oreille, du nez, du pharynx, et du larynx* (P, 1908) I,1, 114–16, 533, one in three; Brühl, *Atlas and Epitome* (→ n.169) 274; Gélineau, *Hygiène de l’oreille* (→ n.113) 1; U.S. War Dept., *Instructions for the Physical Examination of Drafted Men at National Army Cantonments* (DC, 1917); idem, *Physical Examination for Entrance into the Army of the United States by Voluntary Enlistment or by Induction* (DC, 1918) 10–11; Albert G. Love and Charles B. Davenport, *Defects Found in Drafted Men* (DC, 1920) 64, q. 79, 80, 93, 117–19, 177–78, 200, 205–206, 277–78, 352, 364, 368–69. On the English: Davis Silbey, “Bodies and cultures collide: enlistment, the medical exam, and the British working class, 1914–1916,” *Social H of Med* 17,1 (2004) 61–76; J. M. Winter, “Military fitness and civilian health: Britain during the First World War,” *J Contemporary H* 15 (1980) 211–44. For a retrospective: George St. J. Perrott, “Some public health implications of selective service rejections,” *Bull NY Acad Med* 43 (1947) 420–35.

184. James Galloway et al., for the Ministry of National Service, *Report upon the Physical Examination of Men of Military Age by National Service Medical Boards from November*

1st 1917–October 31st 1918 in British Sessional Papers, 1919, XXVI, Cmd 504, pp. 335, 357; Rosen, *Preventive Medicine*, 5; Hector F. Deluca, “Historical perspective,” in *Vitamin D*, eds. David Feldman et al., 2nd ed. (Amsterdam: Elsevier, 2005) 3–14; Rod Graham, “From Kansas Farm Boy to ‘Dr. Vitamin,’” [*Johns Hopkins U*] *Gazette Online* 30,5 (Oct. 2, 2000) at www.jhu.edu/~gazette/2000/octo2000/02mccoll.html; Elmer V. McCollum, *From Kansas Farm Boy to Scientist* (U Kansas, 1964) 14–15, 165–73 on vitamin D, 211–12 on his own health; Michèle Garabédian and Hanifa Ben-Mekhbi, “Rickets and Vitamin D deficiency,” in *Vitamin D: Physiology, Molecular Biology, and Clinical Applications*, ed. Michael F. Holick (Totowa: Humana, 1999) 273–86; Stephen Cohen and Gerald L. Becker, “Origin, diagnosis, and treatment of dental manifestations of Vitamin-D resistant rickets,” *J Amer Dental Assoc* 92,1 (1976) 120–29; Gerald B. Brookes, “Vitamin D deficiency—a new cause of cochlear deafness,” *JLO* 97,5 (1983) 405–20; idem, “Vitamin D deficiency and deafness: 1984 update,” *Amer J Otolology* 6,1 (1985) 102–107; A. Rabié et al., “Cholecalciferin (28-kDa CaBP): a key component in sensory pathways?” *Vitamin D: Chemical, Biochemical and Clinical Update*, eds A. W. Norman et al. (Berlin: Walter de Gruyter, 1985) 373–74; Love and Davenport, *Defects Found in Drafted Men*, 79–80. A genetic inability of the kidneys to process D may also lead to rickets with ear involvement: R. Vargas-Poussou et al., “Genetic investigation of autosomal recessive distal renal tubular acidosis: evidence for early sensorineural hearing loss associated with mutations in the ATP6VOA4 gene,” *J Amer Soc Nephrology* 17 (2000) 1437–43. B-vitamin (thiamine, niacin, cobalamin) deficits have also been linked to hearing loss; conversely, high levels of such antioxidants as vitamins C and E and the co-enzymes alpha lipoic acid and Q10 may protect against tinnitus, noise-induced hearing loss, and age-related hair cell loss, as may trace elements such as zinc and magnesium: B. Sergi et al., “The role of antioxidants in protection from ototoxic drugs,” *Acta Otolaryngologica*, Suppl 552 (May 2004) 42–45.

185. Richard B. Tennant, *The American Cigarette Industry* (Yale U, 1950) 16–17; Susan Wagner, *Cigarette Country: Tobacco in American History and Politics* (NY: Praeger, 1971) 33, 41–44; Tara Parker-Pope, *Cigarettes: Anatomy of an Industry from Seed to Smoke* (NY: New Press, 2001) 12. On nicotine ototoxicity: Karen J. Cruickshanks, “Cigarette smoking and hearing loss: the epidemiology of hearing loss study,” *JAMA* 279 (June 3, 1998) 1715–19; S. Ferrite and V. Santana, “Joint effects of smoking, noise exposure and age on hearing loss,” *Occup Med* 55 (2005) 48–53; Yasue Uchida et al., “Is there a relevant effect of noise and smoking on hearing?” *Intl J Audiology* 44,2 (2005) 86–91.

186. Lannois, *Précis des maladies de l’oreille*, 129; Samuel Sherwell, “A case of xanthoma diabetorum,” *J Cutaneous and Genito-Urinary Diseases* 18 (1900) 387–94, repr. with notes in *Archives of Dermatology* 136 (2000) 1100; Fisher, *Report on National Vitality*, 32, diabetes rate; Venkata Kakarlapudi et al., “The effect of diabetes on sensorineural hearing loss,” *Otology and Neurotology* 24,3 (2003) 382–86; Nancy Vaughan et al., “A five-year prospective study of diabetes and hearing loss in a veteran population,” *ibid.* 27 (Jan. 2006) 37–43, high-frequency hearing loss is more common among diabetics.

187. With declining rates of infanticide and more charitable funds devoted to educating the deaf, the percentage of the congenitally deaf who lived to adulthood was also rising. For 19th-century ratios of “deaf and dumb” individuals to national populations (highest

in Switzerland): William Farr, *Vital Statistics* (Metuchen: Scarecrow, 1975 [1885]) 56–57; M. Dasent, “Nombre des sourds et muets en Europe,” *La Santé publique* 1 (May 1, 1872) 7.

188. Galton, *Inquiries into Human Faculty*, 26 (→ n.173); Hendrik Zwaardemaker, “The presbycusis law,” *Archives of Otolology* 23 (1894) 228–33, using Galton’s whistle to prove the contraction of hearing ranges with age; Swan M. Burnett, “The relative frequency of ear diseases in the white and colored races in the United States,” *Archives of Otolology* 16 (1887) 294–96; W. Dixon Ward, “Noise-induced hearing loss: research since 1973,” in *Proc Third Intl Congress on Noise as a Public Health Problem*, eds. Jerry V. Tobias et al. (Rockville: ASHA, 1980) 70 on African-Americans and the blue-eyed; Elisabeth S. Smith and Herbert Riechelmann, “Cumulative lifelong alcohol consumption alters auditory brainstem potentials,” *Alcoholism: Clinical and Experimental Research* 28,3 (2004) 508. Data on racial differences in hearing loss remain controversial: J. C. Cooper, Jr., “Health and Nutrition Examination Survey of 1971–75: Part I. Ear and race effects in hearing,” *J Amer Acad Audiology* 5 (1994) 30–36; Lee et al., “Prevalence of unilateral hearing loss in children” (→ n.181). On men and guns, I have benefitted from an interview with a retired physicist, hunter, and hearing-aid wearer, Donald Swanson, Pomona, CA, Jan. 18, 1999; cf. John D. C. Bennett and John R. Young, *Offbeat Otolaryngology* (NY: Thieme, 2001) 59–60. As for gender distinctions, research in the 1980s suggested that women, found to have better hearing than men unless themselves hunters or industrial workers, experience temporary hearing loss or lagging auditory response during menstrual cycles. Although these results have not been followed up, Dafydd Stephens et al. have established the ototoxic effects of progesterone therapy in post-menopausal women: “The epidemiology of hearing problems,” *Acta Otolaryngologica*, Suppl 552 (May 2004) 11–13. Cf. Jürgen Hellbrück, “Do women evaluate sound in a different way than men?” in *Contributions to Psychological Acoustics*, eds. August Schick et al. (Oldenburg U, 1986) 238–51, proposing that women, who tend to judge tones to be louder than they (“absolutely”) are, remove themselves from loud milieux more quickly than do men, so suffer less noise-induced hearing loss; Mary B. Parlee, “Menstrual rhythms in sensory processes,” *Psych Bull* 93 (May 1983) 539–48; Janice L. Andreyko and Robert B. Jaffe, “Use of a gonadotropin-releasing hormone agonist analogue for treatment of cyclic auditory dysfunction,” *Obstetrics and Gynecology* 74 (1989) 506–509; P. Guimares et al., “Progesterin negatively affects hearing in aged women,” *Proc National Acad Sci* 103 (Sept. 2006) 14246–49. The criminologist Hans Gross used what was known of age and gender differences in hearing acuity in 1905 to describe the trickiness of auditory witnessing: *Criminal Psychology: A Manual for Judges, Practitioners, and Students*, tr. Horace M. Kallen from 4th ed. (Montclair: Patterson Smith, 1968 [1911]) 208–12.

189. U.S. War Department, *Scheme for History and Examination of Mental Cases*, Circular no. 12 (DC, 1913) 6.

190. I rely here upon John G. Neuhoff, ed., *Ecological Psychoacoustics* (B: Elsevier, 2004): Neuhoff’s “Introduction and history,” q. 5; Rhodri Cusack and Robert P. Carlyon, “Auditory perceptual organization inside and outside the laboratory,” 15–48, esp. 42 on hearing loss; David Van Valkenburg and Michael Kubovy, “From Gibson’s fire to gestalts,” 113–47, q. 114 on “echology”; Lawrence D. Rosenblum, “Perceiving auditory events,” 219–48; Robert S. Schlauch, “Loudness,” 317–45.

191. Peiss, *Cheap Amusements* (→ n.48); “A mechanical duel with disastrous results,” *Boilermakers J* 8 (1896) 303.

192. Scott Rutherford, *The American Roller Coaster* (Osceola: MBI, 2000) 12–14; H. M. Alden, “The Pennsylvania coal region,” *Harper’s New Mo Mag* 27 (Sept. 1863) 455–67; Mauch Chunk Museum, Local History, <http://mauchchunkmuseum.com>; Clint Chamberlin, “Mauch Chunk Switchback Railroad,” www.northeast.railfan.net/mauch_chunk.html; “Summary of anthracite accidents in which five or more persons were killed, 1847–2000,” https://www.dep.state.pa.us/dep/deputate/minres/bmr/annualreport/2000/table_03.htm; “Another terrible mining disaster in Pennsylvania,” *NY Times* (Dec. 19, 1869) 1:1; David Kuchta, “The discovery of anthracite coal and how it led to the driving of the Number 9 Mine in Landsford, Pa.,” at www.tccweb.org/penncoal.htm (wr. 1930–1940).

193. Robert Cartmell, *The Incredible Scream Machine: A History of the Rollercoaster* (Bowling Green: Amusement Park, 1987) esp. 4–5, 86, 117; Jones and Wills, *Invention of the Park* (→ n.49) 92–126; LeRoy Ashby, *With Amusement for All: A History of American Popular Culture since 1830* (U Press of Kentucky, 2006) 135–38, q. 139 Cannon Coaster; Woody Register, *The Kid of Coney Island: Fred Thompson and the Rise of American Amusements* (Oxford U, 2001) 116–17 on Van Kannel; Rutherford, *American Roller Coaster*, 15–22, 27–28, 64–65; Jeffrey L.H. Tank, “History of the motorcycle, III: early racing,” www.virginiawind.com/byways/history_03.asp on motordromes.

On “The Scream,” whose fiery sky recalled sunsets created by clouds of ash sent skyward by the eruption of Krakatoa in 1883; Donald W. Olson et al., “When the sky ran red: the story behind *The Scream*,” *Sky & Telescope* 107 (Feb. 2004) 28; Sue Prideaux, *Edvard Munch: Behind the Scream* (Yale U, 2005) 150–52; Paul Erik Tøjner, *Munch: In His Own Words* (Munich: Prestel, 2003) 41–42, 62, 69, 91–92, q. 96, 97–98, q. 132; Robert Rosenblum, ed., *Edvard Munch: Symbols and Images* (DC: Natl Gallery of Art, 1978) 8; Reinhold Heller, “‘Could only have been painted by a madman’—or could it?” in *Edvard Munch: The Modern Life of the Soul*, ed. Kynaston McShine (NY: MOMA, 2006) 17–31.

194. “Two killed in air on roller-coaster,” *NY Times* (Sept. 4, 1911) 1:7, quoted in Arwen P. Mohun, “Designed for thrills and safety: amusement parks and the commodification of risk, 1880–1929,” *J Design H* 14 (2001) 291–306, q. 291; Alan G. Barbour, *Cliffhanger: A Pictorial History of the Motion Picture Serial* (NY: A & W, 1977) 15–16; Bernhard Rieger, *Technology and the Culture of Modernity in Britain and Germany, 1890–1945* (Camb U, 2005) q. 52; Dennis Nartker, “Kendallville theater survives decades of changes,” *The News-Sun* (2000?) at www.kpcnews.net/special-sections/reflections2/reflections6.html; Donald Hyslop et al., *Titanic Voices* (NY: St. Martin’s, 1994) 205, cable noise.

195. Steven Biel, *Down with the Old Canoe: A Cultural History of the Titanic Disaster* (NY: Norton, 1996) 133, megaphones; Michael Davie, *Titanic: The Death and Life of a Legend* (NY: Knopf, 1987) 20, 30, 78 Thayer, 86–91 on the Duff-Gordons; Hyslop et al., *Titanic Voices*, 122 Hart, 146 Scarrott, 286 Haisman; Stephen J. Spignesi, *The Complete Titanic* (Secaucus: Birch Lane, 1998) 183, Dr. Dodge’s wife; Jay H. Mowbray, *Sinking of the Titanic: Most Appalling Ocean Horror* (Harrisburg, 1912) 188 Barkworth, 214 Beesley (or Beasley), 217–18 Lady Duff-Gordon. A fine website is www.encyclopedia-titanica.org and at /

item/5031 an article in the *Toronto World* (April 17, 1912) discusses what was heard, what was heard badly, and what was not heard at all by way of wireless messages from the *Titanic* just before and during the disaster, and cf. Jeffrey Sconce, *Haunted Media: Electronic Presence from Telegraphy to Television* (Duke U, 2000) 72-74.

196. Davie, *Titanic*, 28, on its near-miss (by four feet) of the *Saratoga* / *New York*, which we last heard with its gun salutes at the Kiel Canal in 1895, and was the flagship of the U.S. fleet at Santiago during the Spanish-American War; Stephen Bottomore, *The Titanic and Silent Cinema* (Hastings: Projection Box, 2000) 50-68 on slideshows, 85-89 on *Olympic* substitutions and actual *Titanic* footage, 109-13 on Gibson, and throughout.

197. Eileen Bowser, *The Transformation of Cinema, 1907-1915* (NY: Scribner's Sons, 1990) 13-19; Kathryn H. Fuller, *At the Picture Show: Small-Town Audiences and the Creation of Movie Fan Culture* (DC: Smithsonian, 1996) 69, automatic pianos; Scott Eyman, *The Speed of Sound: Hollywood and the Talkies Revolution, 1926-1930* (NY: Simon and Schuster, 1997) 25-26, noting that by the 1920s more American musicians were employed in cinemas than in any other venue; James P. Kraft, *Stage to Studio: Musicians and the Sound Revolution, 1890-1950* (Johns Hopkins U, 1996) 34-37 on photoplayers, 43 on organs; John W. Landon, *Behold the Mighty Wurlitzer: A History of the Theatre Pipe Organ* (Westport: Greenwood, 1983) 5, 11-13, 24-34; Gregory A. Waller, *Main Street Amusements: Movies and Commercial Entertainment in a Southern City, 1896-1930* (DC: Smithsonian, 1995) 150; "A word about the Drummers' Club," *The Overture [Amer Federation of Musicians]* 1 (April 1, 1921) 8; Raymond Fielding, "The technological antecedents of the coming of sound," in *Sound and the Cinema: The Coming of Sound to American Film*, ed. Evan W. Cameron (Pleasantville: Redgrave, 1980) 4-5, actors and Noiseographs; S. de Serk, *Les Bruits de coulisse au cinéma* (P, 1914) on the need for, and use of, sound-effects in cinema; W. Stephen Brush, "When 'effects' are unnecessary noises," *Moving Picture World* (Sept. 9, 1911) 690, and cf. Stephen Bottomore, "The story of Percy Peashaker: debates about sound effects in the early cinema," in *Sounds of Early Cinema*, eds. R. Abel and R. Altman (Indiana U, 2001) 129-42, as also, same vol., Jean Châteauevert and André Gaudreault, "The noises of spectators, or the spectator as additive to the spectacle," 183-91; Miriam Hansen, *Babel and Babylon: Spectatorship in American Silent Film* (Harvard U, 1991) 95-97 on middle-class efforts to impose silence in early movie theaters; André Gaudreault, "Bruitage, musique et commentaires aux débuts du cinéma," *Protée* 13,2 (1985) 25-29; "Patrons Avoid Noise," movie theater notice (1930s), in the Prelinger Collection, www.movies10.archive.org. Rick Altman furnishes an outline of, and a critique of received opinions about, sound in early film: "Introduction: Sound/History," in *Sound Theory Sound Practice*, ed. Altman (NY: Routledge, 1992) 113-25. Perhaps the most intriguing and imaginative sound analysis of silent films, especially of the "Edison Kinetoscopic Record of a Sneeze, January 7, 1894," and "the Kiss," is Jonathan Auerbach's interlude, "The vocal gesture: sounding the origins of cinema," in his *Body Shots: Early Cinema's Incarnations* (UC, 2007) 63-81. For an explicit analysis of noise in and around silent films: Dennis Hanlon, "The roar of *The Crowd*: urban noise and anti-noise in silent cinema," *Mosaic* 42,2 (2009) 73-88.

198. David Nasaw, "Children and commercial culture: moving pictures in the early twentieth century," in *Small Worlds: Children and Adolescents in America, 1850-1950*, eds.

E. West and P. Petrik (U Press of Kansas, 1992) 14–25, q. 21; Steven Mintz, *Huck's Raft: A History of American Childhood* (Harvard U, 2004) 169, three-quarters of post-Civil War autobiographers describe being beaten “with some sort of instrument” as a child, and (p. 182) 2,000,000 American children were still at work in mines, mills, and factories in 1900; Lynne A. Werner and Lori J. Leibold, “Ecological developmental psychoacoustics,” in Neuhoﬀ, ed., *Ecological Psychoacoustics* (→ n.190) 191–217.

199. John B. Goesse and George E. Rueppel, “The Geophysical Observatory: Meteorology in St. Louis University,” *Bull St. Louis U* 8 (April 1912) 1–55—Rueppel had assisted Odenbach at St. Ignatius College in Cleveland; James B. Macelwane, “Odenbach, Frederick Louis,” *Dict Amer Biog*, Suppl 1–2 (1958) 579–80; John J. Grabowski and David D. Van Tassel, comps., “Odenbach, Frederick L.,” *Encyclopedia of Cleveland History* (1997) at <http://ech.case.edu>.

200. Hesiod, *Theogony and Works and Days*, tr. M. L. West (Oxford U, 1988) 27; Howard Frisinger, “Meteorology before Aristotle,” *Bull Amer Meteorological Soc* 52 (1971) 1078–80; Aristophanes, *Clouds*, tr. Moses Hadas (NY, 1962 [423 BCE]) 112–13; Lily Ross Taylor, *Roman Voting Assemblies* (U Michigan, 1966) 77, 87–88; Thelma H. Bell, *Thunderstorm* (NY, 1960) 17 on Tiberius, relying upon Suetonius, and cf. Sextus Empiricus, *Against the Musicians* (*Adversus musicos*), tr. Denise D. Greaves (U Nebraska, 1986) 141, Epicurean naturalist explanation of thunder; Rabbi Shelomo Almoli, *Dream Interpretation from Classical Jewish Sources*, tr. Yankov Elman (Hoboken: Ktav, 1998) 118; Leigh Eric Schmidt, *Religion, Illusion, and the American Enlightenment* (Harvard U, 2000) 61–64; Blavignac, *La Cloche* (→ n.71) 154–62; J. L. Heilbron, *Electricity in the Seventeenth and Eighteenth Centuries* (UC, 1979) 341, bell-ringers; *Annual Register, or a View of the History, Politics, and Literature for the Year 2* (1759) 103; Edmund Burke, *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful*, ed. J. T. Boulton (L, 1958 [1757]) sect. XVII, 82.

201. Richard C. Rath, *How Early America Sounded* (Cornell U, 2003) 10–42; Ursula B. Marvin, “Ernst Florens Friedrich Chladni and the origins of modern meteorite research,” *Meteoritics and Planetary Sci* 31 (1996) 545–88; Cuthbert Girdlestone, *Jean-Philippe Rameau* (L, 1957) 139–40; Izaak Walton, *The Compleat Angler*, ed. Richard LeGallienne (L, 1897 [from 5th ed., 1676]) I, 135; Samuel Molyneux, “A relation of the strange effects of thunder and lightning,” *Phil Trans* 26 (1709) 36–40; Joseph Nelson, “A letter . . . concerning the effects of the abovementioned storm of thunder and lightning,” *ibid.*, q. 141, lad mad; Denis Barbaret, *Dissertation sur le rapport qui se trouve entre les phénomènes du tonnerre et ceux de l'électricité* (Bordeaux, 1750) 4; Benjamin Franklin, *Observations and Suppositions Towards Forming a New Hypothesis for Explaining the Several Phenomena of Thunder Gusts* (1749) in his *Papers*, ed. Leonard W. Labaree (Yale U, 1959) III, 365. On brontidi or Moodus noises, which have subterranean origins but seem atmospheric: “Moodus and its noises,” *NY Daily Trib* (April 29, 1903) 11:1, reprinting, in part, W. Harry Clemons, “The legends of Machi-moodus,” *Connecticut Mag* 7 (1903) 451–58; “Moodus noises,” *Sci Amer* 78 (Jan. 29, 1898) 67; “A remarkable acoustic phenomenon,” *ibid.* 97 (Oct. 19, 1907) 279; C. Fitzhugh Talman, “Brontidi, mistpoeffers, or barisal guns,” *ibid.* 75 (Jan. 18, 1913 Suppl) 47–48; Federal Writers Project, WPA, *Connecticut* (B, 1973 [1938]) 404–405. The term “brontidi” was coined in 1904 by Prof. Tito Alippi to cover Italian phenomena known as

bomba, rombo, boato, bonaito, mugglio, baturlio, tromba.

202. John W. Allen, *Legends & Lore of Southern Illinois* (Southern Illinois U, 1985) 68-70; *Commonwealth of Massachusetts v. Wing*, 26 Mass 1 (1829); B. W. A., "Lines to a Little Girl, Overtaken in a Thunder Storm," *Amer Mag and Repository* 1 (July 1841) 23; George P. Clark, ed., *Into the Old Northwest: Journeys with Charles H. Titus, 1841-46* (Michigan State U, 1994) 162; "The Thunder Storm," *The Juvenile Miscellany* 4 (July 1830) 217-18; William H. McGuffey, *McGuffey's New Fourth Eclectic Reader* (Cincinnati, 1866) 180-85; H. Clay Trumbull, *Hints on Child-Training* (Phila, 1891) 230-31. More recent children's books: Chris Arretis, *Why Does It Thunder and Lightning?* (Chicago: Rand McNally, 1985); Joanne Barkan, *Baby Piggy and the Thunderstorm* (NY: Muppet, 1987); Gina Mayer, *Just a Thunderstorm* (Racine: Western, 1993); Lynea Bowdish, *Los Truenos No Me Asustan! [Thunder Doesn't Scare Me!]* (NY: Children's Press, 2001). Richard Crane, introducing his *Thunder: A Play of the Brontës* (L: Heinemann, 1976) notes that the Rev. Patrick Brontë, "a man of passionate moods and silences," changed the spelling of the family name to match exactly the Greek for "thunder."

203. Mrs. A. W. C. et al., "Calmness during a thunderstorm: symposium," *Home Progress* 2 (July 1913) 58-59, and cf. a similar dust-cleaning theory of thunderstorms, George C. Simpson, "On the Wilson-Gerdien theory of thunderstorm electricity," *Phil Mag* ser. 6, 18 (1909) 610-34; J. Frost, ed., *The Class Book of Nature* (Hartford, 1850) 33; Rev. David Pickering, "Reflections, occasioned by the thunder-storm on Tuesday evening, 21st instant," *Christian Telescope* 1, 47 (1825) 1:3, dismay; "Marvels of thunderstorms," *Eclectic Mag of Foreign Lit* 48 (1859) 216, oppression. For theories of thunder, see, e.g., George F. Hopkins, *Observations on Electricity, Looming, and Sounds; Together with a Theory of Thunder Showers . . .* (NY, 1825); François Arago, "On thunder and lightning," *Edinburgh New Phil J* 26 (1838, tr. from *Annuaire du Bureau des Longitudes*) 81-144, 275-91 ("The explanation of thunder is . . . yet to be found"); "Curiosities of thunder-storms," *Brit QR* 23 (1855) 36-61, reviewing Arago as well as W. Snow Harris (*On the Nature of Thunderstorms* [1843]), Dionysius Lardner (*A Manual of Electricity, Magnetism, and Meteorology* [1844]), and an S.P.C.K. tract (*The Thunderstorm* [1848]); Théodose Du Moncel, *Notice historique et théorique sur le tonnerre et les éclairs* (P, 1857), esp. 31-39 on different thunders; [Charles Dickens], "Thunder," *All the Year Round* 9 (June 13, 1863) 375-78, q. 376 globules; Peter G. Tait, "Thunderstorms," *Nature* 22 (1880) 339-40, 364-66, 408-10, 436-38. From *Sci Amer*, I use R. S. Mershon, "A theory of thunder," 23 (1870) 68; [W. Marcet], "Atmospheric electricity," 58 (1888) 261; M. Hirn, "The sound of thunder," 59 (1888) 201; Robert V. Reynolds, "The cause of thunder," 88 (1903) 41; E. L. Bates, "The cause of thunder," 88 (1903) 115; James A. Lyon, "The cause of thunder again," 88 (1903) 191; John Trowbridge, "The noise of lightning," 89 (1903) 461; Edith E. Cummings, "Young girl's theory of thunder storms," 99 (1908) 123; W. J. Humphreys, "Facts about thunderstorms," 80 (July 17, 1915 Suppl) 37-38. Humphreys, a professor of meteorological physics at the U.S. Weather Bureau, furnished a more technical explanation of "The thunderstorm and its phenomena" in *J Franklin Inst* 178 (Nov.-Dec. 1914) 1-69. Resorts to myth: John Ruskin, *The Queen of the Air: Being a Study of the Greek Myths of Cloud and Storm* (NY, 1880 [1869]); George S. Jones, "Myths of the thunderstorm," *Penn Mo* 4 (1873) 680-98, worldwide, as also Richard Anderson,

“Thunderstorms: their history and mystery,” *St. James’s Mag*, 4th ser., 41 (1881) 152–58.

204. Robert Bornstein, “Observations of the urban heat island effect in New York City,” *J Applied Meteorology* 7 (1968) 575–82; Robert Bornstein and Qinglu Lin, “Urban heat islands and summertime convective thunderstorms in Atlanta,” *Atmospheric Env* 34 (2000) 507–16; Richard A. Lovett, “Skyshapers,” *San Diego Union-Trib* (Oct. 12, 2006) E1, on skyscrapers and climate. Statistics: C. Fitzhugh Talman, “Sixteen million thunderstorms,” *Lit Digest* 91 (Oct. 9, 1926) 25–26, reflecting earlier data. Louis-Sébastien Mercier had observed in the 1780s that a man wakened from his first sleep by the noise of a galloping carriage would turn “to his wife, by no means unwilling. . . . Thunder sends up the birth-rate here too, as it does everywhere else”: *Panorama of Paris: Selections from Le Tableau de Paris*, tr. Helen Simpson, ed. Jeremy D. Popkin (Penn State U, 1999 [1781–1788]) 95.

205. Iwan R. Morus, *Frankenstein’s Children: Electricity, Exhibition, and Experiment in Early-Nineteenth-Century London* (Princeton U, 1998) q. 45 Sturgeon, pass.; Dean P. Currier, “William Sturgeon,” at www.acmi.net.au/aic/sturgeon_bio.html; Alexander G. McAdie, “Needless alarm during thunder-storms,” *Century Mag* 58 (Aug. 1899) 604–605, q. 605, but in his *Protection from Lightning* (DC, 1895) he comments on the large numbers of churches struck by lightning; William A. Koelsch, “Ben Franklin’s heir: Alexander McAdie and the experimental analysis and forecasting of New England storms, 1884–1892,” *New England Q* (1986) 523–43, esp. 530–31; Tal P. Shaffner, *The Telegraph Manual* (NY, 1859) ch. 40 on paratonnerres; Ido Yavetz, “A Victorian thunderstorm: lightning protection and technological pessimism in the nineteenth century,” in *Technology, Pessimism, and Postmodernism*, eds. Yaron Ezrahi et al. (Dordrecht: Kluwer, 1994) 53–76, q. 60 from William H. Preece, for whose side of the story see E. C. Baker, *Sir William Preece, F.R.S. Victorian Engineer Extraordinary* (L: Hutchinson, 1976) 293–98. For current puzzlements: Wilfred J. Remillard, “The history of thunder research,” *Weather* 16 (1961) 245–53; Choji Magono, *Thunderstorms* (Amsterdam: Elsevier, 1980) v, “when we get down to it and really try to find an explanation, we find that it is unbelievably complex”; Herbert S. Ribner and Dipankar Roy, “Acoustics of thunder: a quasilinear model for tortuous lightning,” *JASA* 72,6 (1982) 1911–25; P. Graneau, “The cause of thunder,” *J Physics D. Applied Physics* 22 (1989) 1083–94; idem, et al., “Evidence of thunder being a chemical explosion of air,” *J Plasma Physics* 69,3 (2003) 187–97. Cf. a novel by J. N. Rhoads, *A Thunderstorm* (Phila, 1904) 108–109, who made of two colliding thunderheads a psychomachia, as did August Strindberg in his chamber play, *The Thunderstorm* (1907).

206. Cornelia A. H. Crosse, ed., *Memorials, Scientific and Literary, of Andrew Crosse, the Electrician* (L, 1857) q. 2, 4, 54, 58, q. 66 poem, q. 130, 131, q. 154–55, q. 157, 169–78, q. 190, 355–58; Peter Haining, *The Man Who Was Frankenstein* (L: Muller, 1979) 5–6, 37, 58, q. 65, 67, 99; R. F. Pocock, “Andrew Crosse: early nineteenth-century amateur of electrical science,” *IEEE Proc-A* 140 (May 1993) 187–96; Henry M. Noad, *Manual of Electricity*, 4th ed. (L, 1859) 173–76, 179 on Weekes, 377–92; James A. Secord, “Extraordinary experiment: electricity and the creation of life in Victorian England,” in *The Uses of Experiment*, eds. David Gooding et al. (Camb U, 1989) 337–82, noting that contemporary critics assumed that the mites arose from (*Athenaeum*, q. 353) “virtually indestructible” insect eggs that had contaminated the rocks.

207. Secord, “Extraordinary experiment,” q. 350 Lovelace, 364–66 on Weekes, q. 371 from Adam Sedgwick on the apparatus; Pocock, “Andrew Crosse,” 195; Crosse, *Memorials*, 87, 225–33 on electro-vegetation, q. 303, q. 325, q. 353; Benjamin Woolley, *The Bride of Science: Romance, Reason, and Byron’s Daughter* (NY: McGraw-Hill, 1999) 145–63, 257–75, 307–308, q. 309, 310–13, q. 314, 339–41 on the betting syndicate (also including the father of Florence Nightingale), 357–59, 369; Christopher D. Green, “Introduction to Ada Lovelace’s translation of, and notes to, Luigi F. Menabrea’s ‘Sketch of the analytical engine invented by Charles Babbage, Esq.’” at <http://psychclassics.yorku.ca/Lovelace/intro.htm>.

208. Mahlon Loomis to his sister Mary, Oct. 15, 1852, on his height, his happiness, and his (prospective) wife, in Box 1, f. 15 of the Loomis-Wilder Family Papers, Dept. of Manuscripts and Archives, Sterling Lib, Yale U; Thomas Appleby, *Mahlon Loomis, Inventor of Radio* (privately printed, 1967) 1–4; Edward A. Sharpe, “Mahlon Loomis—First Wireless Telegrapher” at www.smec.org/mhlon_loomis.htm (2003); A. H. Newton, “Elias Loomis, LL.D.—memorial address delivered in Osborn Hall, April 11, 1890,” *New Englander and Yale R* 52 (June 1890) 555–83; Woodforde, *Strange Story of False Teeth* (→ n.170) 58–60 on Mahlon’s redesign of porcelain dentures, which still made a grating sound while chewing. For the rest: Mahlon Loomis Papers, Division of Manuscripts, Lib of Congress: “Memorandum or a Book of Domestic and Public Occurrences in the Life of Mahlon Loomis Commenced at Cambridgeport Massachusetts 1852[–1886],” entries for Sept. 4–5, Oct. 7, and Dec. 21 1852, and for Jan. 1, Feb. 16, 1853; Journal entry for Feb. 20, 1864, referring to 1858 paper; letter to brother of April 18, 1847; undated clip from *Springfield [Mass] Republican* on telegraph wire around garden, possibly inspired by Elias’s study of the current generated by a zinc plate buried in the earth (Newton, p. 579). For electrobotany: Noad, *Manual of Electricity*, 481–83. On Spiritualism and electricity: Cathy Gutierrez, “From electricity to ectoplasm: hysteria and American Spiritualism,” *Aries* n.s. 3, 1 (2003) 55–81; John B. Buescher, *The Remarkable Life of John Murray Spear: Agitator for the Spirit Land* (U Notre Dame, 2006) esp. chs. 12–13; Sconce, *Haunted Media* (→ n.195) 21–58; John Griesemer, *Signal & Noise* (NY: Picador, 2003), an historical novel that neatly interweaves the laying of transatlantic cables with Spiritualism and contemporary electrical metaphor.

209. James L. Green et al., “Eyewitness reports of the great auroral storm of 1859,” *Advances in Space Research* 38 (2006) 145–54, q. 145–46; Balfour Stewart, “On the great magnetic disturbance which extended from August 28 to September 7, 1859,” *Phil Trans Royal Soc of L* 151 (1861) 423–30, and noting that Andrew Sabine had earlier found a correlation between sunspots and magnetic disturbances: “On periodical laws discoverable in the mean effects of the larger magnetic disturbances, I, II,” *ibid.* 141 (1851) 123–39 and 142 (1852) 103–24; Benjamin Silliman et al., eds., “The Great Auroral Exhibition of August 28th to September 4th, 1859 [a series],” *Amer J Sci and Arts* 28 (1859) 385–419, esp. 387 and 397 on legibility, 389 and 396 on extent; *ibid.*, 29 (1860) 92–97 telegraphy and aurora, continued by Elias Loomis, 30 (1860) 79–101, auroral distribution, and 31 (1860) 339–62, 32 (1861) 318–35, esp. 323–24 on telegraphy; Appleby, *Mahlon Loomis*, 4; Mahlon Loomis Papers, Diaries, March 8, 1864. For context: A. J. Meadows and J. E. Kennedy, “The origins of solar-terrestrial studies,” *Vistas in Astron* 25 (1982) 419–26; E. W. Cliver,

“Solar activity and geomagnetic storms: the first forty years,” *Eos* 75 (Dec. 6, 1994) 569, 574–75; Stuart Clark, *The Sun Kings: The Unexpected Tragedy of Richard Carrington and the Tale of How Modern Astronomy Began* (Princeton U, 2007). On the fair weather field, [Lothar Ruhnke], “Soaking in atmospheric electricity,” http://science.nasa.gov/newhome/headlines/essd15jun99_1.htm.

210. Robert FitzRoy, *Weather-Book* (L, 1863) q. 97, 451–58; Katharine Anderson, “The weather prophets: science and representation in Victorian meteorology,” *H of Sci* 37 (1999) 179–219, esp. 179, 189; eadem, *Predicting the Weather: Victorians and the Science of Meteorology* (U Chicago, 2005) 41–82; John R. Gribbin and Mary Gribbin, *FitzRoy: The Remarkable Story of Darwin’s Captain and the Invention of the Weather Forecast* (L: Review, 2003) esp. 78–79, 156, 189–90, 264, 269, 278, 280, 283. Loomis’s claim to “a conscience clear as glass” and FitzRoy’s allusion to “glassy essence” (from *Measure for Measure*) partook of the contemporary glamor of glass as detailed by Isobel Armstrong, *Victorian Glassworlds: Glass Culture and the Imagination, 1830–1880* (Oxford U, 2008), who deals as well with the political noise of window-breaking and (p. 232, from *Sharpe’s London Mag*) the “cacophony of conflicting forms, colours, and styles” of the Bavarian glasswork shown at the Crystal Palace in 1851.

211. Mahlon Loomis Papers, “First public demonstrations”; George Loomis, “The pioneer in telegraphing without wires,” *New England Mag* 24 (1901) 145–51; Appleby, *Mahlon Loomis*, 4.

212. Mahlon Loomis Papers, Notebook entries for Dec. 1868 and March 15, 1869; Stewart, “On the great magnetic disturbance,” 429; Janet Oppenheim, *The Other World: Spiritualism and Psychical Research in England, 1850–1914* (Camb U, 1985) 336–38; Mahlon Loomis to his brother Joseph (an electrician), Jan. 23, 1868, typescript, in Box 2, f. 51, Loomis-Wilder Family Papers, Dept. of Manuscripts and Archives, Sterling Library, Yale U. For another historical take on (nearly) the same phenomena: Douglas Kahn, “Radio of the spheres,” in *Radio Territories*, eds. E. G. Jensen and B. LaBelle (LA: Errant Bodies, 2007) 218–30.

213. Mahlon Loomis Papers: clipping from *Baltimore Sun* (Jan. 31, 1873); Mahlon Loomis, “Improvement in Telegraphing,” U.S. Patent 129,971 (July 30, 1872); S. R. Winters, “The Story of Mahlon Loomis” *Radio News* (Nov. 1922) 974–78, reprinting an address Loomis prepared for Congress in 1872 in which he refers to the Massachusetts examples of auroral telegraphy; Act to Incorporate Loomis Aerial Telegraph Company, 42nd Congr., Sess. III, ch. 45, 413 (Jan. 21, 1873). Cf. Elisha S. Loomis, “The progenitors of the Loomis Family and its descendants,” in *The Loomis Family in America* (Windsor, 1875) 22–24, on the Loomis scientists, including Elias and “greatest of all, Dr. Mahlon Loomis.”

214. Mahlon Loomis, letters to his brother Joe, May 30, 1885, Jan. 10, 1886, April 4, 1886, and letter from George Loomis to Achsie, Oct. 13, 1886, pencil copy of original, in Loomis-Wilder Family Papers, Dept. of Manuscripts and Archives, Sterling Library, Yale U; Frederic W. Wile, *Emile Berliner, Maker of the Microphone* (NY: Arno, 1974 [1926]); David Edward Hughes, “On the physical action of the microphone,” *Phil Mag and J Sci* ser. 5,6 (1878) 44–50; “The microphone,” *Spectator* 51 (May 25, 1878) 662–63, the fly; G. Burniston Brown, “David Edward Hughes, FRS, 1831–1900,” *Notes and Records of Royal*

Soc of L 34,2 (1980) 227–39; Sungook Hong, “Marconi and the Maxwellians: the origins of wireless telegraphy revisited,” *Tech and Culture* 35 (1994) 717–49, 720ff. on the coherer; Mahlon Loomis, “Convertible Valise,” U.S. Patent 241,387 (May 10, 1881); Mahlon Loomis Papers, “Dr. Mahlon Loomis and wireless telegraphy,” unsourced clip, 1902; FitzRoy, *Weather Book*, 75; Benjamin Silliman, Jr., *First Principles of Physics, or Natural Philosophy, Designed for the Use of Schools and Colleges* (Phila, 1859) q. 264, 266–76; Florence McLandburgh, *The Automaton Ear and Other Sketches* (Chicago, 1876) 7–44, q. 8; W. H. Preece, “The microphone,” *Nature* 18 (June 20, 1878) 207–10; Mahlon Loomis, “Electrical Thermostat,” U.S. Patent No. 338,090 (March 16, 1886); Albert A. Hopkins, *Magic: Stage Illusions and Scientific Diversions* (NY: Blom, 1967 [1897]) 35, 101, 103, and ch. 7.

215. Millicent Todd [Bingham], *Eben Jenks Loomis. 11 November 1828–2 December 1912* (Camb, Mass, 1913) 4–5, q. 51; Eben Jenks Loomis, *A Sunset Idyl, and Other Poems* (Camb, Mass, 1903) 2, 25, 27, 85–86, 92; idem, *Wayside Sketches* (B, 1894) 30, q. 74, q. 75; Polly Longworth, *Austin and Mabel: The Amherst Affair & Love Letters of Austin Dickinson and Mabel Loomis Todd* (NY: Farrar Straus Giroux, 1984) 13–17. Norbert Hirschhorn and Polly Longworth, “‘Medicine posthumous’: a new look at Emily Dickinson’s medical condition,” *New England Q* 69 (1996) 299–316, substitute hypertension for Dickinson’s own doctor’s diagnosis of Bright’s disease. Cf. A. Oreziak et al., “Detection of atrial electrical instability in hypertensive patients,” *Computers in Cardiology* 30 (2003) 557–60.

216. Longworth, *Austin and Mabel*, 37–47, q. 172–73; Loomis, *A Sunset Idyl*, 14–15; W. P. Sheehan and Anthony Misch, “Ménage à trois: David Peck Todd, Mabel Loomis Todd, Austin Dickinson, and the 1882 transit of Venus,” *J H of Astron* 35,2 (2004) 123–34; Ellen L. Hart and Martha N. Smith, *Open Me Carefully: Emily Dickinson’s Intimate Letters to Susan Huntington Dickinson* (Ashfield: Paris, 1998) esp. 204, 258–59, 264–66; Richard B. Sewall, *The Life of Emily Dickinson* (NY: Farrar, Straus, Giroux, 1974) 1,170–79, 215–17, 225–26. For more on Mabel Todd’s erotic life: Peter Gay, *The Bourgeois Experience: Victoria to Freud I. Education of the Senses* (NY: Norton, 1984) 81–101.

217. Thomas H. Johnson, ed., *The Letters of Emily Dickinson* (Harvard U, 1958) 204; idem, ed., *The Poems of Emily Dickinson* (Harvard U, 1963) 1,209 (no. 290), III,1089–90 (no. 1581), 1182–83 (no. 1764); Jack L. Capps, *Emily Dickinson’s Reading, 1836–1886* (Harvard U, 1966) 181; Brad Ricca, “Emily Dickinson: Learn’d Astronomer,” *Emily Dickinson J* 9,2 (2000) 96–108; Paul Crumbley, *Inflections of the Pen: Dash and Voice in Emily Dickinson* (U Press of Kentucky, 1996), esp. 15–18. For Denison Olmsted, see his “On the recent secular period of the aurora borealis,” *Smithsonian Contributions to Sci* 8 (1853) Art. 3; C. S. Lyman, “Biographical sketch of Prof. Denison Olmsted,” *Amer J Sci and Arts* 28 (1859) 109–18; Elisha Scott Loomis, ed., *Descendants of Joseph Loomis . . . by Elias Loomis LL.D., 1875* (Berea, 1909) as amended by Diana Matthiesen, at <http://dgmweb.net/genealogy/7/Genealogies/Loomis.htm>, linking both Denison and Frederick Law Olmsted to the Loomis lineage.

218. Elias Loomis, “Aurora Borealis or polar light,” *Harper’s New Mo Mag* 39 (June 1869) 1–21, q. 11; Johnson, ed., *Poems of Emily Dickinson*, 209 (no. 290), wr. ca. 1861; Carol Quinn, “Dickinson, telegraphy, and the aurora borealis,” *Emily Dickinson J* 13,2 (2004) 58–78; Robert H. Eather, *Majestic Lights: The Aurora in Science, History, and the Arts* (DC: Amer Geophysical Union, 1980) 110, ethnographer, and 154–61; William F. Butler, *The*

Wild North Land (L, 1873) 138, and cf. David Thompson, *Narrative*, ed. Richard Glover (Toronto, 1962) 122-23, earlier blindfolded experiment; C. A. Chant, "The audibility of the aurora," *J Royal Astron Soc of Canada* 17 (Sept. 1923) 273-84, q. 275-77, q. 279-80, accounts from the 1800s. Since 1814 (*OED*), "flare" could refer to a flame or a sudden or loud noise or fanfare.

219. S. M. Silverman and T. F. Tuan, "Auroral audibility," *Advances in Geophysics* 16 (1973) 155-266, identifying the sounds with brush discharges; T. Stockfleeth Jørgensen, *On the Naturally Occurring Electromagnetic Noise Called Auroral Hiss* (København: Danish Meteorological Inst, 1968); Harriet Wilson, "Sizzling skies," *New Scientist* 169 (Jan. 6, 2001) 15-16; Chant, "Audibility of the aurora," q. 278, q. 282; Noad, *Manual of Electricity*, q. 169.

220. Jed Z. Buchwald, *The Creation of Scientific Effects: Heinrich Hertz and Electric Waves* (U Chicago, 1994) q. 131.

221. *Ibid.*, 10-13, 19, 23, but noting, 197, that Helmholtz's energy principle, on which Hertz relied until 1883, was irreconcilable with field theory; cf. Charles Susskind, *Heinrich Hertz: A Short Life* (San Francisco: San Francisco Press, 1995) 57-58. On Faraday: Bruce J. Hunt, *The Maxwellians* (Cornell U, 1991) 11. Technically, dielectrics are substances so weakly conductive that they may be used as insulators; as Amos E. Dolbear explained in *Matter, Ether, and Motion*, ed. A. Lodge (L, 1899 [1892/1894]) 190, "The term non-conductor came into use before the refined methods now in use for measuring conductivity were known. It is now believed that the only non-conductor of electricity is the ether." Dolbear invented the first telephone receiver with a permanent magnet (1865) and held an 1882 patent on a wireless telegraph that worked through electrical induction, as did Loomis's.

222. Hunt, *The Maxwellians*, 30-32, 45-47, and cf. Hans Christian von Baeyer, *Maxwell's Demon: Why Warmth Disperses and Time Passes* (NY: Random House, 1998) for a more popular account. Sylvanus Thompson in 1876 and David Hughes, with his microphone in 1879, had seen evidences of response to nearby current, but neither conceived of these as possible "receivers" of electromagnetic signals: James G. O'Hara and Willibald Pricha, *Hertz and the Maxwellians* (L: Peregrinus, 1987) 11, 13.

223. On the tone-deafness, Susskind, *Heinrich Hertz*, 30, q. 33, 43, q. 54, 65, and q. 107 for "symphonic relations," and cf. Steven Mithen, *The Singing Neanderthals* (Harvard U, 2006) 58-60, history of research on tone-deafness or amusia. For the physics of this and next paragraph: Dieter Hoffmann, "Heinrich Hertz and the Berlin School of Physics," in *Heinrich Hertz: Classical Physicist, Modern Philosopher*, eds. Davis Baird et al. (Dordrecht: Kluwer, 1998) 1-8, q. 5 on the Physical Society; John H. Bryant, "Heinrich Hertz's experiments and experimental apparatus," *ibid.*, 39-58; Manuel G. Doncel, "On Hertz's conceptual conversion: from wire waves to air waves," *ibid.*, 73-88, q. 74, q. 81; Stephan Vogel, "Sensation of tone, perception of sound, and empiricism: Helmholtz's physiological acoustics," in *Hermann von Helmholtz*, ed. Cahan (→ n.98) 259-87; Buchwald, *Creation of Scientific Effects*, 217-324; and Susskind, esp. 102-15.

224. As above, and Buchwald, *Creation of Scientific Effects*, 287-88 on the "disturbingly loud" noise of Ruhmkorff coils, q. 320 on the energy field; Susskind, *Heinrich Hertz*, 120-32.

225. Hunt, *The Maxwellians*, 48ff., q. 173; Joseph F. Mulligan, "The aether and Heinrich

Hertz's *The Principles of Mechanics Presented in a New Form*," *Physics in Perspective* 3,2 (June 2001) 136–64; Paul J. Nahin, *Oliver Heaviside, Sage in Solitude: The Life, Work, and Times of an Electrical Genius of the Victorian Age* (NY: IEEE, 1987/1988); Ido Yavetz, *From Obscurity to Enigma: The Work of Oliver Heaviside, 1872–1889* (Basel: Birkhauser, 1995) 5–28, esp. 19 on Pupin; Laszlo Solymar, *Getting the Message: A History of Communications* (Oxford U, 1999) 120–21; Alan Heather, www.oliverheaviside.com, account of his ancestor (posted 2005); Rollo Appleyard, "Oliver Heaviside," *Pioneers of Electrical Communication* (Freeport: Books for Libraries, 1968) 211–60—and noting (p. 240) that Heaviside and Hertz exchanged correspondence but never met. The Heaviside layer, identified in 1924 by Edward V. Appleton as a region in the mid-ionosphere, has a circadian rhythm to its reflection of (mid-frequency) radio waves: during the day, the solar wind presses this layer closer to the Earth; at night, it pulls the layer away, increasing the range through which radio waves can travel by reflection, producing better night-time reception, a phenomenon that operators had noted for twenty years. Edwin Kennelly, an electrical engineer, independently predicted the existence of this layer, also in 1902.

226. Hunt, *The Maxwellians*, q. 49 deafness; Nahin, *Oliver Heaviside*, 15, q. 121 Thompson, and cf. A. C. Lynch, "Silvanus Thompson: teacher, researcher, historian," *IEEE Proc* 136, pt.1,6 (Nov. 1989) 306–12; Yavetz, *From Obscurity to Enigma*, 5–8; Appleyard, "Oliver Heaviside," esp. 217, 227 on "scienticultists," 217 and 223 on deafness; Baker, *Sir William Preece* (→ n.205) 109, 204–208 on dealings with Heaviside.

227. *Webster's Revised Unabridged Dictionary* (1913) 477 s.v. "electricity," 1406 s.v. "static"; James Knight, *Static Electricity as a Therapeutic Agent* (NY, 1882) q. 3, 4–5; New Century Correspondence Schools, *Static Electricity* (Wilkes-Barre? 1904) 15; National Telephone Exchange Association, *Proceedings* (Saratoga Springs, 1882) q. 57 M. Gaiffe on sounds of unknown origin, q. 67 Lockwood. On "static" as a misnomer: Prof. Robert T. Beyer, interviewed Oct. 19, 1994 at Brown U. For a history of static generators: Arthur D. Moore, *Electrostatics*, 2nd ed. (Morgan Hill: Laplacian Press, 1997).

228. Prideaux, *Edvard Munch* (→ n.193) 142; Margaret Cheney, *Tesla: Man Out of Time* (NY: Dell, 1981) 68–73; Marc J. Seifer, *Wizard: The Life and Times of Nikola Tesla* (Secaucus: Citadel, 1998) 69, 85, 96–97, 142–43, 183ff.; Russell Naughton, "Alexander Stepanovitch Popov: 1859–1906," at his Adventures in Cybersound website, www.acmi.net.au/AIC/POPOV_BIO.html; J. Murray-Erskine, *Handbook of Wireless Telegraphy* (L, 1907) 22–23; Tom Lewis, *Empire of the Air: The Men Who Made Radio* (NY: Harper, 1991) 30, 35–37; Donald Kimberlin, "The world's most heralded radio failure," *Radio Guide* (Oct. 2003) 4, 6, at www.olderadio.com/archives/jurassic/marconi2.pdf, spinning off from John S. Belrose, "A radioscientist's reaction to Marconi's transatlantic wireless experiment—revisited," *IEEE Antennas and Propagation Soc. Intl Symposium* 1 (2001) 22–25, also online, with critiques of Belrose and suggestions as to how Marconi could possibly have heard the Morse "S," at <http://marconi2006.com/critiques.html>. On early concerns with jamming and interference: Sungook Hong, *Wireless: From Marconi's Black Box to the Audion* (MIT, 2010) ch. 4.

229. Buckner Speed, "Voices of the universe," *Harper's Mo Mag* 138 (April 1919) 613–15. Cf. Hugo Gernsback, "The evolution of radio," *Proc Radio Club of Amer* 36 (May 1960).

230. Douglas Kahn, "Three receivers," in *Experimental Sound and Radio*, ed. Allen S. Weiss (MIT, 2001) 73-80, q. 74 from Stefan Themerson on his wireless set of 1924; John Oliver Ashton Correspondence and Papers, Recollections in Radio Pioneering, "The original radio ham," in MSS 79/114, Bancroft Library, UC Berkeley, where also find a transcript (77/105c) of the interview of Leonard F. Fuller by Arthur L. Norberg (1973-1975) on spark-pitches; Robert L. Coe, "Saga of American Broadcasting," q. 5, q. 24, 25, q. 34, in his Papers, Series II, Box 2, Library of American Broadcasting, Hornbake Lib, U Maryland; Stanford C. Hooper, "Tape Transcript of Material for Navy History of Radio-Radar-Sonar," p. 9, in his Papers, Box 37, Division of Manuscripts, Lib of Congress; Edwin H. Armstrong, letter to Lloyd Espenschied, Jan. 18, 1951, p. 12, in his Papers, Box 112, Lloyd Espenschied file, and Box 570, Armstrong's Supplementary Brief, pp. 4, 7, 11, to Westinghouse Electric & Manufacturing Co. and *Edward H. Armstrong v. United States*, Alexander Meissner, General Electric Co. et al., 276 U.S. 610 (1928), both in Rare Books and Manuscripts Library, Columbia University Libraries, Columbia U; Hugh Aitken, *The Continuous Wave: Technology and American Radio, 1900-1932* (Princeton U, 1985) q. 61 first voice reception, 87, q. 88 on Navy generator; Lloyd Espenschied, memo for Mr. Miller, "Wireless in Washington, D.C., February 25, 1913," paraphrasing Dr. L. W. Austin, in MSS 72/116, Haraden Pratt Papers, Box 1, Lloyd Espenschied file, Letter to Pratt, Aug. 25, 1952, p. 4, Bancroft Library, UC Berkeley; Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm, 1870-1970* (NY: Viking, 1989) 139-41 on the feedback or regenerator circuit (which the Supreme Court would rule incorrectly as having been originated by Fessenden in 1912); Charles A. Culver, "Transatlantic radio reception," *J Franklin Inst* 187 (May 1919) 529-80 at 530n.

231. Yavetz, *From Obscurity to Enigma*, 209-18; Oliver Heaviside, "On telegraph and telephone circuits [wr. 1887]," *Electrical Papers* (L, 1892) II,347-48. On personal equations: Graeme Gooday, "Spot-watching, bodily postures, and the 'practical eye': the material practice of instrument reading in Late Victorian electrical life," in *Bodies/Machines*, ed. Iwan R. Morus (Oxford: Berg, 2002) 165-95, esp. 177-79 on reading galvanometers.

232. Cheney, *Tesla*, 21, 79, 133-51; Nikola Tesla, *Colorado Springs Notes, 1899-1900* (Beograd: Nolit, 1978) 12, 16, q. 36, 61, q. 128, q. 158, 159, 314, 345, 392; Thomas C. Martin, *The Inventions, Researches and Writings of Nikola Tesla* (NY: Hollywood Angriff, 1981 [1894]) 348-49; Harry L. Goldman, "Nikola Tesla's bold adventure," *Amer West* 8,2 (1971) 4-9; Seifer, *Wizard*, esp. 22-24, 41, 63, 71, 85. Fred Nadis puts Tesla in the context of other electrical showmen: *Wonder Shows: Performing Science, Magic and Religion in America* (Rutgers U, 2005) 66-74.

233. "Who is the greatest genius of our age?" *R of Rs* (July 1890) 45, and T. Carpenter Smith, "Our view of the Keely motor," *Engineering Mag* 2 (1891-1892) 14-19, both quoted in Seifer, *Wizard*, 61, 63-64; Clara Bloomfield-Moore, *Keely's Discoveries: Aerial Navigation* (L, 1890) q. 4, q. 5, at www.svpvrii.com/discover.html, articles on and by Keely, including his "The Chord-Settings of Life," from *Dashed Against the Rock* (1894) and O. M. Babcock, *Fraud! Force!! Facts!!! The Doom of Steam, or The Coming of Force* (Phila, 1881) pt. 2, from which I quote.

234. Oppenheim, *The Other World* (→ n.212) ch.5; Annie Besant and C. W. Leadbeater,

Thought-Forms (L, 1905) 12, q. 13, q. 18, q. 20, 27–28, 52, q. 83–84; C. W. Leadbeater, *The Hidden Side of Things*, 2nd ed. (Adyar, 1919 [1913]) 207–208, 210–12. Cf. H. P. Blavatsky on sensitivity to vibrations and “certain correlations in ether,” in *Collected Writings: VII, 1886–1887* (Adyar, 1958) 74. On Spiritualist rhetoric in the promotion of telegraphy, and vice versa: Richard Noakes, “Telegraphy is an occult art: Cromwell Fleetwood Varley and the diffusion of electricity to the other world,” *Brit J for the H of Sci* 32 (1999) 421–59; Rāma Prasād, *Nature’s Finer Forces*, 3rd ed. (Adyar, 1933 [1890]) 179: “The modifications of thought moving along the universal tantric ‘wires’ affect any and every man.”

235. G. W. F. Hegel, *Aesthetics: Lectures on Fine Art*, tr. T. M. Knox (Oxford: Clarendon, 1975 [1820s]) II, 888–958, q. 890, q. 903; Berlioz, “The current state of singing” (1853), in *Art of Music* (→ n.80) 60; idem, *Memoirs*, tr. David Cairns (NY: Knopf, 1969 [1870]) 483–84; John Graziano, “Jullien and his *Music for the Million*,” in *A Celebration of American Music*, eds. Richard Crawford et al. (U Michigan, 1990) 192–215, as also David Ewen, *Music Comes to America* (NY, 1947) 6–7, 24–25; Isaac Rice, *What Is Music?* (NY, 1875) 14, 19; John Kitto, *The Lost Senses—Series I. Deafness* (L, 1845) 32, 35, 40, 42; “Vibratory therapeutics,” *Sci Amer* 68 (Oct. 22, 1892) 265, and cf. Patrizia Guarnieri, tr. Terri Philips, “Between soma and psyche: Morselli and psychiatry in late-nineteenth-century Italy,” *The Anatomy of Madness*, eds. W. F. Bynum et al. (L: Routledge, 1985) 102–24 at 117. For vibratory therapeutics applied to hearing: Evan Yellon, *Surdus in Search of His Hearing: An Exposure of Deafness Quacks* (L, 1910) 19, 26, 30–32, 79–81, in Box 181, file 17, American Medical Assoc Archives, Chicago, as also a letter of May 1, 1924 (file 18) from Joseph A. Davis, who had been using this cure for years. Cf. Sterne, *Audible Past* (→ n.110) 81 on the use of phonographic sound to massage the ossicles of the deaf and restore hearing, as in Louis J. Lautenbach, “New methods employed for the relief of impaired hearing, especially by the use of the phonograph, vibrometer, vibrophone, and metronomic ear masseur,” *College and Clinical Record* 10 (July 1894) 165–69.

236. R. S. Wyld, *The Physics and Philosophy of the Senses* (L, 1875) 96–97; Michel Serres, *The Parasite*, tr. Lawrence R. Schehr (Johns Hopkins U, 1982). For other takes: Friedrich A. Kittler, *Gramophone, Film, Typewriter*, trs. G. Winthrop-Young and M. Wutz (Stanford U, 1999) 21–114; Charles Grivet, tr. Stephen Sartarelli, “The phonograph’s horned mouth,” in *Wireless Imagination: Sound, Radio, and the Avant-Garde*, eds. D. Kahn and G. Whitehead (MIT, 1992) 31–61; Sterne, *Audible Past* (→ n.110) 215–61; Shelly Trower, “‘Nerve-vibration’: therapeutic technologies in the 1880s and 1890s,” in *Neurology and Modernity*, eds. L. Salisbury and A. Shail (NY: Palgrave, 2009) 148–62. As for fiction: in “A Psychological Invasion,” from *John Silence, Physician Extraordinary* (L, 1912) 58, Algernon Blackwood has his detective divest a haunted house of the “glamour” of an evil Personality by chanting “certain rhythmical sounds that slowly rolled through the air like a rising sea, filling the room with powerful vibratory activities that whelmed all irregularities of lesser vibrations in its own swelling tone.” And Max Nordau, in *The Drones Must Die* (NY, 1897) 171, describes thoughts as waves of ether, millions of which hit us each moment; when a vibration resonates with a particular brain, it prompts a consciousness of that thought, so that “we stand continually on the shore of the whole ocean of possible thoughts.”

237. Rachel P. Maines, *Technology of Orgasm: “Hysteria,” the Vibrator, and Women’s Sexual*

Satisfaction (Johns Hopkins U, 1999) 4, 15, 17, 53–54, 67, 93, 101, q. 103, q. 106; Ernest Jones, “The Madonna’s conception through the ear (1914),” *Essays in Applied Psycho-Analysis* (L, 1951) II, 266–357, q. 355.

238. John Tyndall, “On Radiation [1865],” in *Fragments of Science for Unscientific People* (L, 1871) 177–78, contextualized by Gillian Beer, “Wave theory and the rise of literary modernism,” in *Open Fields* (→n.103) 295–316 at 311; James Dewey and Perry Byerly, “The early history of seismometry (to 1900),” *Bull Seismological Soc of Amer* 59,1 (1969) 183–227; Charles Davison, “On earthquake-sounds,” *L, Edinburgh and Dublin Phil Mag and J Sci* 49 (1900) 31–70, q. 32; Otto Klotz, “The undagraph,” *J Royal Astron Soc of Canada* (Nov.–Dec. 1913) 415–16; Henry R. Rigg, “A home-made seismograph,” *Sci Amer* 99 (Oct. 17, 1908) 263–64; Carl W. Stover and Jerry L. Coffman, *Seismicity of the United States (Revised)* (DC: U.S. Geological Survey, 1993) 6–7 for Mercalli’s scale of destructiveness. For Japan, I rely on Gregory Clancey’s excellent *Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868–1930* (UC, 2006) 2, 17, q. 40 sway, 53, 63, q. 64 Milne, 67–70, 72, 77–78, 83, q. 84 nervousness, 101, 103 on number of quakes, 113ff. on 1891 quake, 140 stiffness, 149–56 on seismology and its scales, 157 countryfolk, 160 tsunamis, 165 stations, 167 Potsdam, 172 Messina, q. 173 Fusakichi. Cf. Edward S. Morse, *Japanese Homes and Their Surroundings* (NY: Dover, 1961 [1886]) for a more admiring look at Japanese architecture, though still worried (pp. 2–4) about the spread of fire.

239. W. T. Gairdner, “A short account of cardiac murmurs,” *Edinburgh Med J* 7 (1861/1862) 442–50, scales; Robert G. Frank, “The telltale heart: physiological instruments, graphic methods, and clinical hopes, 1854–1914,” in *The Investigative Enterprise*, eds. W. Coleman and F. L. Holmes (UC, 1988) 211–90, q. 211 on arming the heart; Augustus D. Waller, “A demonstration on man of electromotive changes accompanying the heart’s beat,” *J Physiology* 8 (1887) 229–34; W. Bruce Fye, “A history of the origin, evolution, and impact of electrocardiography,” *Amer J Cardiology* 73 (1994) 937–49; John Burnett, “The origins of the electrocardiogram as a clinical instrument,” in *The Emergence of Modern Cardiology*, eds. W. F. Bynum et al. (L: Wellcome, 1985) 53–76; Walter B. James and Horatio B. Williams, “The electrocardiogram in clinical medicine,” *Amer J Med Sci* 140 (1910) 408–21, 644–699, q. 410 on lines of diffusion; Joel D. Howell, “Frank Norman Wilson: theory, technology, and electrocardiography,” in *Medical Lives and Scientific Medicine at Michigan, 1891–1969*, ed. Howell (U Mich, 1993) 101–28; Alain Karma and Robert F. Gilmour, Jr., “Nonlinear dynamics of heart rhythm disorders,” *Physics Today* 60 (March 2007) 51–57, q. 52.

240. Frank, “The telltale heart”; A. Calò, *Les Bruits du coeur et des vaisseaux* (P, 1950) 20; Soraya de Chadarevian, “Graphical method and discipline: self-recording instruments in nineteenth-century physiology,” *Studies in H and Phil of Sci* 24,2 (1993) 267–91; Raviv Ganchrow, “Hear and there: notes on the materiality of sound,” in *OASE Architectural J* 7–8 (2009) 70–76; Margaret Watts Hughes, commentary by Sophie B. Herrick, “Visible sound,” *Century Mag* 42 (1891) 34–36; James Loudon, “A century of progress in acoustics,” *Sci* 14 (1901) 987; Emile Berliner, “Vocal physics—historic notes,” *J Franklin Inst* 208 (1929) q. 15–16; Letter from Binghamton, “Visible sound printing through nature,” *NY Herald* (Feb. 11, 1901) V, 12:1–2. On phonography and the making of “communication channels

immune to the troublesome fact of bodily presence”: Peters, “Helmholtz, Edison, and sound history” (→ n.97). For more on inscription: Gitelman, *Scripts, Grooves* (→ n.109). Richard Caton in 1875 found that the brain was also abuzz with electrical activity, but the currents were so weak that human “brainwave” recordings were not published until Hans Berger perfected his electroencephalogram in 1929: Mary A. B. Brazier, *A History of the Electrical Activity of the Brain; The First Half-Century* (NY, 1961).

241. Friedrich Kurylo, *Ferdinand Braun, A Life of the Nobel Prizewinner and Inventor of the Cathode-Ray Oscilloscope*, tr. Charles Susskind (MIT, 1981) 86–89, q. 98 Zenneck; Peter A. Keller, *The Cathode Ray Tube: Technology, History, and Applications* (NY: Palisades, 1991); V. J. Phillips, *Waveforms: A History of Early Oscillography* (Bristol: Hilger, 1987); John J. Roche, “Semantics of graphics in mathematical natural philosophy,” in *Non-Verbal Communication in Science Prior to 1900*, ed. Renato G. Mazzolini (Firenze: Olschki, 1993) 197–233 at 222–23, fig. 12c for Kelvin; David Kunzle, *The History of the Comic Strip: The Nineteenth Century* (UC, 1990) ch. 15, and 37 fig. 1.3, 117 fig. 2.5, 242 fig II.15 for Busch’s “The Virtuoso, or a New Year’s Concert” (1865). Other images: manometric traces at www.phys.cwru.edu/ccpi/Flame_manometer.html, from Rudolf Koenig’s *Acoustic Catalogue* (1865); Wilhelm Busch, *Max und Moritz* (1865) Fourth Trick, online at www.fln.vcu.edu/mm/mmeng4.html (from a 1925 Munich edition, scanned by Robert Godwin-Jones, 1994–1999). For a more mythopoetic and literary-historical account of the origins and implications of visible sound: Steven Connor, “Seeing sound: the display of Marsyas,” lecture at U Nottingham (Oct. 16, 2002) at www.bbk.ac.uk/english/skc/marsyas.

242. On Kandinsky: Jerome Ashmore, “Sound in Kandinsky’s painting,” *J Aesthetics and Art Criticism* 35 (1977) 329–36, esp. 333, on painted sound “as generated from chaos, collision, strife, and catastrophe” and their noisy vibrations; R. W. Sheppard, “Kandinsky’s abstract drama, *Der Gelbe Klang*,” *Forum for Modern Lang Studies* 11 (1975) 165–76; Mel Gordon, “Songs from the museum of the future: Russian sound creation (1910–1930),” in Kahn and Whitehead, eds., *Wireless Imagination*, 197–243. On Duchamp: Craig Adcock, “Marcel Duchamp’s gap music: operations in the space between art and noise,” in *ibid.* 105–38, at 106–107; Douglas Kahn, “Introduction,” *ibid.*, 14–18, and Christopher Schiff, “Banging on the windowpane: sound in early Surrealism,” *ibid.*, 139–89; Thierry de Duve, ed., *The Definitely Unfinished Marcel Duchamp* (MIT, 1991), essays that deal throughout with sound-puns at the root of Duchamp’s work.

243. On combination tones, still disputed: David Pantalony, “Rudolf Koenig’s workshop of sound: instruments, theories, and the debate over combination tones,” *Annals of Sci* 62 (2005) 57–82.

244. Mark S. Roberts, “Wired: Schreber as machine, technophobe, and virtualist,” in Weiss, ed., *Experimental Sound and Radio* (→ n.225) 27–41; Louis A. Sass, *The Paradoxes of Delusion: Wittgenstein, Schreber, and the Schizophrenic Mind* (Cornell U, 1994) q. 43; Holger Steinberg, tr. Dirk Carius, “A short history of psychiatry at Leipzig University” (Dec. 13, 2005) on Flechsig, at <http://www.uni-leipzig.de/~psy/eng/geschi-e.htm>; Guglielmo Marconi, “On Transatlantic Wireless Telegraphy,” offprint of a talk given March 13, 1908 to the Royal Institute of Great Britain; Sigmund Freud, “Psychoanalytic notes upon an autobiographical account of a case of paranoia (dementia paranoides) [1911],” in *Three Case*

Histories, ed. Philip Rieff (NY: Collier, 1963) 103–86, q. 129; Paul Schilder, *The Image and Appearance of the Human Body* (NY, 1960) 215, 218. For a re-vision of Schreber's life and voices: Daniel B. Smith, *Muses, Madmen, and Prophets: Rethinking the History, Science, and Meaning of Auditory Hallucinations* (NY: Penguin, 2007) 193–211. A recent therapy for auditory hallucinations is itself electromagnetic: R. E. Hoffmann et al., "Transcranial magnetic stimulation of left temporoparietal cortex and medication-resistant auditory hallucinations," *Archives of General Psychiatry* 60 (Jan. 2003) 49–56.

245. Baker, *Sir William Preece* (→n.205) 8–9, 69, 114, 121–23, 154 on telephone poles and wires, 162, 172; "The underground wire question," *Manufacturer and Builder* 17 (Aug. 1885) 170–71; "The wire nuisance," *ibid.* 183, citing an earlier influential critique by the President of the British Iron and Steel Institute, Dr. John Percy. Cf. E. F. Schurig (Omaha city electrician), "Municipal control versus municipal ownership," *Proc Sixth Annual Convention of Intl Assn of Municipal Electricians* (1901) 74–82, with discussion 83–88, on overhead wires for lighting, electricity, telephones, telegraphs; Walter C. Owen, *Telephone Lines and Methods of Constructing Them Overhead and Underground* (L, 1903) esp. 202. Pressure to move wires underground also arose from such tabloid articles as "A New York Horror: Lineman John Feeks' Terrible Death Among the Telegraph Wires Shocked to Eternity and Then Frightfully Burned in the Presence of Thousands," *Natl Police Gazette* (Oct. 26, 1889), illustrated with Feeks caught among the wires, reproduced in Gene Smith and Jayne Barry Smith, comps., *The Police Gazette* (NY: Simon and Schuster, 1972) 115, and discussed by Mark Essig, *Edison and the Electric Chair* (NY: Walker, 2003) ch. 17.

246. "A fine telephone system," *Amer Telephone J* 6 (July 26, 1902) 53; George Van Cowe, "The passing of the aerial," *ibid.* 9 (Feb. 6, 1904) 81 and (April 2, 1904) 211; Schurig, "Municipal control versus municipal ownership," 74–75. The undergrounding of wires was part of the connection of middle-class homes to "a growing maze of pipes, wires, ducts, cables, conduits, and mains": Thomas J. Schlereth, "Conduits and conduct: home utilities in Victorian America, 1876–1915," in *American Home Life, 1880–1930: A Social History of Spaces and Services*, eds. Jessica H. Foy and Schlereth (U Tennessee, 1992) 225–41.

247. William H. Wilson, *The City Beautiful Movement* (Johns Hopkins U, 1989) 2, q. 16 from Andrew Jackson Downing on undulations, 44, 74; Mrs. Harriette M. Plunkett, *Women, Plumbers, and Doctors; or, Household Sanitation* (NY, 1885) 48 on fresh air, 173 on "eternal vigilance"; Charles M. Robinson, *The Improvement of Towns and Cities; or, the Practical Basis of Civic Aesthetics*, 3rd ed. (NY, 1911) 55, "fairer cityhood"; John R. Stilgoe, *Borderland: Origins of the American Suburb, 1920–1939* (Yale U, 1988) esp. 49–54, q. 67 on Webster.

248. Richard L. Bushman, *The Refinement of America: Persons, Houses, Cities* (NY: Knopf, 1992) 37off. on main streets; Mountfield, *Coaching Age* (→n.93) 77–81; Clay McShane, "Transforming the use of urban space: a look at the revolution in street pavements, 1880–1924," in *J Urban H* 5 (1979) 279–307; Kenneth T. Jackson, "The impact of technological change on urban form," in *Technoogy, the Economy, and Society*, eds. J. Colton and S. Bruchey (Columbia U, 1987) 150–61 esp. on trolley tracks; Gijs Mom, "Inter-artifactual technology transfer: road building technology in the Netherlands and the competition between bricks, macadam, asphalt, and concrete," *H and Tech* 20 (2004) 75–96; Balaÿ,

L'espace sonore (→ n.75) 97–100 on slow adoption of asphalt in France, though recommended as early as the 1870s by an influential physician: Jean-Baptiste Fonssagrives, *Hygiène et assainissement des villes* (P, 1874) 202–203. Known to the Romans, the secrets of concrete were not recovered until the mid-1800s and concrete was rarely used in road-building until the 1920s. Traffic noise and bad paving had been issues since Roman times: Juvenal, “On leaving town,” *Satires*, tr. Jerome Mazzaro (U Mich, 1965) 36–46; G. T. Salusbury-Jones, *Street Life in Medieval England*, 2nd ed. (Totowa: Rowman and Littlefield, 1975) esp. 40–41. On spitting: Chapin, *Municipal Sanitation* (→ n.82) 158–60.

249. Mark Clark, “Suppressing innovation: Bell Laboratories and magnetic recording,” *Tech and Culture* 34 (1993) 516–38, esp. 517–18 on Oberlin Smith’s ideas of 1878 for using electromagnetism to record sound, which he thought would be a less noisy process than using phonographic physical vibrations; idem, with Henry Nielsen, “Crossed wires and missing connections: Valdemar Poulsen, the American Telegraphone Company, and the failure to commercialize magnetic recordings,” *Business H R* 69 (Spring 1995) 1–41.

250. I. B. Holley, Jr., “Blacktop: how asphalt paving came to the urban United States,” *Tech and Culture* 44 (2003) 703–33, q. 705 rasping; Geoffrey Lapage, “Noise,” *Chambers’s J* 13 (1923) 772–75, q. 773, shrill; John Ewen, Jr., “Wooden pavement,” *Niles’ Weekly Register* 51 (Sept. 3, 1836) 8, Manhattan; “Wood pavement,” *J Franklin Inst [repr. from Railway Mag]* 26 (Sept. 1840) 205–209; [James White], “The battle of the blocks: the paving question,” *Blackwood’s Edinburgh Mag* 53 (May 1843) 614–25, q. 617; G. F. B., “[Letter from Boston],” *National Era* 1 (May 13, 1847) 3; “Wood-Paving,” *Lancet* 2 (Oct. 14, 1876) 550; McShane, “Transforming the use of urban space,” 288–89.

251. [Ernest Hart], “London noise,” *Sanitary Record* (Oct. 28, 1876) 277–78; “An anti-noise society,” *Public Improvements* (Sept. 15, 1899) 198; Mrs. Patrick Campbell, *My Life and Some Letters* (NY, 1922) 188, 216–18, 224–28; Margot Peters, *Mrs. Pat* (NY: Knopf, 1984) 220–22; “Tanbark for Mrs. Campbell,” *NY Daily Trib* (Jan. 21, 1902) 6:3; Emma Goldman, *Social Significance of the Modern Drama* (B, 1914) 71–80.

252. Holley, “Blacktop”; David V. Herlihy, *Bicycles: The History* (Yale U, 2004), esp. 141, 216, 235, 244–54, q. 258, 266, 280, 298, 310, 316; Nordau, *The Drones Must Die* (→ n.236) 298–99 on women becoming louder, more obstreperous when accustomed to bicycling; Elmer S. Batterson, “Progress of the anti-noise movement,” *Natl Municipal R* 6 (May 1917) 376; McShane, “Transforming the use of urban space,” 280, table 1, and idem, *Technology and Reform: Street Railways and the Growth of Milwaukee* (Madison: State H Soc, 1975) 4–5 on paving for trolleys; Frederick Dalzell, *Engineering Invention: Frank J. Sprague and the U.S. Electrical Industry* (MIT, 2010) on the electric trolley systems, electric elevators, and elevated trains; Robert C. Post, *Urban Mass Transit: The Life Story of a Technology* (Johns Hopkins U, 2007) ch. 2; Gijs Mom, *The Electric Vehicle: Technology and Expectation in the Automobile Age* (Johns Hopkins U, 2005) esp. 84 on problems with pavement; Sam Alewitz, *Filthy Dirty: A Social History of Unsanitary Philadelphia in the Late Nineteenth Century* (NY: Garland, 1989) 96–103. If, as Charles Babbage determined in his *On the Economy of Machinery and Manufactures* (L, 1832) 243–44, horses’ hooves were more damaging to pavement than cart wheels, pavement was also damaging to horses, who fared poorly on city streets: Joel Tarr, *The Search for the Ultimate Sin: Urban Pollution in Historical Perspective*

(U Akron, 1996) 327. The acoustics of roads are deeply affected by their textures: Roger L. Wayson, *Relationship between Pavement Surface Texture and Highway Traffic Noise* (DC: Natl Acad, 1998).

253. Quincy A. Gillmore, *A Practical Treatise on Roads, Streets, and Pavements* (NY, 1876) 202, 206; Ira O. Baker, *A Treatise on Roads and Pavements* (NY, 1907) q. 579, 583–84; Harland Bartholomew, *Problems of St. Louis* (St. Louis, 1917) 112, on the noisiness of different pavements; James C. Bayles, “Pipe galleries for New York,” *Bull Municipal Art Soc of NY* 11 (1902) 1–3, q. 4–5; Winter, *London’s Teeming Streets* (→ n.38) 36–40, 119–21; Robert S. Saunders, “My Autobiography—A Life to Live,” (typescript, 1967) in Box 1, f. 2, “On the Road,” 25, 45, 65, in Western Historical Mss sl 87, U Missouri-St. Louis. Cf. Lloyd A. Herman and Matt J. Ambroziak, *Effects of Pavement Type on Traffic Noise Levels* (Ohio U Center for Geotechnical and Environmental Research, 2000) 9: asphalt is quiet until its pores become clogged and it stiffens, after which it amplifies noise from vibration and tire treads; traffic actually wears down irregularities in concrete, so noise levels decline.

254. M. Lethier, “[Address to] Séance Plénière,” *Compte rendu des travaux du Congrès International de la Route* (P, 1909) 8; Joseph A. Amato, *Dust: A History of the Small and the Invisible* (UC, 2000) 12, 23, 79–80, 81 on surfaces, 88, 90, 106; Suellen M. Hoy, *Chasing Dirt: The American Pursuit of Cleanliness* (Oxford U, 1995). On vacuum cleaners: Charles R. Lester, Vintage Vacuum Cleaner Cyberspace Museum, www.137.com/museum; Warshaw Collection, “Vacuum Cleaners” file, advertisements for Regina Pneumatic Cleaner (191–?), Federal Vacuum Cleaners (1912?), Vacuna Portable Turbine Vacuum Cleaner (1911?), and brochure from Keller Mfg Co., *The Dustless Home with the Santo Vacuum Cleaner* (Phila, 1910), as well as a confidential memo on the Electrolux Dig More Dirt Demonstration (1938) for salesmen who begin by using the housewife’s own machine, instructing them to bend forward as if trying “to catch what she says” over the noise of her old cleaner; Douglas Laird, *What Makes People Buy* (NY, 1935) ch. 17 on successful vacuum cleaner salesmen; Glynn Mapes, “A vacuum’s whoosh, a car door’s thunk don’t just happen,” *Wall Street J* (Sept. 10, 1968) 1—“A vacuum without a whoosh would be as untempting as a steak without a sizzle”; Clifford R. Bragdon, *Noise Pollution: The Unquiet Crisis* (U Penn, 1971) 6 on the failure of Hoover’s “whisper quiet” vacuum cleaner. For an explicit association of dust with noise: “Dust and noise—the little holes where profits leak through,” *Current Opinion* 57 (Dec. 1914) 434, and speaking of dust, farmers would hear the quieted tractors produced by Allis-Chalmers as having too little horsepower: Aram Glorig, interviewed on Aug. 8, 1995, House Ear Institute, Los Angeles.

255. Heather Viles, “‘Unswept stone, besmeer’d by sluttish time’: air pollution and building stone decay in Oxford, 1790–1960,” *Env and H* 2 (1996) 359–72; John Graham, Jr., ed., *Letters of Thomas Carlyle to William Graham* (Princeton U, 1950) 75.

256. Horatio Allen, 1828 diary, typescript pp. 1 and 43, Mss 724, Horatio Allen Collection, Baker Library Historical Collections, Harvard Business School, Harvard U; Commissioners for Inquiring into the State of Large Towns and Populous Districts, *First Report* (L, 1844) 24–26, 42; Robinson, *Improvement of Towns*, 61, “brilliancy”; Peter Brimblecombe, “Perception and effects of Late Victorian air pollution,” in *Smoke and Mirrors: The Politics and Culture of Air Pollution*, ed. E. Melanie DuPuis (NYU, 2004) 15–26, 21 for frequency

of fogs, 23 for artists; Stephen Mosley, “Public perceptions of smoke pollution in Victorian Manchester,” in *ibid.*, 51–76, q. 51 smoke cloud, 52 chimneys, q. 55 Bellasis poem, q. 59 incense, q. 64 on birdsong (from Edward Carpenter, “The smoke-plague and its remedy,” *Macmillan’s* 62 [1890] 204–206); *idem*, *The Chimney of the World: A History of Smoke Pollution in Victorian and Edwardian Manchester* (Camb: White Horse, 2001); A Boiler Maker, “A movement that is just and needful—the short hour day,” *Boilermakers J* 8 (1896) 54–56; Alan Derickson, *Black Lung: Anatomy of a Public Health Disaster* (Cornell U, 1998) 39, q. 45 on “antiseptic,” 46. For context: Peter Thorsheim, *Inventing Pollution: Coal, Smoke and Culture in Britain since 1800* (Ohio U, 2006) esp. 14–16 on fog, 16–18 on “healthful” smoke.

257. Samuel B. Flagg, *City Smoke Ordinances and Smoke Abatement* (DC, 1912) 26 for Ringelmann chart. As evidence of decay *and* rebuilding, of aging *and* speed, dust had a close relationship with “the process of urban restructuring [that] generated ruins and visions of ruins”: Nick Yablon, *Untimely Ruins: An Archaeology of American Urban Modernity, 1819–1919* (U Chicago, 2009) esp. ch. 4, and q. 109.

258. L. Vernon Briggs, *Smoke Abatement: What Has Been Done and Is Being Done Today to Abate this Nuisance* (B, 1941) ch. 2; William H. Te Brake, “Air pollution and fuel crises in preindustrial London, 1250–1650,” *Tech and Culture* 16 (1975) 337–59, q. 337, Evelyn on “presumptuous smook”; Peter Brimblecombe, *The Big Smoke: A History of Air Pollution in London since Medieval Times* (L: Methuen, 1987) 7–11, q. 12–13 for Assize case, 63, 74; Joel F. Brenner, “Nuisance law and the industrial revolution,” *J Legal Studies* 3 (June 1974) 403–39; Ronald Rees, “The South Wales copper-smoke dispute, 1833–95,” *Welsh H R* 10, 4 (1981) 480–96; *St. Helen’s Smelting Company v. William Tipping*, XI H.L.C. (1865) 642, 11 Engl Reports 1483. Cf. *Whitney v. Bartholomew*, 21 Conn 213 (1851) for reversal of a decision in favor of a plaintiff whose house filled with smoke and ash from a nearby carriage factory and blacksmith shop whenever the windows were open.

259. John Ranlett, “The Smoke Abatement Exhibition of 1881,” *H Today* 31 (Nov. 1981) 10–13; W. F. Pollock, “Smoke prevention,” *Nineteenth Century* 9 (March 1881) 478–90, q. 479–80, “smoke-curse”; Brimblecombe, *The Big Smoke*, 128–29; Thorsheim, *Inventing Pollution*, 20–30, 52–54, q. 55 from Sir Frederick Leighton, 60 on Parliament, 89–99 on the Exhibition; Lord E. Ashby and Mary Anderson, “The roots of the British Clean Air Act, 1956: I. The awakening of public opinion over industrial smoke, 1843–1853; II. The appeal to public opinion over domestic smoke, 1880–1892; III. The ripening of public opinion, 1898–1952,” *Interdisciplinary Sci R* 1 (1976) 279–90 and 2 (1977) 9–26, 191–206; Clapp, *Environmental History of Britain* (→n.10) chs. 2–3.

260. Europe: H. Diederiks and C. Jeurgens, “Environmental policy in nineteenth-century Leyden,” in *The Silent Countdown: Essays in European Environmental History*, eds. P. Brimblecombe and C. Pfister (NY: Springer, 1990) 167–81; E. Schramm, “Experts in the smelter smoke debate,” *ibid.*, 196–209; Ilja Mieck, “Umweltschutz in Alt-Berlin: Luftverunreinigung und Lärmbelästigung zur Zeit der frühen Industrialisierung,” *Jahrbuch Verein für die Geschichte Berlins* 22 (1973) 7–25; Leonard Hill and James A. Campbell, *Health and Env* (NY, 1925) 6 on German commissions; Frank Uekoetter, *The Age of Smoke: Environmental Policy in Germany and the United States, 1880–1940* (U Pittsburgh, 2009), a fine comparative work. United States: Angela Gugliotta, “Class, gender, and coal smoke:

gender ideology and environmental injustice in Pittsburgh, 1868–1914,” *Env H* 5 (April 2000) 165–93; eadem, “How, when and for whom was smoke a problem in Pittsburgh?” (→n.10); David Stradling, *Smokestacks and Progressives: Environmentalists, Engineers, and Air Quality in America, 1881–1951* (Johns Hopkins U, 1999) q. 28, Cleveland; Willard Glazier, *Peculiarities of American Cities* (Phila, 1886) 128 on Cincinnati, 134 on Pittsburgh; Bessie L. Pierce, comp., *As Others See Chicago: Impressions of Visitors, 1673–1933* (U Chicago, 1933) 276 for Giacosa, and cf. Henry Demarest Lloyd, *No Mean City* (NY, 1910 [1898]) 202, White City as a countermodel “to smoke and whirl”; Scott H. Dewey, *Don’t Breathe the Air: Air Pollution and U.S. Environmental Politics, 1945–1970* (Texas A & M, 2000) 23–24, Chicago ordinance; Civic League of St. Louis, Correspondence and Reports on Matters in the Hands of Committees, 1914–1915, f. 5, Civic Work in Other Cities [Toledo], in RB-M 307.76, oversize, Special Collections, St. Louis Public Library; John H. Grundlach, letter to editor, *St. Louis Globe-Democrat* (Nov. 28, 1917) clipping in St. Louis Citizen’s Smoke Abatement League, Papers 1917–35, Box 1, f. 1, Missouri Historical Soc, St. Louis; St. Louis Civic League, Smoke Abatement Committee, *Making St. Louis a Smokeless City!* (St. Louis, ca. 1914–1919) on tons of soot; Rolla Wells, *Episodes of My Life* (St. Louis, 1933) q. 122 sunlight, 127, q. 157 water; Robert D. Grinder, “The war against St. Louis’s smoke, 1891–1924,” *Missouri H R* 69,2 (1975) 191–205; Civic Club of Philadelphia, *Annual Report* 12 (1906) 72–73 and *ibid.* 13 (1907) 14.

261. Academy of Ophthalmology and Otolaryngology, Council Minutes 1903, p. 23, Petition on Street Cars, resolving “that Street Railway Companies should be encouraged by public sentiment to introduce noiseless wheels and other appliances [e.g., rubber stops, window frame batting] to overcome the horrible noise which is so characteristic of many of the systems,” in vertical file, “Street Cars,” Archives of the John Q. Adams Center for the History of Otolaryngology—Head and Neck Surgery, Alexandria, Virginia; Annie Besant and C. W. Leadbeater, *Man: Whence, How and Whither* (Adyar, 1913) 439; Ruth Schwartz Cowan, “Coal stoves and clean sinks: housework between 1890 and 1930,” in *American Home Life* (→n.245) 211–24; W. R. Collier, “Atlanta, the smokeless city,” *City Builder* 1,2 (April 1916) 10,16 on gas ranges; advertisement for White Closed Cars, *NY Times* (Oct. 18, 1908) III,4; Stradling, *Smokestacks and Progressives*, 50–52; Mothers Club of Cambridge, Papers 1881–1942, Box 1, Records of Meetings, v.6 (March 10, May 19, and Dec. 15, 1909), Arthur and Elizabeth Schlesinger Lib on the History of Women in America, Radcliffe Institute, Harvard U.

262. Grundlach letter, *St. Louis Globe-Democrat* (Nov. 28, 1917); Kewanee Boiler Co. advertisement, “Get All the Heat From Your Coal,” *Lit Digest* (March 7, 1914) 511; Frederick Law Olmsted, Jr., and Harlan Page Kelsey, *The Smoke Nuisance* (Phila, 1908) q. 5, 15 cartoon. On symbolisms of smoke: Michel Serres, *Feux et signaux de brume: Zola* (Paris: Grasset, 1975).

263. Adam W. Rome, “Coming to terms with pollution: the language of environmental reform, 1865–1915,” *Env H* 1 (July 1996) 6–28; Harold L. Platt, “Invisible gases: smoke, gender, and the redefinition of environmental policy in Chicago, 1900–1920,” *Planning Perspectives* 10 (1995) 67–97; Maureen A. Flanagan, “The city profitable, the city livable: environmental policy, gender, and power in Chicago in the 1910s,” *J Urban H* 22 (1996)

163–90; Stradling, *Smokestacks and Progressives*; Robert D. Grinder, “The battle for clean air: the smoke problem in post-Civil-War America,” in *Pollution and Reform in American Cities, 1870–1930*, ed. Martin V. Melosi (U Texas at Austin, 1980) 83–104, q. 86 from Mrs. Merrill and Dr. J. B. Stoner, “The ill effects of smoke on health and comfort,” *Military Surgeon* 32 (1913) 373; William Nicholson, *Smoke Abatement* (L, 1905) 1–2.

264. Henkin, *City Reading* (→ n.152) 35, 54, 70–73; Joshua Brown, *Beyond the Lines: Pictorial Reporting, Everyday Life, and the Crisis of Gilded Age America* (UC Berkeley, 2002) 235–37, q. 189 on flaming poster from an 1882 issue of *Frank Leslie’s Mag*; David Traxel, 1898: *The Birth of the American Century* (NY: Knopf, 1998) 292; Diana Hindley and Geoffrey Hindley, *Advertising in Victorian England, 1837–1901* (L: Wayland, 1972) 68, 130; Phillip Tocker, “Standardized outdoor advertising,” in *Outdoor Advertising: History and Regulation*, ed. John W. Houck (U Notre Dame, 1969) 30–35; William H. Wilson, “The billboard: bane of the City Beautiful,” *J Urban H* 13 (1987) 396–97; E. F. Trefz, “Influence of outdoor advertising on the sub-conscious mind,” *Billposter and Distributor* 13 (Oct. 1908) 21; Catharine Gudis, *Buyways: Billboards, Automobiles, and the American Landscape* (NY: Routledge, 2004) pt. 3, esp. 164–72.

265. W. E. H. Lecky et al., “The advertisement nuisance,” *New R* 9 (Nov. 1893) 466–81; Donal McCartney, *W. E. H. Lecky, Historian and Politician* (Dublin: Lilliput, 1994) 154–60; Jim Smyth, “[Review of McCartney]” *The Historical J* 38 (1995) 253–56; “A famous portrait painter—death of Sir W. B. Richmond,” *L Times* (Feb. 14, 1921) 13:5; Elizabeth Lee, rev. Katharine Chubbuck, “Sturgis, Julian Russell,” *Oxford Dict of Natl Biog* (Oxford U, 2004–2007) at www.oxforddnb.com; Mary Jeune, *Memories of Fifty Years* (L, 1909).

266. Richardson Evans, “Preface,” in *SCAPA: A Record of Work and Thought Intended to Serve as a Handbook for the Use of Members and Others Interested* (L, 1909) q. 3, q. 7, q. 8, q. 12, 22, and his *The Age of Disfigurement* (L, 1893) esp. 17 and q. 6, legal recourses “if a small boy shouts into my ear every two minutes,” none for “assault and battery on my eyes”; *Beautiful World* 1,3 (June 1894) 106. For the rest: C. T. Abdy Williams, “The grievance of unnecessary noise,” *ibid.* 2,5 (Dec. 1895) 31–32, with editorial comment, 33–34; [Alfred] Waterhouse, “Address,” *ibid.* 3,6 (Dec. 1896) 14, 20.

267. *Beautiful World* 3,6 (Dec. 1896) 20–21 for Crackanthorpe, and 3,7 (Feb. 1898) 14 for Canziani; J. Horace McFarland, “Why billboard advertising as at present conducted is doomed,” *Chautauquan* 51 (June 1908) 19–46, q. 38, Welch; Robert G. Cook, *Report of the Mayor’s Billboard Advertising Commission of the City of New York* (NY, 1913) esp. 7–9 on electric signs; Hindley and Hindley, *Advertising in Victorian England*, 68; John A. Jakle and Keith A. Sculle, *Signs in America’s Auto Age: Signatures of Landscape and Place* (U Iowa, 2004) esp. 5, 9 on speed and signage, 10–12 on posting companies, 14 “sky signs”; Helen Stoddart, *Rings of Desire: Circus History and Representation* (Manchester U, 2000) 53. As for the “glare” of the signage, electrified or not, there had been growing ophthalmological concern with the toll on vision exacted by ornate furnishings, glitter, and overstimulated eyes: Peter J. Brownlee, “Ophthalmology, popular physiology, and the market revolution in vision,” *J Early Republic* 28,4 (2008) 597–626.

268. A. P., “Act to prevent defacing of natural scenery,” *Brush and Pencil* 11,2 (1902) 121–22; William H. Rollins, *A Greener Vision of Home: Cultural Politics and Environmental*

Reform in the German Heimatschutz Movement, 1904-1918 (U Michigan, 1997) 3, 61, 83, 91, 170-74; "The Pennsylvania Department billboards, a menace to health," *The Index* (July 28, 1906) 10; H. Leonard Bendle, "The billboard campaign," *Bull Municipal Art Soc of Hartford* 11 (1909) 41-45, and cf. Baldwin, *Domesticating the Street* (→ n.50) 60-62; Grosvenor Atterbury, "Hospitals and esthetics," *Amer Mag of Art* 7 (Sept. 1916) 443-47; Albert S. Bard Papers, Box 25, Mayor's Billboard Advertising Commission, Transcripts of Hearings, 1913, p. 14, testimony of Mr. Dielman, and Box 19, Municipal Art Society, Bard on "The billboard blight—what to do about it," *Bull Municipal Art Soc of NY* 22 (Mar 1922) 20, in Manuscripts and Archives Division, NY Public Lib. On French regulations: Marcel Fitoussi, *L'Affichage* (PUF, 1995).

269. "Pennsylvania Department billboards," 10; Clinton R. Woodruff, *The Billboard Nuisance* (DC, 1908) 5, serpents; J. Horace McFarland, "The last call on billboard removal," *Ladies' Home J* (Aug. 1905) 28; Harry F. Lake, "The billboard nuisance," *Amer City* 3 (1910) 219-24, q. 222, vulgarity; Gudis, *Buyways*, 167-68; Woodruff, *Billboard Nuisance*, 8 for Gilder; McFarland, "Why billboard advertising as at present conducted is doomed," 20; "Retrospect of 1897," *Beautiful World* 3,7 (Feb. 1898) 26.

270. Trefz, "Influence of outdoor advertising on the sub-conscious mind," 21-23; Elizabeth Waterhouse, "A beautiful world," *Beautiful World* 1,1 (1893) 2, self-assertion; "The Bill-Posters and the Society," *ibid.*, 11; "Memorial to London County Council," *ibid.* 3,7 (Feb. 1898) 27, brutal attack; Michael Redclift, *Chewing Gum: The Fortunes of Taste* (NY: Routledge, 2004) 40-42 on Wrigley, who put 117 billboards along 70 miles of rail line from Atlantic City to Trenton. As chewing gum became popular, daily life in and beyond the schoolroom had another sound to accommodate. The popping of bubble-gum came later.

271. Sylvester Baxter, "The nuisance of advertising," *Century Mag* 73 (1907) 419-30, q. 420, q. 428; John W. Reps, headnotes to *idem*, "The German way of making better cities," *Atlantic Mo* 104 (July 1909) 72-95, at www.library.cornell.edu/Reps/DOCS/baxter.htm. For China, Di Wang, *Street Culture in Chengdu: Public Spaces, Urban Commoners, and Local Politics, 1870-1930* (Stanford U, 2003) esp. 69-80, 133-35, 144, 154, 197, 211-14; Victoria L. Tongish, presentation at Haliburton Soundscape Workshop, Haliburton, Ontario, July 29, 1966. Cf. Jackson Lears, *Fables of Abundance: A Cultural History of Advertising in America* (NY: Basic, 1994) 177ff. on vitalism in turn-of-the-century advertising. For an English case revolving upon the literal noisiness (rattling and creaking) of a billboard: *Cooper v. Crabtree*, 20 Ch.D. 589 (1882).

272. Indeed, the *OED Online* acknowledges neither "visual noise" nor "optical noise," although both phrases had appeared by the 1930s. And the process of making audible that which is first or chiefly present to another sense (in parallel to the process of "visualization" tracked by historians of science and medicine across the 19th century), has only recently acquired a name that is likely to stick: Michael Vorländer, *Auralization: Fundamentals of Acoustics, Modelling, Simulation, Algorithms, and Acoustic Virtual Reality* (Berlin: Springer, 2008).

273. Johann Georg Sulzer, trs. Peter le Huray and James Day, "Music," in *German Essays on Music* (→ n.2) 31, from his *Allgemeine Theorie der schönen Künste* (1771-1774).

274. Evans, *Age of Disfigurement*, 31, 43; idem, “Advertising as a trespass on the public,” *Nineteenth Century* 37 (June 1895) 968–80.

275. Raymond R. Coletta, “The case for aesthetic nuisance: rethinking traditional judicial attitudes,” *Ohio State Law J* 48 (Winter 1987) 141–75; Wilson, “The billboard,” q. 409 on art, 412–19; *Bill Posting Sign Co. v. Atlantic City*, 58 Atl. 342–44 (1904); *City of Chicago v. Gunning System*, 214 Ill 628 (1905); *Commonwealth v. Boston Advertising Co.*, 188 Mass 348 (1905) at 351; *Passaic v. Paterson Bill Posting Co.*, 72 NJ Law 285 (1905), summed up in *People ex rel. M. Wineburgh Advertising Co. v. Edward S. Murphy*, 195 NY 126 (1909); *St. Louis Gunning Advertising Co. v. City of St. Louis*, 235 Mo 99 (1911) at 135, 145, 153, and 175, partially reversed at 248–250 US 599 (1918).

276. Samuel D. Warren and Louis D. Brandeis, “The right to privacy,” *Harvard Law R* 4 (1890) 193–220; Editorial, “An actionable right of privacy?” *Yale Law J* 12 (1902–1903) 34–38; James Barrow, “Warren and Brandeis . . . : Demystifying a landmark citation,” *Suffolk U Law R* 13,4 (1979) 875–922; Robert C. Post, “Rereading Warren and Brandeis: privacy, property, and appropriation,” *Case Western Reserve Law R* 41 (1990–91) 647–80; Hillel Schwartz, *The Culture of the Copy: Striking Likenesses, Unreasonable Facsimiles* (NY: Zone, 1996) 326–31.

277. Martin Green, *The Mount Vernon Street Warrens: A Boston Story, 1860–1910* (NY: Scribners, 1989) esp. 3–12, 193–212; http://dedhamhorsethieves.org/_wsn/page5.html as presented by Bob Hanson; Melvin I. Urofsky and David W. Levy, eds., *The Family Letters of Louis D. Brandeis* (U Oklahoma, 2002) q. 46–47, q. 64, 73; Felix Adler, “The moral value of silence,” *Intl J Ethics* 8 (1898) 345–51, q. 351.

278. For word-dating: *OED* s.v. “shock” etc. On newspapers: W. Joseph Campbell, *Yellow Journalism* (Westport: Praeger, 2001) 6–7, and 48 for the *NY J Sunday Amer Mag* headline (May 20, 1897) to article by Winifred Black on modern photography; “Net results of the passage through Hempstead of young Vanderbilt’s flying auto,” *NY World* (Oct. 28, 1900) 1; David R. Spencer, *The Yellow Journalism: The Press and America’s Emergence as a World Power* (Northwestern U, 2007); Elliott J. Gorn, “The wicked world: the *National Police Gazette* and Gilded Age America,” *Media Studies J* 15 (1992) 1–16; Guy Reel, *The National Police Gazette and the Making of the Modern American Man, 1879–1906* (NY: Palgrave Macmillan, 2006). On shock or concussion of the spine: Jeffrey T. Schapp, “Crash (speed as engine of individuation),” *Modernism/Modernity* 6,1 (1999) 1–50, starting with the collision of horse-drawn carriages in the 1780s; Thomas Keller, “Railway spine revisited: traumatic neurosis or neurotrauma?” *Bull H Med and Allied Sci* 50 (1995) 507–24; Ralph Harrington, “The railway accident,” in *Traumatic Pasts* (→n.157); Eric Caplan, “Trains and trauma in the American Gilded Age,” *ibid.*, 57–80; Shelly Trower, “‘Upwards of 20,000’: extrasensory quantities of railway shock,” *Senses and Society* 3,2 (2008) 153–67. On musical shock: Thomas F. Kelly, *First Nights: Five Musical Premieres* (Yale U, 2000) 258ff. on *The Rite of Spring*, “one of the loudest unamplified moments” in 20th-century music. Of the electric chair: Richard Moran, *Executioner’s Current: Thomas Edison, George Westinghouse, and the Invention of the Electric Chair* (NY: Knopf, 2002); Essig, *Edison and the Electric Chair* (→n.245) esp. ch. 11. On medical shock: *Index-Catalogue of the Library of the Surgeon-General’s Office. U.S. Army, Series 1–2* (DC, 1880–1916), 736 citations; H. Gasser,

“Shock,” *Med Times* 28 (July 1900) 197–99, q. 197; Tom A. Williams, “The relative value of the affective and the intellectual processes in the genesis of the psychosis called traumatic neurasthenia,” *J Abnormal Psych* 5,2 (1910) 47–56; George W. Crile, “The kinetic system,” in *The Origin and Nature of the Emotions*, ed. Amy F. Rowland (Phila, 1915) 173–226. On explosions: Émile Jouguet, “Remarque sur les ondes de choqe: application à l’onde explosive,” *Comptes rendus des séances de l’Académie des Sciences* 144 (1907) 415–17; L. Crussard, “Ondes de choc et onde explosive,” *Bull [trimestriel] de la société de l’industrie minérale*, ser. 4,6 (1907) 258–363. On seismology: Robert Mallet, “On observation of earthquake phenomena,” in *A Manual Prepared for the Use of Officers in Her Majesty’s Navy*, ed. R. Main (3rd ed: L, 1859) 356: “The sound-wave through the earth travels probably at the same rate as the shock, or earth-wave; it is, in fact, *the shock (or its fractures)* heard.”

279. “The opening of street car doors,” *Staughton News Sentinel* (Jan. 20, 1917) clipping in Blue Hill Street Railway Co. (Canton, Mass), Papers 1898–1920, Scrapbook no. 2, in Historical Collections, Baker Lib, Harvard Business School, Harvard U; Roddis Lumber and Veneer Co., *Roddiss Doors Catalog* (Marshfield, Wis, 1910–1920s?) 108–109 on Flush Doors, in Building Supplies Files, John W. Hartman Center. On Hannah Harger’s screen doors: John F. Merry, *History of Delaware County, Iowa and its People* (Chicago, 1914) II,30–34, 370–71 at <http://iagenweb.org/delaware/bios/1914>, entries for F. B. Doolittle and Charles Harger. On door stops: Yale & Towne Mfg. Co. advertisement, “Mr. Never-Close-the-Door Mr. Always-Slam-the-Door Goodbye!” *Hampton’s Mag Advertiser* (Oct. 10, 1892) 136, and idem, “As soft as cotton,” *World’s Work Advertiser* (Oct. 1919), both in “Door Opener” files, Archives, U Illinois at Urbana-Champaign, as also Caldwell Mfg Co. advertisement, “The Silent Door: ‘Dime’ Screen Door Check,” unsourced clip (1911) and P. & F. Corbin advertisement, “Now we’ll be through with slamming and drafts,” *Saturday Evening Post* (Oct. 25, 1924), door checks as akin to “firm, but gentle parents” that “quietly insist that doors close—quickly, silently, securely.”

280. Knudson, “Peculiar sound effects” (→ n.45) 81 on hissing and the wolf-whistle (like a man “going *citt* with his teeth”); Theophilus Van Kannel, “Storm-Door Structure,” U.S. Patent 387,571 (Aug. 7, 1888); James Buzard, “Perpetual revolution,” *Modernism/Modernity* 8,4 (2001) 559–81, using Harvey E. Van Kannel and Joanne Fox Marshall, *T. Van Kannel, The Inventor: His Autobiography and Journal*, 2 vols. (Oak Ridge, 1988); Alan Beardmore, *The Revolving Door since 1881* (Edam: Royal Boon Edam, 2001) 11, 29–31, 50, 112; Van Kannel Revolving Door Co., *Circular No. 1 General Information on Revolving Doors* (NY, 1904) in Building Supplies File, Hartman Center.

281. Virginia Woolf, *A Room of One’s Own* (L, 1929) 56, q. 78–79, 157, q. 160, 166, and next note; Peter Stansky, *On or About December 1910: Early Bloomsbury and Its Intimate World* (Harvard U, 1996) 2–3 and throughout. As Woolf completed *A Room of One’s Own*, Brandeis issued his historic dissent in *Olmstead v. United States*, 277 U.S. 438 (1928), the first telephone wiretapping case to reach the high court. The Bench majority did not regard such secret surveillance as physical trespass and would not recognize a more abstract “right to be let alone” (p. 478) until *Katz v. United States*, 389 U.S. 347 (1967). Cf. Judith W. Decew, *In Pursuit of Privacy: Law, Ethics, and the Rise of Technology* (Cornell U, 1997) 14–17, 19. For Montaigne: M. A. Screech, tr. and ed., “On solitude,” *The Essays*

of *Michel de Montaigne* (L: Allen Lane Penguin, 1991 [1580]) 270. On walls: "Musical neighbours," *The [London] Spectator* (Dec. 17, 1892) 884. On private apartments: Mark Girouard, *Life in the English Country House* (Yale U, 1978) 11, and ch. 10 on the introduction of call-bells to summon servants from their quarters in the back parts of the house, thus opening more front rooms to socializing among family and guests. For concerns about privacy and noise transmitted from scullery to dining room or study: Robert Kerr, *The Gentleman's House* (NY: Johnson Reprint, 1972 [1864]) 67-69, 186-87. Cf. Roger-Henri Guerrand, "Private Spaces," in *A History of Private Life: IV. From the Fires of Revolution to the Great War*, ed. Michelle Perrot, tr. Arthur Goldhammer (Belknap Press, Harvard U, 1990) 359-449. As for the comet: Jerred Metz, *Halley's Comet, 1910: Fire in the Sky* (St. Louis: Singing Bone, 1985).

282. Hermione Lee, *Virginia Woolf* (NY: Knopf, 1997) 38 on accidents, 42, 105, 111, 233, 235, and ch. 10, "madness"; Julia Duckworth Stephen, "Notes from Sick Rooms" (1883) in her *Stories for Children, Essays for Adults*, eds. D. F. Gillespie and E. Steele (Syracuse U, 1987) xviii-xxi, q. 230; Alison M. Lewis, "Caroline Emelia Stephen (1834-1909) and Virginia Woolf (1882-1940): a Quaker influence on modern English literature," *Quaker Theology* 3 (Autumn 2000) at www.quaker.org/quest/issue3-3.html; Virginia Woolf, *The Flight of the Mind: The Letters of Virginia Woolf. Volume I. 1888-1912 (Virginia Stephen)*, ed. Nigel Nicolson (L: Hogarth, 1975) 144-52, q. 145, q. 147, q. 229-30; Thomas C. Caramagno, *The Flight of the Mind: Virginia Woolf's Art and Manic-Depressive Illness* (UC, 1992) 11-14 on Savage and the rest cures; Carol A. Nathanson, "The American reaction to London's first Grafton show," *Archives of Amer Art J* 25, 3 (1985) 2-10, q. 3, letter of Nov. 22, 1910 to Isabella Stewart Gardner from Matthew Prichard on the reaction of Londoners; Stansky, *On or About December 1910*, 12, 48, 57-60, 208; Woolf, *A Room of One's Own*, 19, 22-23. For the quotation from *The Voyage Out*: Patricia O. Laurence, *The Reading of Silence: Virginia Woolf in the English Tradition* (Stanford U, 1991) 1. Contrast Jane Marcus, *Virginia Woolf and the Languages of Patriarchy* (Indiana U, 1987) 10-16 on Woolf's celebration of the coarseness of speech as a means of honoring women's work.

283. Paul Ferris, *The House of Northcliffe: The Harmsworths of Fleet Street* (L: Weidenfeld and Nicolson, 1971) 51, 56-57, 67 on servants; Hamilton Fyfe, *Northcliffe: An Intimate Biography* (NY, 1930) 79 on foul language; Reginald Pound and Geoffrey Harmsworth, *Northcliffe* (NY: Praeger, 1960) 29, "ear orifices," 118 for Dickens; S. J. Taylor, *The Great Outsiders: Northcliffe, Rothermere, and the Daily Mail* (L: Weidenfeld and Nicolson, 1996) 5-7, 46, 79, and for hypochondria: 75, 111, 188.

284. James W. Barrett, *Joseph Pulitzer and the World* (NY, 1941) 120; George Juergens, *Joseph Pulitzer and the New York World* (Princeton U, 1966) 3, 46-47; W. A. Swanberg, *Pulitzer* (NY: Scribner's, 1967) 145, 153, 158-62, 166-67, 268-69, 272, 285, 313-14; Don C. Seitz, *Joseph Pulitzer, His Life and Letters* (NY, 1924) 179, 228, 252-53, 387-88, q. 415 last words; Alleyne Ireland, *An Adventure with a Genius: Recollections of Joseph Pulitzer* (NY, 1920) 229, 231; Leland Roth, *McKim, Mead and White, Architects* (NY: Harper & Row, 1983) q. 261 from Mead; Samuel G. White, *The Houses of McKim, Mead and White* (NY: Rizzoli, 1998) 218-23. Noise from large fans was always troublesome: R. W. Pryor, Jr., "Reduction or elimination of noise attending the operation of mechanical ventilating machinery,"

Trans Amer Soc Heating and Ventilating Engineers 20 (1914) 320–29.

285. William C. Carter, *Marcel Proust* (Yale U, 2000) 454, 494–98, 689, 731, 772, and ch. 1 on Adrien; Hayman, *Proust* (→n.97) 337–43; Elizabeth R. Jackson, “The crystallization of *À la recherche du temps perdu*, 1908–1909,” *French R* 38 (1964) 157–66; André Maurois, *The World of Marcel Proust*, tr. Moura Budberg (NY, 1960) 160–61, 181; Ann E. Gaylin, *Eavesdropping in the Novel from Austen to Proust* (Camb U, 2002) ch. 5; Annegret Fauser, *Musical Encounters at the 1889 Paris World’s Fair* (U Rochester, 2005) 279–312; Catherine Bertho-Lavenir, “Innovation technique et société du spectacle: le théâtrephone à l’Exposition de 1889,” *Mouvement social* 149 (Oct.–Dec. 1989) 59–70; Clément Ader, “Telephonic Transmission of Sound from Theaters,” U.S. Patent 257,453 (May 9, 1882), and cf. Claude Carlier, *L’Affaire Clément Ader* (P: Perrin, 1990) 21–25; Marcel Proust, *Correspondance*, ed. Philip Kolb (P: Plon, 1983) IX, 196 and X, vii, xi; idem, *The Way by Swann’s*, tr. Lydia Davis (L: Allen Lane, 2002 [1913]) 7, 10, q. 17, 18. On Proust’s mother’s voice over the phone: Stephen Kern, *The Culture of Time and Space, 1880–1918* (Harvard U, 1983) 215, citing Mina Curtiss, ed. and tr., *Letters of Marcel Proust* (NY, 1966) 73, and Proust’s transmutation of this experience in *Le Côté de Guermantes I*, ed. Thierry Laget (P: Gallimard, 1988 [1920]) 325–27, q. 342 for barrel organ, and 369–77 for the well-known pages on the ubiquity of the ticking of a watch and the auditory state of an invalid who has plugged up his ears. Cf. Hiromi Akaogi Masuo, *Les Bruits dans A la recherche du temps perdu* (Tokyo: Surugadai, 1994); Sara Danius, *Senses of Modernism: Technology, Perception and Aesthetics* (Cornell U, 2002) 12, 16, 22; Gérard Genette, *Figures of Literary Discourse* (Columbia U, 1982) 203–28, Proust and the sensory palimpsest; Balaÿ, *L’espace sonore* (→n.75) 165–72.

286. David Frisby and Mike Featherstone, eds., “[Excursus on] Sociology of the senses,” *Simmel on Culture* (L: Sage, 1997) 109–19, from Simmel’s *Soziologie. Untersuchungen über die Formen der Vergesellschaftung* (Leipzig, 1908), and cf. his “The sociology of sociability” (1911) 120–29, and “The metropolis and mental life” (1903) 174–86; David Frisby, *Sociological Impressionism: A Reassessment of Georg Simmel’s Social Theory*, 2nd ed. (L: Routledge, 1992) esp. 73–77, 120; Ralph M. Leck, *Georg Simmel and Avant-Garde Sociology: The Birth of Modernity, 1880–1920* (Amherst, NY: Humanity, 2000) esp. 31–33. For much more on the German philosophical and psychological context: Erlmann, “Rhythm and clues: time and the acoustic unconscious, ca. 1900,” in his *Reason and Resonance* (→n.102) 271–306.

287. Donna R. Braden, “‘The family that plays together stays together’: family pastimes and indoor amusements, 1890–1930,” in *American Home Life* (→n.246) 145–61, as also Katherine C. Grier, “Decline of the memory palace: the parlor after 1890,” 49–74; “The ideal flat,” *Puck* 65 (April 7, 1909) 5. On player pianos, which I am sadly neglecting: Brian Dolan, *Inventing Entertainment: The Player Piano and the Origins of an American Musical Industry* (Lanham, MD: Rowman and Littlefield, 2009).

288. [International Committee of the YMCA], *Messages of the Men and Religion Movement* (NY, 1912) II, 35, 39, 40, parts quoted by Colleen McDannell, “Parlor piety: the home as sacred space in Protestant America,” *American Home Life* (→n.246) 162–89, q. 175; *OED* s.v. “shock”; Kathleen Franz, *Tinkering: Consumers Reinvent the Early Automobile* (U Penn, 2005) 4–6 on the open road, 56; Theodore Dreiser, *Jennie Gerhardt* (Cleveland,

1946 [1911]) q. 107, 128-30, q. 132; W. A. Swanberg, *Dreiser* (NY: Scribner's, 1965) esp. 48, 96-100, 141-51.

289. William D. Orcutt, *Wallace Clement Sabine: A Study in Achievement* (Norwood, 1933) 7-19, 22, 26, 28, 35, 39, 44, 73 on his reputation as a "silent man"; Wilbur H. Siebert, *The Underground Railroad from Slavery to Freedom* (NY, 1899); idem, *The Mysteries of Ohio's Underground Railroads* (Columbus, Ohio, 1951); W. C. Sabine, *A Student's Manual of a Laboratory Course in Physical Measurements* (B, 1893) q. 1, 2, q. 4.

290. Wallace Clement Sabine, *Collected Papers on Acoustics* (Harvard U, 1922) 131; David Chase, "'Superb privacies': the later domestic commissions of Richard Morris Hunt, 1879-1895," *The Architecture of Richard Morris Hunt*, ed. Susan R. Stein (U Chicago, 1986) 151-72; Orcutt, *Wallace Clement Sabine*, q. 103 on Beecher and Hunt; Preservation Society of Newport County, "National Historic Landmark Nomination [for The Breakers]," ed. M. Carolyn Pitts, www.nps.gov/nhl/designations/samples/ri/breakers.pdf; Paul R. Baker, *Richard Morris Hunt* (MIT, 1980) 376-78, q. 379, 450. On Beecher, Hunt, and the Pilgrim Church: Joseph Bennett, "Observations on music in America: II. Church music," *Musical Times* (April 1, 1885) 194 on Pilgrim Church, as also Jeanne H. Kilde, *When Church Became Theatre: The Transformation of Evangelical Architecture and Worship in Nineteenth-Century America* (Oxford U, 2002) 112-13; Richard W. Fox, *Trials of Intimacy: Love and Loss in the Beecher-Tilton Scandal* (U Chicago, 1999) 57-58, Beecher's voice.

291. Rochelle Gurstein, *The Repeal of Reticence* (NY: Hill and Wang, 1996) 18-28; Charles Eliot Norton, *Letters*, eds. Sara Norton and M. A. DeWolfe Howe (B, 1913) II, q. 220, q. 236-37, 244, 248, and 343-44 in favorable response to the anti-noise campaigns of Edward S. Morse, for whom see below; idem, *Notes in Fine Arts IV at Harvard University*, taken by W. H. W[iggin], Jr. (Cambridgeport, 1890) I, 21, q. 23, q. 68, and II, q. 74; Linda Dowling, *Charles Eliot Norton: The Art of Reform in Nineteenth-Century America* (U Press of New England, 2007) esp. 28, 40, 119-22, 129, q. 138-39, 140, q. 142, q. 143, 146-47, q. 149; Michael W. Brooks, "New England Gothic: Charles Eliot Norton, Charles H. Moore, and Henry Adams," *Studies in H of Art* 35 (1990) 113-25. As for the regrettable noisiness of democracy, newspapers were full of accounts of politicians cried down by the opposition, e.g., "Hanna speaks to noisy crowd," *NY Daily Trib* (Nov. 3, 1900) 2:5, and there were special 14-inch rattles for campaign processions: "A new campaign rattle: It is red, white and blue and makes a great noise," *Brooklyn Daily Eagle* (July 21, 1892) 4.

292. Norton, *Letters*, 236, q. 244; Peter C. Hoffer, "Charles Eliot Norton: aesthetic reformer in an unaesthetic age," *J Aesthetic Education* 8,3 (1974) 19-31, q. 25 on the walls; Edwin H. Hall, "Biographical memoir: Wallace Clement Ware Sabine, 1868-1919," *Memoirs Nat Acad Sci* 21 (1967) 1, 13, 17; "Hon. Hylas Sabine," unsourced entry (1881/1882) at <http://freepages.genealogy.rootsweb.com/~unicountyohbio/honhylasabine.html>; Vida A. Latham, "Jane Downes Kelly Sabine, M.D., F.A.C.S.," *Med Woman's J* 57,9 (1950) 40-41; Orcutt, *Wallace Clement Sabine*, 7-8, and cf. Frank P. Graves's review of Orcutt in *J Higher Education* 5,3 (1934) 170-72, stressing his mother's influence. Sabine would have known of the infamous Grille from his mother and wife, or from headlines in 1908, when Muriel Matters and two other Australian suffragists chained themselves to the Grille while Matters made what was billed as the first speech by a woman in Parliament: Anne

Nugent, “Sister suffragists: Australian women activists in England,” *Natl Lib Australia News* 13,5 (Feb. 2003) at www.nla.gov.au/pub/nlanews/2003/feb03/article2.html.

293. “Hon. Hylas Sabine”; Latham, “Jane Downes Kelly Sabine”; Brown & Sharpe Manufacturing Company History, online at www.fundinguniverse.com/company-histories/Brown-amp-Sharpe-Manufacturing-Co-Company-History.html; Orcutt, *Wallace Clement Sabine*, 110. For another take: Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–33* (MIT, 2002), esp. 107–13 on Sabine’s biographers and his “isolation” from various scientific communities.

294. Hall, “Biographical memorial,” 17; Sabine, *Collected Papers*, 3–6; Théodore Lachèz, *Acoustique et optique des salles de réunions* (P, 1879 [1848]) vii–viii, xvii, q. 1, q. 17, 24, 69, 72, 80–81, 106, 111, 122n., 372; Mr. Russell, “[Summary of a communication to British Association],” in *Eclectic Museum of Foreign Lit, Sci, and Art* 3 (1843) 422; George S. Emmerson, *John Scott Russell: A Great Victorian Engineer and Naval Architect* (L: John Murray, 1977) 22–23. T. Roger Smith in 1895 did write that “The audience in any room absorb or deaden a great deal of sound by their clothing and the amount of uneven, soft, unreflecting surface they present,” but did not quantify this in his *Acoustics in Relation to Architecture* (→ n.176) 39. On the plans of Ledoux and Fourier, whose utopian communities were designed for quiet: Baläy, *L’espace sonore* (→ n.75) 187–202, and cf. 216–58 for architectural acoustics in France, referring often to Julien Guadet, *Éléments et théorie de l’architecture* (P, 1901–1904). Even in the four volumes of his 4th edition (1905), Guadet insists that there is no useful theory of architecture acoustics: “Quant à l’acoustique . . . personne n’y connaît rien, et les resultats sont au petit bonheur” (III,93). Cf. Günther Hartmann, “Aus der Frühgeschichte der Raumakustik,” *Acustica* 72 (1990) 247–57; M. C. M. Wright, “A short history of bad acoustics,” *JASA* 120 (Oct. 2006) 1807–15.

295. J. H. Lienhard, V, “Origins and early history of the Heat Measurements Laboratory: 1870 to 1933,” web.mit.edu/html/www/history.html; Sabine, *Collected Papers*, 6–7, 245–48; Gerald Holton, “How the Jefferson Physical Laboratory came to be,” *Physics Today* 37 (Dec. 1984) 32–37; Lawrence Aronovitch, “The spirit of investigation at Harvard University, 1870–1910,” in *The Development of the Laboratory*, ed. Frank A. J. L. James (Basingstoke: Macmillan, 1989) 83–103; Orcutt, *Wallace Clement Sabine*, 39. Thompson, *Soundscape of Modernity*, 34–37, stresses that Sabine, trained as a physicist, was among the first (after Joseph Henry) to frame architectural acoustics in terms of sound-as-energy.

296. Sabine, *Collected Papers*, q. 9, 10n., 14, q. 26; Orcutt, *Wallace Clement Sabine*, 97, q. 110; Ewart A. Wetherill, “Sabine’s first experiment—analysis of the acoustics of the Fogg Art Museum Lecture Room,” in *Proc Wallace Clement Sabine Centennial Symposium* (NY: Acoustical Soc of Amer, 1994) 33–36, with photo of the Lecture Room ca. 1910 on cover; Brian F. G. Katz and Ewart A. Wetherill, “Fogg Art Museum Lecture Room: a calibrated recreation of the birthplace of room acoustics,” *Forum Acusticum 2005 Budapest*, 2191–96, www.limsi.fr/Recherche/PERSI/thmsonesp/FoggArtMuseumLectureHall/FoggArtMusum.htm.

297. Sabine, *Collected Papers*, 13–52.

298. *Ibid.*, 52–60. For a later review: Cyril M. Harris and Charles T. Molloy, “The theory of sound absorptive materials,” *JASA* 24 (Jan. 1952) 1–7, noting that theory half a

century later was still weak with regard to non-homogeneous and non-isotropic materials.

299. *Ibid.*, 23, 53, 56; Orcutt, *Wallace Clement Sabine*, 72, 118; W. C. Sabine, “Acoustics,” in *Sturgis’ Illustrated Dictionary of Architecture and Building*, ed. Russell Sturgis (NY: Dover, 1989 [1901–1902]) I, 12–22. On window glazing, see R. Murray Schafer, *Voices of Tyranny, Temples of Silence* (Ontario: Arcana, 1993) 70–73.

300. Orcutt, *Wallace Clement Sabine*, 70; Thompson, *Soundscape of Modernity*, 18–33; Sabine, “Acoustics,” 15; *OED* s.v. “volume.” I thank Stefan Helmreich here for suggesting that I consider the peculiarity of the phrase, “turning up the volume.”

301. Richard D. Stebbins, *The Making of Symphony Hall, Boston: A History with Documents* (B: BSO, 2000) 13–14, q. 20–21, q. 38 McKim, q. 48–49 Sabine; Leo Beranek, “The notebooks of Wallace Sabine,” *Sabine Centennial*, 361–62.

302. Lachèz, *Acoustique*, 115n. on the Trocadéro, 415ff. on Garnier; Bruno Suner and Karl J.-F. Degioanni, “Architectural acoustics in France circa World War I and today... déjà vu?” *Sabine Centennial*, 37–40; Baedeker, *Paris and Environs with Routes from London to Paris*, 13th ed. (Leipzig, 1898) 78–79, 165–66; Orcutt, *Wallace Clement Sabine*, 133–41, q. 145 Krehbiel; Charles Garnier, *Le Théâtre* (P, 1871) 211–19, q. 213 *tohu-bohu*; Smith, *Acoustics in Relation to Architecture and Building* (→n.176) 2; Kurt M. Graffy, “The acoustical history of the Royal Albert Hall,” *Sabine Centennial*, 259–63; Eugene H. Kelly, *Architectural Acoustics: or, the Science of Sound Application Required in the Construction of Audience Rooms* (Buffalo, 1898) q. 5, q. 7, 9, 12, 35, 39, q. 63, q. 64, 67–68, 76, 97–102; Chuck LaChiusa, “Esenwein & Johnson in Buffalo, New York,” in Buffalo as an Architectural Museum, at <http://freenet.buffalo.edu/bah/a/archs/ej/ej.html>; “Doing the Pan: A Virtual Tour of the Pan-American Exposition,” at http://panam1901.bfn.org/tour_1/music1.htm; Ricardo Gonzalez, “The Temple of Music,” www.lib.umd.edu/ARCH/honr219f/1901buff.html and <http://ublib.buffalo.edu/libraries/exhibits/panam/art/architecture/temple.html>.

303. “Queen Victoria dead at Osborne,” *NY Times* (Jan. 23, 1901) 1; Jack C. Fisher, *Stolen Glory: The McKinley Assassination* (La Jolla: Alamar, 2001) 45, 46, 58–59; Stebbins, *Making of Symphony Hall*, 97, q. 99, 137–40, 152–53, 166, 170, q. 174, 184–91; Boston Landmarks Commission, Dept. of the Environment, City of Boston, *Gaiety Theater Study Report* (2000) at www.cityofboston.gov/environment/pdfs/gaiety.pdf, 30–31, citing C. H. Blackall, “Acoustics of halls and audiences,” *The Technograph* 16 (1901–1902) 11–12 and idem, “American Theater IV, Sight Lines,” *The Brickbuilder* 17 (March 1908); Sabine, *Collected Papers*, 242–43; Thompson, *Soundscape of Modernity*, 13–17, 51–55; Wallace Clement Sabine Papers (from the Riverbank Laboratory, Geneva, Illin), Harvard U Archives, HUG 1761.10, clipping, Frank Waldo, “Boston Symphony Hall: a scientific analysis of its acoustics,” from *The World* (Dec. 31, 1902): “We have become so accustomed to this reverberation being strongly pronounced in most music halls that even though it does interfere with the purity of tone, yet its absence causes dissatisfaction, and the tone is regarded as ‘dead’ or lacking in warmth.” On Symphony Hall in relation to others: Bertram Y. Kinzey, Jr., “An architect’s and a scientist’s approach to the architectural acoustics of a symphony hall: a comparison of nineteenth-century pioneers,” *Sabine Centennial*, 53–56, and J. S. Bradley, “Comparison of Boston Symphony Hall with older North American concert

halls,” 195–98. What is still needed is an historical analysis of the transformations of architectural acoustics in the context of changes in symphonic repertoires and notions of the self as a listening body; one can begin here with Michael P. Steinberg, *Listening to Reason: Culture, Subjectivity, and Nineteenth-Century Music* (Princeton U, 2004).

304. On toilets in particular: Margaret Morgan, “The plumbing of modern life,” *Postcolonial Studies* 5,2 (2002) 171–95; Haines, Jones & Cadbury Co., *Illustrated Catalog M* (Phila, 1906) 188 on the new Flushometer, which “Is very quiet; doing away with much of the disagreeable rushing and hissing of water”; Smith & Anthony Stove Co., *Sanitas Plumbing Appliances* (B, 1890s?) on the “practically noiseless” Sanitas water closet, “Plumbing” files, Warshaw Collection. On architecture: Joseph W. Siry, *The Chicago Auditorium Building: Adler and Sullivan’s Architecture and the City* (U Chicago, 2002) q. 125; Sabine Papers, HUG 1761.10 f. 100, letter of Nov. 11, 1909 from Alfred S. Alschuler, with reply by Sabine on Nov. 21, 1909; Charles E. Gregerson et al., *Dankmar Adler: His Theatres and Auditoriums* (Athens, Ohio: Swallow, 1990) 5–6, 11–18; Leo L. Beranek and John W. Kopec, “Wallace C. Sabine, acoustical consultant,” *JASA* 69,1 (1981) 1–16, esp. 4–5 reproducing the Alschuler correspondence; Lee S. Weissbach, “The architecture of the *bimah* in American synagogues,” *Amer Jewish H* 91,1 (2003) 29–51; George A. Lane, *Chicago Churches and Synagogues* (Loyola U, 1981) 122, noting that Sinai Temple was the first to have all seats facing the *bimah*. Adler’s theory of acoustics was supposedly predicated on his revision of Russell’s isacoustic curve, although Sullivan said that Adler’s talents were “not a matter of mathematics”: Thompson, *Soundscape of Modernity*, 32. Gregerson et al. claim that Adler did attend to acoustics, volume, and the evenness of reflecting surfaces. Cf. Larry Kirkegaard et al., “Acoustics metamorphoses of Orchestra Hall Chicago,” *Sabine Centennial*, 303–304. For Sabine’s consultancies: Sabine Papers, HUG 1761.10, letter of Dillon, McLellan and Beadel, NY, to Sabine May 14, 1915 and reply May 18, on phonograph booths; 1761.10 f.79, summary of inquiries.

305. Sabine Papers, HUG 1761.10, file 189, letter to Goodhue, Oct. 31, 1912; Beranek and Kopec, “Wallace C. Sabine,” 5–6, with letters on the Cathedral of St. John the Divine, NY; Norton biography at <http://web.mit.edu/html/www/norton.html>, including Robert S. Williams, “Charles Ladd Norton (1870–1939),” *Proc Amer Acad Arts and Sci* 74,6 (1940). On sound-panels and tiles: Charles L. Norton and E. A. Atkinson, “Sound-proof partitions,” *Amer Architect* 78 (1902) 5–6; Richard Pounds et al., “The unseen world of Guastavino acoustical tile construction,” *Assoc for Preservation Tech Bull* 30,4 (1999) 33–39; Stebbins, *Making of Symphony Hall*, 170; “Sound-proof building plates,” *Sci Amer* 96 (April 6, 1907) 289, summarizing an article in *Bautechnische Z.*

306. Martin Heidegger, *History of the Concept of Time: Prolegomena*, tr. Theodore Kisiel (Indiana U, 1985 [1925 lecture-course]) 198; Rodolphe Gasché, “Reading chiasms: an introduction” to Andrzej Warminski, *Readings in Interpretation: Hölderlin, Hegel, Heidegger* (U Minnesota, 1987) x–xii; Edmund Husserl, *Experience and Judgment: Investigations in a Genealogy of Logic*, ed. L. Landgrebe, trs. J. S. Churchill and K. Ameriks (Northwestern U, 1973) 7, 30; Ian Leask, “Husserl, givenness, and the priority of the self,” *Intl J Phil Studies* 11,2 (2003) 141–56; Jacques Derrida, *Of Grammatology*, tr. Gayatri C. Spivak (Johns Hopkins U, 1976); Tobias Foshay, “Intentionality, Originarity, and the ‘Always Already’

in Derrida and Gans," *Anthropoetics—The Electronic Journal of Generative Anthropology* 4,1 (Spring/Summer 1998) at <http://www.anthropoetics.ucla.edu/archive.htm>.

307. Marvin Farber, *The Foundation of Phenomenology: Edmund Husserl and the Quest for a Rigorous Science of Philosophy* (Albany, 1943) esp. ch. 7; Edmund Husserl, "Lectures on the consciousness of internal time, from the year 1905," *On the Phenomenology of the Consciousness of Internal Time (1893-1917)*, tr. John B. Brough (Dordrecht: Kluwer, 1991) q. 5, q. 11, 14, 33-34; Barry Smith, "Gestalt theory," *Foundations of Gestalt Theory*, ed. B. Smith (München: Philosophia, 1988) 23-26; Carl Stumpf, *Tonpsychologie* (Hilversum: Knuf, 1965 [1883-1890]) esp. II,6, 497-98; Dennis Brian, *Einstein: A Life* (NY: Wiley, 1996) q. 187, and 2-3, 11-12, 16-17, 80-81 on his violin-playing.

308. Edmund Husserl, *The Basic Problems of Phenomenology: From the Lectures, Winter Semester, 1910-11*, trs. Ingo Farin and James G. Hart (Dordrecht: Springer, 2006) xix, 54-55; Lawrence Baron, "Discipleship and dissent: Theodor Lessing and Edmund Husserl," *Proc Amer Phil Soc* 127,1 (1983) 32-49.

309. Baron, "Discipleship and dissent"; Rainer Marwedel, *Theodor Lessing, 1872-1933* (Darmstadt: Luchterhand, 1987) 104-107; Matthias Lentz, "Eine Philosophie der Tat, eine Tat der Philosophie: Theodor Lessings Kampf gegen den Lärm," *Z Religions- und Geistesgeschichte* 50,3 (1998) 242-64. Cf. Husserl, *Basic Problems of Phenomenology*, xxvi, 84 on *Einfühlung*, badly translated as empathy, better translated as the "making present" of another. I am everywhere simplifying Husserl's complex positions.

310. Theodor Lessing, "Ueber den Lärm," *Nord und Sud* 24 (1901) 77-84, q. 78—and never mind a translation, just say the words aloud; idem, "Noch Einiges über den Lärm," *ibid.* 26 (1902) 330-39; idem, ed., *Der Antirüpel*, 1-3 (1909-1911), of which I have seen only the last two volumes (1910-1911), bound and published with *Arzt als Erzieher* 6-7 (1910-1911) and soon taking the original subtitle, *Das Recht auf Stille*, as its main title, which is how it is cited by Lawrence Baron, "Noise and degeneration: Theodor Lessing's crusade for quiet," *J Contemporary H* 17 (1982) 165-78. I use *Der Antirüpel* throughout, as the more popular title. Cf. Matthias Lentz, "'Ruhe ist die erste Bürgerpflicht': Lärm, Grosstadt und Nervosität im Spiegel von Theodor Lessings 'Antilärmverein,'" *Medizin, Gesellschaft und Geschichte* 13 (1995) 81-105 on nervousness/neurasthenia as cultural context. In 1902, Dr. George F. Still published the first account of what is now called ADHD, Attention Deficit Hyperactivity Disorder: "Some abnormal psychical conditions in children," *Lancet* 1 (1902) 1008-12, 1077-82, 1163-68, concordant with Lessing's phenomenological critique of noise. For Thomas Hood and Arthur Schopenhauer: "On noise," *Studies in Pessimism*, tr. T. Bailey Saunders, 4th ed. (L, 1893, from *Parerga und Paralipomena* II, ch. 30 [1851]) 132. On Schopenhauer's intolerance for noise and crowds, consider Rüdiger Safranski's acoustically-slanted take: *Schopenhauer and the Wild Years of Philosophy*, tr. Ewald Osers (Harvard U, 1990) 7, 42-43, 45, 47, 48, 56, 62, 77, 87.

311. Baron, "Noise and degeneration," q. 168 coalition; Max Nordau, *Degeneration*, 2nd ed. (NY, 1895) 12-13, 37; Marilyn Reizbaum, "Max Nordau and the generation of Jewish muscle," in *Jewish Culture and H* 6,1 (2003) 130-51; Michael Stanislawski, *Zionism and the Fin de Siècle: Cosmopolitanism and Nationalism from Nordau to Jabotinsky* (UC, 2001) 22-24, 56-59, 68. In a *L Times* editorial applauding citizen action against night noise (Nov. 30,

1895), the editors cite Nordau, who “condemns us in the gross as a degenerate and neurotic race, ill-fitted for the hard work of the world,” then argue that, neurotic as we are, we must still do the world’s work, so we all deserve a good night’s rest.

312. Theodor Lessing, “Noch Einiges über den Lärm,” 333–34 on bacteriology, 336 on the Malthusian effects of modern transport; idem, “Die Lärmschutzbewegung,” *Dokumente des Fortschritts* 1 (Oct. 1908) 954–61, 954 on degeneration, 955–56 on housecleaning and telephones; Peter Payer, “The age of noise: early reactions in Vienna, 1870–1914,” *J Urban H* 33 (2007) 773–93, q. 773. An avant-garde American composer would later turn the analogy on its head: “Since the ‘disease’ of noise permeates all music, the only hopeful course is to consider that this noise-germ, like the bacteria of cheese, is a good microbe, which may provide previously hidden delights to the listener, instead of producing musical oblivion.” Henry Cowell, “The joys of noise,” *The New Republic* (July 31, 1929) 287–88, and cf. Douglas Kahn, *Noise Water Meat: A History of Sound in the Arts* (MIT, 1999) 81–83.

313. Maja I. Siegrist, *Theodor Lessing—die entropische Philosophie* (Bern: Peter Lang, 1995) esp. 85–115; Schopenhauer, “On noise,” 127; David C. Large, *When Ghosts Walked: Munich’s Road to the Third Reich* (NY: Norton, 1997) xviii, xix–xx, q. 4; Wolfgang Hardtwig, “Soziale Räume und politische Herrschaft,” in *Soziale Räume in der Urbanisierung. Studien zur Geschichte Münchens im Vergleich 1850 bis 1933*, eds. W. Hardtwig and K. Tenfelde (München: Oldenbourg, 1990) 59–153, 83 on population growth; Nadezhda K. Krupskaya, *Reminiscences of Lenin*, tr. Bernard Isaacs (NY: International, 1970 [1933]) 63; Paul Forman and Armin Hermann, “Sommerfeld, Arnold,” *DSB XII*, 525–32; Arnold Sommerfeld, *Thermodynamics and Statistical Mechanics in his Lectures in Theoretical Physics*, 5 (NY, 1956) 213–14, 217; John Blackmore, ed., *Ludwig Boltzmann: His Later Life and Philosophy, 1900–1906. Book One: Documentary History* (Dordrecht: Kluwer, 1995) 127, and cf. 161, lecture on “Explanation of Love and the Entropy Law by Means of the Principles of Mathematical Probability” (1905) based on his study of Schopenhauer; Michael Eckert, “Mathematics, experiments, and theoretical physics: the early days of the Sommerfeld School,” *Physics in Perspective* 1,3 (1999) 238–52, q. 249 for Einstein; Brian B. Laird, “Entropy, disorder, and freezing,” *J Chemical Educ* 76 (1999) 1388 for “lack of restraint.”

314. Lessing, “Die Lärmschutzbewegung,” 960 on other names; *Der Antirüpel*—specifically 2,1 (Jan. 1910) q. 2 Pudor, 6 tonitruone; 2,3 (March 1910) q. 16–17 Geissler; 2,4 (April 1910) 23 Medicus; 2,5 (May 1910) 34 Baedeker, suicide; 2,9 (Sept. 1910) 47 music and noise; 3,1 (Jan. 1911) 8, door closers; 3,2 (Feb. 1911) 10 typewriters, doorclosers; 3,4 (April 1911) 18, college yells; 3,6 (June 1911) 27, sirens. On his student life: Lentz, “‘Ruhe ist die erste Bürgerpflicht,’” 83. For motto: Baron, “Noise and degeneration,” 170. For more on early college yells: Natalie G. Adams and Pamela J. Bettis, *Cheerleader! An American Icon* (NY: Palgrave, 2003) 8, 13. The Futurists will make their brouhaha in Round Three.

315. Baron, “Noise and degeneration”; Lentz, “‘Ruhe ist die erste Bürgerpflicht’”; *Der Antirüpel* 2,1 (Jan. 1910) 6 on Newport, and 2,2 (Feb. 1910) 14, number of sympathizers.

316. Roger Chickering, *Karl Lamprecht: A German Academic Life (1856–1915)* (Atlantic Highlands: Humanities, 1993) esp. 195–203; Karl Lamprecht, *What Is History? Five Lectures on the Modern Science of History*, tr. E. A. Andrews (NY, 1905 [given in St. Louis and at Columbia U, 1904]) 3, 98–99, 106, 119–20; Jütte, *History of the Senses* (→ n.145) 202–03.

A (the?) dominant chord in this era in Germany was that of *Heimat* or home/land, played upon by Lessing and put in historical-environmental context by David Blackbourn, “‘The garden of our hearts’: landscape, nature, and local identity in the German East,” in *Localism, Landscape and the Ambiguities of Place: German-Speaking Central Europe, 1860–1930* (U Toronto, 2007) 149–64, as also by Thomas Lekan, “The nature of home: landscape preservation and local identities,” 165–94. Contrast Martin Jay, *Downcast Eyes: The Denigration of Vision in Twentieth-Century Thought* (UC, 1993).

317. Klaus Saul, “‘Kein Zeitalter seit Erschaffung der Welt hat so viel und so ungeheuerlichen Lärm gemacht...’—Lärmquellen, Lärmbekämpfung und Antilärmbewegung im Deutschen Kaiserreich,” in *Umweltgeschichte—Methoden, Themen, Potentiale: Tägung des Hamburger Arbeitskreises für Umweltgeschichte, Hamburg, 1994*, eds. Günter Bayerl et al. (Münster: Waxmann, 1996) 187–217, esp. 196 on warning system sounds, 204–207 on pavement; “The age of noise,” *The Horseless Age* 1 (Feb. 1896) 5, and cf. “A pleasing prospect,” *ibid.* 1 (Nov. 1895) 8, cited by Traxel, 1898 (→ n.263) 55–56; Major C. G. Matson, “The truth about motor cars,” *Badminton Mag* 25 (1907) 507–508, quietness of steam cars; John R. White, “Here’s a 72-year-old automobile that still gets people steamed up,” *B Globe* (Aug. 7, 1988) A87, the chuff; *DAE*, s.v. “honk” re. car horns, verb in 1895, noun in 1906; Elmer S. Batterson, contributing to “The Noise problem in Chicago,” *City Club Bull* 6 (July 23, 1913) q. 2; J. Delplace, *Guide théorique et pratique à l’usage du corps des gardiens de la paix et des inspecteurs de commissariats de police de la Ville de Paris* (P, [after 1918]) II,427, decrees of March 10, 1899 and July 24, 1913, note 2; Pedal Car Museum, in ZAM, Centre of Unusual Museums, Munich, visited Nov. 21 1999; *Phila Record* article repr., “Dispensing with ambulance gongs,” *Natl Hosp Record* 12 (March 15, 1909) 13.

Carriagemakers since the 1870s had been promoting the quietness of their better vehicles (“On ordinary roads one goes silent and even, as if carried in the air on steady wing”: Edwin Cross, M.D., in 1884, *Testimonials* for the W.R. Church Company of Illinois), and some offered to put on solid rubber tires for their durability, “to say nothing of the increased pleasure gained in riding, owing to their noiselessness and ease”: H. H. Babcock Co., *Fine Carriages* (Watertown, NY, 1903) 84. But the “incessant shrill, irregular rattle of the iron-shod wheels of [horsesdrawn] lorries and carts upon the granite setts” continued into the 1920s: Geoffrey Lapage, “Noise,” *Chambers’s J*, 7th ser., 13 (1923) 772–75, q. 773.

318. William Dean Howells, “Editor’s easy chair,” *Harper’s Mo Mag* 113 (Nov. 1906) 957–60. On the “grinding” around curves caused by the gradual flattening out of the metal tires of trolleys, consider the promise of the Robinson Radial Car Truck Company of Boston (1890, “Street Cars” file, Box 1, Warshaw Collection) to “entirely obviate” this problem, which was still formidable when I was riding trolleys in Chicago in the 1950s.

319. Susan Goodman and Carl Dawson, *William Dean Howells: A Writer’s Life* (UC, 2005) 199–207, 365, 371, 375 for Portsmouth explosion; W. D. Howells, *Life in Letters*, ed. Mildred Howells (Garden City, 1928) II,213, 258; *idem*, “Editor’s easy chair,” 957, and cf. his *Roman Holidays, and Others* (NY, 1908) 38–39 on Naples; *Saturday R* article reprint, “The hooting nuisance,” *Living Age* 7th ser., 52 (Aug. 19, 1911) 508–10, q. 509 mastodon and Mayfair; “The muffin man’s bell,” *L Times* (Jan. 20, 1911) 4c; “Automobilism. Noise and motor-omnibuses,” *ibid.* (June 20, 1911) 16c; F. E. Sipman, Secretary, London Association

of Nurses, "The chauffeur's nocturnal noises," *ibid.* (June 24, 1911) 4d; T. Rice Holmes, "Taxi-cabs as instruments of torture," *ibid.* (July 1, 1911) 6c; [Lord] Russell, "Chauffeurs' nocturnal noises," *ibid.* (July 5, 1911) 13c; Henry Morris, *ibid.* (July 6, 1911) 4f and (Aug. 8, 1911) 6c-d; J. S. Vaughan, *ibid.* (July 8, 1911) 9d; Daniel E. Burnstein, *Next to Godliness: Confronting Dirt and Despair in Progressive Era New York City* (U Illinois, 2006) 55-90, esp. 61-62 on autos and peddlars; Tom McCarthy, "The coming wonder? Foresight and early concerns about the automobile," *Env H* 6,1 (2001) 46-74, 61 for statistics; F. Upton Adams, "Get ready for 5,000,000 automobiles," *Amer Mag* 81 (April 1916) 18-20 on rising number of accidents; Chicago City Council, *J Proc City Council* (1911-1912) 1012, 1926; William Plowden, *The Motor Car and Politics, 1896-1970* (L: The Bodley Head, 1971) 228-29, critique of cut-out mufflers in 1911, as also Harold W. Slauson, "The noise nuisance," *Country Life in America* (June 15, 1912) 48, cut-outs delivering "a concentrated essence of noise." A fine prewar summary of sources of automobile noise appeared in "The noise of motor traffic," *The Engineer (London)* 117 (Feb. 1914) 169-70, 205-206, 230-31.

320. "Automobilism. The Motor Noises Bill," *L Times* (July 11, 1911) 4d, International Convention; Brown Brothers advertisement for the Gabriel Horn, "Melody NOT Noise," *ibid.* (July 7, 1911) 4e-f; Gardner D. Hiscox, *Horseless Vehicles, Automobiles and Motor Cycles* (NY, 1901) 417, horns; Lady Agnes Geraldine Grove, *The Social Fetich*, 2nd ed. (L, 1908) 81; <http://en.wikipedia.org/wiki/Klaxon>; Lovell-McConnell Mfg. Co. ad, "The Traffic Officer Says:—'The Klaxon is my best friend,'" *Hampton's Mag Advertiser* (Oct. 10, 1910) 25; Klaxon advertisement, "Klaxon can be heard above the downtown din!" *Saturday Evening Post* (July 14, 1923) 52; Western Electric Co. brochure, *Hand Klaxonet* (NY, ca. 1915) on numbers sold, in Horn Files, John W. Hartman Center; Randall-Faichney Co. advertisement, "Jericho Horn," *McClure's* (June 1911) in clippings file, "Horns," Archives, U Illinois Lib, Urbana-Champaign; Brown Brothers above for Gabriel; Sparks-Withington Co. advertisement, "Sparton JUMP!" *Hardware Age* (April 17, 1919) 88; Aerocar, Franklin, and Northern advertisements in "Automobiles," *Century Mag* 72,5 (1906) back ad-section; Herbert L. Towle, "Range of automobile warnings," *NY Times* (June 18, 1911) 10; Payer, "The age of noise," 784, the German, Michael Freiherr von Pidol.

321. Payer, "The age of noise," 775, q. 776, 779, q. 782, 783, q. 784; Michael Haberlandt, "Vom Lärm," *Cultur im Alltag* (Vienna, 1900) 177-83; *idem*, *Ethnology*, tr. James H. Loewe (L, 1900) 69. For other German anti-noise activity: Richard Birkefeld and Martina Jung, *Die Stadt, der Lärm, und das Licht: Die Veränderung des öffentlichen Raumes durch Motorisierung und Elektrifizierung* (Seelze: Kallmeyer, 1994); Klaus Saul, "Wider die 'Lärmpest': Lärmkritik und Lärmbekämpfung im Deutschen Kaiserreich," in *Macht Stadt Krank? Vom Umgang mit Gesundheit und Krankheit*, eds. Dittmar Machule et al. (Hamburg: Dölling und Galitz, 1996) 151-92.

322. Karin Bijsterveld, "The diabolical symphony of the mechanical age: technology and symbolism of sound in European and North American noise abatement campaigns, 1900-1940," *Social Studies of Sci* 31 (2001) 37-70; *eadem*, "'The city of din': decibels, noise, and neighbors in the Netherlands, 1910-1980," *Osiris* 18 (2003) 173-93; James Sully, "Civilisation and noise," *Fortnightly R* 30 (1878) 704-20.

323. *B Herald* article repr., "London's many noises," *Sanitarian* 39 (1897) 44-49; *Der*

Antirüpel 2,9 (Sept. 1910) 48; Arthur Reid Kimball, “The right to make a noise,” *The Independent* [NY] (Oct. 1, 1896) 1322, discussing Herbert Spencer’s idea of “negative benevolence”; “Of the right to make some noise,” *NY Times* (March 5, 1909) 8, sewing machines and retreat, but cf. Willcox & Gibbs, *Noiseless Family Sewing Machine Catalogue* (NY, 1863)—testimonials that “It is never obtrusive and noisy, overpowering domestic conversation” and its “tick tick” resembles “the faint echo of a cheery little cricket”; Tim Howego, “Capsule pipelines,” at www.capsu.org/history on pneumatic message tubes; *NY Evening Sun*, article repr., “The philosophy of noise,” *Salem [Ohio] Daily News* (Oct. 4, 1893) 4; Hollis Godfrey, *The Health of the City* (B, 1910) 231–62, q. 231–32, originally in *Atlantic Mo* 104 (1909); “Noise that protects,” *Scribner’s Mag* 46 (1909) 506–507.

324. Theodor Lessing, *Geschichte als Sinngebung des Sinnlosen oder Die Geburt der Geschichte aus dem Mythos* (Hamburg: Rütten & Loening, 1962 [1919]); idem, “Über Hypnose und Suggestion” in *Nachtkritiken: Kleine Schriften 1906–1907*, ed. Rainer Marwedel (Göttingen: Wallstein, 2006) 229–75. Cf. Andrew Lees, *Cities, Sin, and Social Reform in Imperial Germany* (U Michigan, 2002) ch.1 on anti-urbanism; Raymond Smilor, “Toward an environmental perspective: the anti-noise campaign, 1893–1932,” in *Pollution and Reform in American Cities, 1870–1930*, ed. Martin V. Melosi (U Texas-Austin, 1980) 135–51. Bruno Latour argues that “modernity” is a grounding myth of the last two centuries: *We Have Never Been Modern*, tr. Catherine Porter (Harvard U, 1993).

325. Wikipedia, s.v., “Quadrille”; Nicolas Slonimsky, *Book of Musical Anecdotes* (NY, 2002) 231–32; David Ewen, *Music Comes to America* (NY, 1947); William D. Whitney, ed., *Century Dictionary* (NY, 1906) 4886, s.v. “Quadrille” for all the meanings current in 1906.

326. “City noise,” *Chambers’s J*, 6th ser., 5 (Oct. 1902) 670–72.

327. John M. Gould, “A brief biography of Edward Sylvester Morse (1838–1925),” at www.geocities.com/~jmgould/morse.html; Dorothy G. Wayman, *Edward Sylvester Morse* (Harvard U, 1942) 3, 210; “Peabody Academy of Science,” *Sci* 3 (March 28, 1884) 393–94. Cf. Christopher Benfey, *The Great Wave: Gilded Age Misfits, Japanese Eccentrics, and the Opening of Old Japan* (NY: Random House, 2003) 45–74, and 188–211 on Mabel Loomis Todd (remember her?), who was inspired by Morse’s lectures on Japan, visited Japan with her husband on art-astronomical tours, and wrote copiously about the country.

328. Wayman, *Edward Sylvester Morse*, 3, 4, 12, 14–17, 22–23, q. 24, 136, 193, 198, 210, 268n., 277, q. 301, 307–308, 315, 320, 335–36, 348, 369–70, 378; Morse, *Japan Day By Day* (→n.41) I, q. 38–39, q. 115, q. 161, 231, 295, 331; idem, “Spiritualism as a survival,” *Sci* n.s.7 (May 27, 1898) 749–50. See also “Collection Tour: Edward Sylvester Morse Collection of Japanese Ceramics,” www.mfa.org/collections.

329. Wayman, *Edward Sylvester Morse*, 79, 101–103, 167–68, 222–23, 335–36, 399, 405, q. 431; L. O. Howard, “Biographical memoir of Edward Sylvester Morse, 1838–1925,” *Natl Acad of Sci Biographical Memoirs XVII-First Memoir* (DC, 1935) 2–29, esp. on his turning eighty-five; Edward S. Morse, “A crusade for quiet,” *Outlook* 102 (Sept. 28, 1912) 157–59, q. 158 on siren; idem, *On the Importance of Good Manners* (B, 1895) q. 4; idem, *Japanese Homes and Their Surroundings* (NY: Dover, 1961 [1886]) 53, 182–83. A letter supporting “the suppression of unnecessary noise” with particular reference to “railway bell ringing and steam engine whistling” had contrasted English quiet with “The American tendency to

noise”: *Daily Republican* [Decatur, Illin] (Oct. 1, 1872) 1, reprinting a letter from Charles Bernard (of Harvard’s Cercle français?) in the *Phila Ledger*.

330. Edward S. Morse, *Can City Life Be Made Endurable* (from *J Polytechnic Inst* of Nov. 1900) q. 4, q. 5, 6, q. 16; idem, *The Steam Whistle: A Menace to Public Health* (B, 1905) 1, 2, 3, 5, 7, 12. In his intro. to Henry M. Brooks, *Olden-Time Music* (B, 1888) xii–xiii, Morse had written that “while the progress of music was thwarted in this country by the early Church, we are indebted to Catholic Italy through the itinerant organ-grinder, and rational Germany through her political refugees, for much of the musical progress made in recent years.” Morse may have become increasingly vocal about noise in reaction to the contentious ethno-political scene in Salem: Theodore N. Ferdinand, “Politics, the police, and arresting policies in Salem, Massachusetts, since the Civil War,” *Social Problems* 20 (1972) 572–88.

331. Morse, *The Steam Whistle*, q. 3 Platt. All other quotations in this paragraph come from newsclips and handwritten notes, often undated or poorly sourced, in the Edward Sylvester Morse Papers, 1858–1925, used by permission of the Phillips Library at the Peabody Essex Museum, Salem, Mass (henceforth, Morse Papers): Box 87, f. 2/22, *City and State* (Phila, July 19, 1900) on Chicago; Box 87, f. 5, “The nuisance of steam whistles,” *The Outlook* (Nov. 28, 1903) 724–25, number of blasts; Box 88, f. 1, “Noise in China,” unsourced clip with credit line to *North China Herald*; Box 88, f. 1, small unsourced clip on Pompeii; Box 88, f. 1/24, “Berlin a German city of forbidden noises,” unsourced; Box 88, f. 1/26B, “An improvement society,” *B Courier* (July 17, 1893); Box 88, f. 1/30, “Opposite the Old South,” *ibid.* (July 24, 1892); Box 88, f. 3/30, “The crime of noise,” *B Herald* (Sept. 23, 1896) 6; Box 88, f. 3/36, “Aldermen demand police begin war on useless noises,” unsourced clip on Chicago; Box 88, f. 3/47, “The nation of noises,” *NY Trib* (undated); Box 88, f. 5, handcopied notes on Walter B. Platt, “Injurious influences of city life,” *Pop Sci Mo* (Aug. 1888), and also for City of Salem, *Annual Report of the Board of Health to the City Council, December 1898* (Salem, 1899) 6. Some clips in this collection were sent to Morse by Julia Rice through her service, the Argus Press Clipping Bureau, and so stamped; others were clipped by Morse; for many it is not clear who did the clipping. In any case, the clips document Morse’s awareness of the range of responses, and responsiveness, to noise issues.

332. Morse Papers: Box 88, f. 5, handwritten count of whistle blasts, Sept 13–Oct 4, 1900; Box 87, f. 5, clip with handwritten note asking Morse about the engine quotation, and a typewritten “A Complaint & A Warning”; Box 88, f. 2/29, “Brookline to be noiseless town from this day on,” *B Post* (Aug. 5, 1904); Box 88, f. 1, “Noises and repression,” *Salem Evening News* (Feb. 11, 1905), and “Hush! It’s a noiseless town,” *NY Commercial* (Aug. 24, 1905); Box 88, f. 1/85A–B, “To the Man about Town,” *Salem News* (Aug. 6, 1902) Winkle.

333. Morse Papers: Box 88, f. 2, “Orators disturb Relief Hospital,” *B Herald* (Sept. 8, 1903) 5; Box 88, f. 2/19, *B Transcript* (July 23, 1900); Box 88, f. 2/18, suit against peanut stand whistle by an officer of the Museum of Fine Arts, 1901; Box 88, f. 4/2, handwritten notes on peanut vendors.

334. “Troublesome noises,” *NY Daily Trib* (May 31, 1903) II, 4:4; Morse Papers, Box 88, f. 2 “The crime of noise-making,” unsourced newsclip concerning Malcolm McGregor’s *Troublesome Noises and How to Stop Them* (NY: Ross Publishing House, 1903), which I have

not seen, as the only extant copy has been misplaced by the Lib of Congress. Nor can I confidently identify the author: was he the Michigan lawyer who co-authored *A Treatise on the Law of Real Property* [1900], the Florida pastor who had been at Riverside Church in the late 1880s, or another? Cf. Box 88, f. 3, “The noises of New York: Manhattan is not for the nervous and invalid,” *NY Post* (Oct. 30, 1906).

335. H. P. Robinson, “On the gentility of noise,” *The Chautauquan* 19 (1894) 726–29; idem, “The confessions of a classicist,” *Connecticut Mag* 9 (1905) 726–32; idem, *Guilford Portraits: Memorial Epitaphs of Alderbrook and Westside with Introductory Elegies and Essay, 1815–1907* (New Haven, 1907) 105.

336. Morse Papers: Box 88, f. 2/38, “To the Man About Town,” *Salem News* (Sept. 28, 1903) for noise diary; Box 88, f. 1/43A–B, John Langdon Heaton, “The commercial value of quiet,” *Century Mag* 64,2 (1902) 325–26; Box 88, f. 2, “Against the L Road,” *B Herald* (April 3, 1903); Box 88, f. 2/9, C. H. Ames, note from Rochester, NY (April 24, 1905) with unsourced clip on “Non-hurtful cannon”; Box 87, f. 4, House Bills 319 and 362 (1906) and 675 (1907); Box 88, f. 2, “Assembly honors former Senator Jenks of Pawtucket who fought against factory whistles,” *Providence J* (March 21, 1907); Box 88, f. 3/11, “The humane work of factory whistles,” unidentified clip in which Rhode Island Senator Erskine defends the whistles. On the influence of the Baker suit: “Decides noise impairs property rights,” *NY Daily Trib* (Sept. 6, 1902) 7:5. For August P. Clarke, “The importance . . .,” *JAMA* 25 (Sept. 14, 1895) 442–43; for William C. Krauss, “The relation of noises to the public health,” *Buffalo Med J* 36 (1897) 184–94.

337. “Mr. Abbott winning his long fight,” *Chattanooga Times* (Dec. 15, 1911) in Morse Papers, Box 88, f. 1/3, as also f. 1/1, “Mr. Abbott in earnest,” *ibid.* (letter to editor of March 9, 1906); f. 1/4, “Suppress all noises,” letters from Edward A. Abbott and Lyman Abbott in *ibid.* (undated clip re. letters dated Sept. 25, 1903 [1905?]); f. 1/9, “Swathing noise-devil below water line,” *ibid.*, undated, and f. 3, “A campaign suggested for a noiseless city,” *ibid.* (ca. Aug. 7, 1911), quoting Morton. Also: “Edward A. Abbott, dead in California,” *ibid.* (Feb. 21, 1922) 3; “Events in fifty years in Chattanooga,” *ibid.* (July 1, 1928) Jubilee Feature Sect. 5, years 1906 (lynching), 1908 (station), 1909 (terminal), 1910 (duel, airmeet); Gilbert Goran, “Over my shoulders,” *ibid.* (June 1, 1972) 9; Louise Fort, “City garden clubs took part in forming state federation,” *ibid.* (April 25, 1948) in clippings file, “Chattanooga– City Planning,” Historical Collections, Chattanooga Public Lib; Edward A. Abbott, “Avoidable noises,” *Amer Med* 11 (Jan. 6, 1906) 12; idem, “The yelling peril,” *Amer City* 6 (March 1912) 575–76. On Silva: “A Silva salon picture purchased for library,” *Chattanooga Times* (Oct. 17, 1909); Leila Mechlin, “William P. Silva—an appreciation,” *Amer Mag of Art* 14,1 (1923) 26–29; Charleston Renaissance Gallery, “William Posey Silva (1859–1948)” at http://www.fada.com/browse_by_artist.html?gallery_no=10&artist=3877&bio=1.

338. Edward S. Morse, *Glimpses of China and Chinese Homes* (L: Kegan Paul, 2001 [from 2nd ed., 1902]) 13–14, 69, 88–90; Morse Papers, Box 88, f. 3/18, “Noise, nerves, and knowledge,” *NY Mail and Express* (Oct. 26, 1906); John H. Girdner, “The plague of city noises,” *North Amer R* 152 (Sept. 1896) 296–303; idem, “Why eat meat?” *Cosmopolitan Mag* (1906–1907) 571–74; idem, *Newyorkitis* (NY, 1901); Reform Club, *Municipal Affairs*

5,1 (March 1901) 762; “Girdner against noise,” *NY Daily Trib* (June 15, 1901) 10:1; “The disease of life in great cities,” *The Dial* 30–31 (1901) 247. For the Morse quote: Wayman, *Edward Sylvester Morse*, 41, letter of Nov. 10, 1858. For Ingals: “To stop the noise,” *Chicago Daily Trib* (Oct. 11, 1896) 25.

339. James Madison Girdner, “Historical sketch of Girdner family” (Feb. 2, 1911), at www.girdner.net/famtree/girdhist/txt; “Girdner, John Harvey,” *Who’s Who in America* 12 (NY, 1922/1923) 1263; J. H. Girdner, “Skin grafting with grafts taken from the dead subject,” *Med Record* 20 (1881) 119–20; “Booth on dramatic expression,” *Washington Post* (Oct. 2, 1904) A6; William Winter, *Life and Art of Edwin Booth* (NY, 1894) 237; John H. Girdner, letters to Bryan, in William Jennings Bryan Papers, Box 23 for 1899 (q. June 12, Aug. 18, Nov. 4, Nov. 16, Dec. 22–30) and Box 24 for 1900 (March 13, April 23, q. May 29, June 16, q. July 10) at Manuscript Division, Lib of Congress; “Col. Bryan insists silver is an issue,” *NY Times* (June 23, 1900) 3:1; Paolo E. Coletta, *William Jennings Bryan. I. Political Evangelist, 1860–1908* (U Nebraska, 1964) 250, 261; William J. Bryan and Mary Baird Bryan, *The Memoirs of William Jennings Bryan* (NY: Haskell House, 1971 [1925]) 125–27, 252–53; Morse Papers, Box 88, f. 2/14, “The noise nuisance,” *B Transcript* (March 2, 1904); “Administration’s Promises” poster (1900), at <http://ohsweb.ohiohistory.org/ohiopix/Image.cfm?ID=7264>, Presidential Print Collection, Ohio Historical Soc. On the acoustic and class environment of Block Island: Moses Coit Tyler, *Selections from His Letters and Diaries*, ed. Jessica T. Austen (NY, 1911) 283–84. In 1902 Girdner’s twelve-year-old son would be killed when his sailboat struck the wharf at Block Island: “Dr. Girdner’s son killed,” *NY Times* (Sept. 6, 1902) 1.

340. David J. Silbey, *A War of Frontier and Empire: The Philippine–American War, 1899–1902* (NY: Hill & Wang, 2007) 163–65 on the “Water Cure” torture, 194–96 and 201–206 on Gen. Jacob Hurd Smith; Mark Twain, “The greatest American humorist, returning home,” *NY World* (Oct. 6, 1900), cited in http://en.wikipedia.org/wiki/Philippine-American_War, also reproducing the cartoon from the *NYJ* (May 5, 1902) that depicted Gen. Smith’s infamous order “KILL EVERY ONE OVER TEN.” For more: Jim Zwick, ed., *Mark Twain’s Weapons of Satire: Anti-Imperialist Writings on the Philippine–American War* (Syracuse U, 1992).

341. By Girdner: *Newyorkitis*, 7; “To abate the plague of city noises,” *North Amer R* 165 (1897) 460–68; “Theology and insanity,” *ibid.* 168 (1899) 77–83, q. 83; (with Alvah H. Doty and C. M. Drake), “The national government and the public health,” *ibid.* 165 (Dec. 1897) 733–41; “The ounce of prevention,” *Junior Munsey’s Mag* 25 (April 1901) 49; and a wide range of articles (1899–1909) in *Munsey’s Mag*, including “Disease germs, and how to avoid some of them” (March 1899); “The war against consumption” (March 1900); “Noise and health” (June 1901); “Man and his clothes” (June 1902). On Girdner’s involvement with Bryan and then Watson: “Cleveland’s comments on Bryan’s attitude,” *NY Times* (Jan. 26, 1904) 1; “Girdner visits Parker after Colorado talk,” *ibid.* (Sept. 30, 1904) 1; “Journalistic notes,” *Publisher’s Weekly* 1719 (Jan. 7, 1905) 13, Girdner one of those financing the start-up of *Tom Watson’s Mag*; “Jeffersonian Publishing Company,” *New Georgia Ency*, ed. John C. Inscoe, at www.georgiaencyclopedia.org/nge/Article.jsp?id=h-2996; C. Vann Woodward, *Tom Watson: Agrarian Rebel* (Oxford U, 1963) 381. See also “In favor of a

Bureau of Health,” *Washington Post* (Jan. 13, 1894) 4, Girdner testifying before Congress in his capacity as Secretary of the New York Academy of Medicine.

342. Joseph Howard, “Howard’s letter: New York City as yet far from ‘provincial,’” *NY Sunday Herald*[?] (Dec. 1, 1898) clip in Morse Papers, Box 88, f. 2/23; Reform Club of New York, “[Review of] *Newyorkitis*,” *Municipal Affairs* 6,1 (March 1901) 762; “The disease of life in great cities,” *The Dial* 30–31 (1901) 247, a dismissive review; “New York is plagued by needless noises,” *NY Daily Tribune* (Oct. 28, 1906) V, 4:2 for the steamer trunk; Girdner, *Newyorkitis*, 30–31, 40, 119–20, 125–26, 127, q. 128, q. 162–63 for Crosby poem (from his *Swords and Plowshares* [NY, 1902] 60–61); idem, “To abate the plague of city noises,” 461, 465, q. 467; Leonard D. Abbott, *Ernest Howard Crosby: A Valuation and A Tribute* (Westwood, Mass, 1905); Robert Whittaker, “Tolstoy’s American disciple: letters to Ernest Howard Crosby, 1894–1906,” *Triquarterly* 98 (Winter 1996–1997) 210–50. On Zaza: Katie N. Johnson, “Zaza: that ‘obtruding harlot’ of the stage,” *Theatre J* 54,2 (2002) 223–43.

343. “Girdner against noise,” *NY Daily Trib* (June 15, 1901) 10:1, and see note 372; Morse Papers, Box 88, f. 2/14, “The noise nuisance,” *B Transcript* (March 2, 1904); “For a noiseless New York,” *NY Sun* (Feb. 25, 1906). Cf. “Other noises to be suppressed,” *Chicago Daily Trib* (Sept. 13, 1896) 6, suggesting that Girdner was wilfully neglecting the noise of the “free silver orator,” a “particular noise of the present that is causing havoc and widespread devastation among nerves of all degrees of susceptibility.” For literary aspects: Nick Yablon, “Echoes of the city: spacing sound, sounding space, 1888–1916,” *Amer Lit H* 19 (2007) 629–60.

344. James F. Harris, *The People Speak! Anti-Semitism and Emancipation in Nineteenth-Century Bavaria* (U Michigan, 1994) esp. 199; Stefan Fodor, “What Kind of Nation? Political Associations in Bavaria during the Revolution of 1848–1849,” Ph.D. thesis, UC San Diego, 1992, chs. 5, 8; Howard Sachar, *A History of the Jews in America* (NY: Knopf, 1992) 88.

345. Mercutio, [Review of Rice performance], *Dwight’s J of Music* (Feb. 4, 1865) 390; Edwin C. Hill, “Isaac Leopold Rice,” *Historical Register* (NY, 1919) 1–5; Cyrus Adler, “Rice, Isaac Leopold” (1904) at www.jewishencyclopedia.com; “Rice, Isaac Leopold,” *Cyclopaedia of Amer Biog*, ed. James E. Homans (NY, 1918) 327–29; Dorothy Rice Sims, *Curiouser and Curiouser* (NY, 1940) 39 on her father’s life in France and England, but claiming (p. 10) that his family emigrated when he was two; Isaac L. Rice, “Hildise March, Composed for and Dedicated to the Hildise Bund” (NY, 1871), “Wild-Flowers: Five Waltzes” (NY, 1881), “3 Songs: Egyptian Serenade, The Song of Life, Spring Gave Me A Friend” (NY, 1881), in *Music for the Nation: American Sheet Music (1870–1885)*, <http://memory.loc.gov>; “Aryan music,” *The Theosophist* 1,2 (Nov. 1879) on Rice’s “charming monograph,” further assessed by Siegmund Levarie, “Isaac L. Rice: What Is Music?” in *A Celebration of American Music* (→ n.235) 113–31; Edouard Remenyi, article on Hindu music in *Daily Englishman* (Calcutta), excerpted by Gwendolyn D. Kelley and George P. Upton, *Edouard Remenyi: Musician, Litterateur, and Man* (Chicago, 1906) 148ff.; Rice, *What Is Music?* (→ n.235) q. 4, q. 9n. from Silliman, 14, 41, q. 70; idem, *How the Geometrical Lines Have Their Counterparts in Music* (NY, 1880). On traditions of attributing universal

affective qualities to musical keys, listen to Rita Steblin, *A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries* (UMI, 1983).

346. Hermann Keidanz, ed., *Twenty Years of the Rice Gambit* (NY, 1916); “Who is Isaac L. Rice?” *Wall Street J* (Sept. 8, 1893) 2; Franek Rozwadowski, “From recitation room to research seminar: political economy at Columbia University,” in *Economists and Higher Learning in the Nineteenth Century*, ed. William J. Barber (Wesleyan U, 1988) 193; John William Burgess, *Reminiscences of an American Scholar* (NY: AMS, 1966 [1934]) 174–76, q. 211, 212, q. 213 on Roosevelt, 214–16 on Butler, 217–18 on Dewey, as also Winifred Linderman, “History of the Columbia University Library, 1876–1926,” Ph.D. thesis, Columbia U, 1959, esp. 60–61. Burgess (*Reminiscences*, 151) had moved reluctantly from Amherst to Columbia, for “The din and crowds and murky atmosphere of the city have always been repellent to me, and the quiet of the country, with its pure air, broad landscape, and simple customs, has always been my chief delight.” How such Arcadian attitudes toward noise affected *fin de siècle* political science would be worth a monograph.

347. H. W. Brands, *T. R. The Last Romantic* (NY: Basic, 1997) 110–14; Burgess, *Reminiscences*, q. 211, 212, q. 213; Robert T. Sprouse, “Legal concepts of the corporation,” *Accounting R* 33,1 (1958) 37–49—an essay noteworthy for the pivotal role assigned in this context to a famous case on noise and nuisance, *Baltimore and Potomac Railroad Co. v. Fifth Baptist Church*, 108 US 323 (1883); Isaac L. Rice, “Work for a constitutional convention,” *Century Mag* 28 (Aug. 1884) 534–41, q. 534, q. 538; idem, “A definition of liberty,” *North Amer R* 136 (Jan. 1883) 40–54, q. 40, q. 52–53; idem, “Herbert Spencer’s facts and inferences,” *ibid.* 136 (June 1883) 557–68, q. 565, q. 566; E. L. Youmans, “Herbert Spencer’s latest critic,” *ibid.* 139 (Nov. 1884) 472–79, a rebuttal of Rice. Cf. Nathan Bijur’s decision in *Farmers’ Loan and Trust Co. v. Pierson et al.*, 222 NYS 543 (1927) that no personality accrues to a corporation, since personhood is merely a legal metaphor. Rice, however, was no enemy of the corporation *per se* and was dubious of indiscriminate trust-busting: “The consumer,” *The Forum* 12 (July 1892) 594–601.

348. Sachar, *History of the Jews in America*, 88, 93; Ajay K. Mehrotra, “Envisioning the modern American fiscal state: Progressive-Era economists and the intellectual foundations of the U.S. income tax,” *UCLA Law R* 52 (2005) 1793–818; Laurence S. Moss, “Seligman, Edwin Robert Anderson,” *Amer Natl Biog*, eds. John A. Garraty and Mark C. Carnes (Oxford U, 1999) XVIII, 620–21; Barry Kraut, *From Reform Judaism to Ethical Culture: The Religious Evolution of Felix Adler* (Hebrew Union College, 1979) 94–97, 110; Barry E. Supple, “A business elite: German-Jewish financiers in nineteenth-century New York,” *Business H R* 31 (1957) 143–78, 148 n.12 for immigration numbers, and cf. Elliott Ashkenazi, “Jewish commercial interests between North and South: The case of the Lehmans and the Seligmans,” *Amer Jewish Archives* 42 (Spring/Summer 1991) 24–39 on the strong postbellum New Orleans–New York connection of the Seligmans; L. Glen Seretan, *Daniel DeLeon: The Odyssey of an American Marxist* (Harvard U, 1979) 7–8, 78, 80–88, 213–17; Bette Roth Young, *Emma Lazarus in Her World: Life and Letters* (Phila: Jewish Publication Soc, 1995) 201–209. On the tenements: Jared N. Day, *Urban Castles: Tenement Housing and Landlord Activism in New York City, 1890–1943* (Columbia U, 1999) 8 pass. E. R. A. Seligman’s solution was to organize the Tenement House Building Company in 1885, which

built model tenements to house Russian Jews: Horace L. Friess, *Felix Adler and Ethical Culture: Memories and Studies*, ed. Fannie Weingartner (Columbia U, 1981) 75, 102. As Day points out, however (p. 23), model tenements tended to fail as economic and demographic pressures increased; by 1895, New York had 40,000 tenements housing 1,300,000 people, 95 percent of whom were immigrants and their children.

349. Young, *Emma Lazarus*, throughout, q. 210 Henry James; Emma Lazarus, “The Jewish Problem,” *Century Mag* 25 (Feb. 1883) 602–11; Max Cavitch, “Emma Lazarus and the golem of liberty,” *Amer Lit H* 18 (2006) 1–28; “A sensation at Saratoga. New rules for the Grand Union. No Jews to be admitted,” *NY Times* (June 19, 1877) 1; Louisa A. Mayo, *The Ambivalent Image: Nineteenth-Century America’s Perception of the Jews* (Fairleigh Dickinson U, 1988) 94–98; Peter Grose, *Israel in the Mind of America* (NY: Knopf, 1983) 30–32; Eric L. Goldstein, “‘Different blood flows in our veins’: race and Jewish self-definition in late nineteenth-century America,” *Amer Jewish H* 85,1 (1997) 29–55; Partridge, *Dictionary* (→ n.120) 384–85; Ruth HaCohen, “Between noise and harmony: the oratorical moment in the musical entanglements of Jews and Christians,” *Critical Inquiry* 32 (2006) 250–77; Mercutio, [Review], 390. Cf. Derek Vaillant, “Peddling noise: contesting the civic soundscape of Chicago, 1890–1913,” *J Illinois State H Soc* 96 (Autumn 2003) 52–87.

350. Emanuel Lasker, ed., *The Rice Gambit*, 5th ed. (NY, 1910 [1898]) 4off.; Keidanz, ed., *Twenty Years of the Rice Gambit*, q. 315, 327; Edward Winter, “Prof. Isaac Rice and the Rice Gambit,” *Chess Notes* 4521 (Aug. 2006) online with much biographical detail at www.chesshistory.com/winter/winter25.html#4521; William Steinitz, *The Modern Chess Instructor* (NY, 1889) xxiii, scientific, and xxxiii–xli on value of pieces; Kent Landsberger, *William Steinitz, Chess Champion: A Biography of the Bohemian Caesar* (Jefferson: McFarland, 1993) 8, 13, 20–22, 26–27, 31, 33–36, q. 44, 45, 49, q. 53, 55, 60, 89, 125, 138, 153–54; Jeremy Silman, “Wilhelm Steinitz (1836–1900),” at www.jeremysilman.com/chess_history/grt_plyr_w_steinitz.html; Edmund Bruns, *Das Schachspiel als Phänomen der Kulturgeschichte des 19. und 20. Jahrhunderts* (Berlin: LIT, 2003) 27–57 on Steinitz and analogies to capitalism, which I have reconfigured. On Easterns, see an unusual article published in the journal *Rice* founded: Ida M. Van Etten, “Russian Jews as desirable immigrants,” *The Forum* 14 (April 1893) 172–82.

351. Bertram W. Korn, *Early Jews of New Orleans* (Waltham: Amer Jewish H Soc, 1969) 104–10, 136–40; Elliott Ashkenazi, *The Business of Jews in Louisiana, 1840–1870* (U Alabama, 1988) 61–62; *Stewart v. Dunham*, 115 US 61 (1885) at 61 for firm of Katz & Barnett; *New Orleans City Directory for 1878*, Manhattan address for Nathaniel Barnett, at <http://ftp.rootsweb.com/pub/usgenweb/la/orleans/history/directory/1878nocd.txt>; Robert P. Swierenga, *The Forerunners: Dutch Jewry in the North American Diaspora* (Wayne State U, 1994) 211 on the Barnetts; Eric L. Goldstein, “‘Now is the time to show your true colors’: Southern Jews, Whites, and the rise of Jim Crow,” in *Jewish Roots in Southern Soil*, eds. M. C. Ferris and M. I. Greenberg (Brandeis U, 2006) 134–55;

James K. Hogue, *Uncivil War: Five New Orleans Street Battles and the Rise and Fall of Radical Reconstruction* (Louisiana State U, 2006).

352. “Rice, Mrs. Isaac L.,” *Natl Cyclopaedia of Amer Biog* 14 (1910) 508–509, q. 509; Isaac L. Rice, “Spring Gave Me a Friend” in “3 Songs” (NY, 1881), in *Music for the Nation*

at <http://memory.loc.gov>; “Dorothy Rice—a contradiction,” *NY Herald* (May 8, 1910) Mag sect., 9–10, clipping in Morse Papers, Box 88, f. 3/162; International Genealogy Index, Record M001255, marriage of Julia Heineman Barnett and Isaac L. Rice, Dec. 14, 1885, at www.familysearch.org.

353. Ruth Abram, *Send Us a Lady Physician: Women Doctors in America, 1835–1920* (NY: Norton, 1985) 98–101; Sims, *Curiouser and Curiouser*, 12–13; Swierenga, *The Forerunners*, 122ff., on the Hynemans; Henry S. Morais, *The Jews of Philadelphia* (Phila, 1894) 327–28, 345–46, 379; Leon Hyneman, *Masonic Library of Leon Hyneman* (NY, 1879) listing nearly 800 titles; “Illness of Mr. Leon Hyneman,” *NY Times* (Feb. 27, 1879) 3; “City and suburban news,” *ibid.* (March 6, 1879) 8, Leon’s obit; Jacob R. Marcus, *The American Jewish Woman, 1654–1980* (Ktav, 1981) 37; T. Allston Brown, *A History of the New York Stage* (NY, 1903) III, 158; Heather E. Weir and Marion Ann Taylor, eds., *Let Her Speak for Herself: Nineteenth Century Women Writing on Women in Genesis* (Baylor U, 2006) 138–39 on Rebekah/Rebecca Hyneman, and see her *The Leper, and Other Poems* (Phila, 1853); Alice Hyneman Rhine, “Woman in industry,” in *Woman’s Work in America*, ed. Annie N. Meyer (NY, 1891) 276–322; eadem (as Alice Rhine Sotheran), “Reminiscences of Charles Sotheran as pioneer American socialist,” in posthumous edition of his *Horace Greeley and Other Pioneers of American Socialism* (NY, 1915 [1892]) ix–xxxix; K. Paul Johnson, *The Masters Revealed: Madam Blavatsky and the Myth of the Great White Lodge* (SUNY Albany, 1994) 80–89 on Sotheran; Howard Quint, *The Forging of American Socialism* (Indianapolis, 1964) 68, q. 155, DeLeon and Sotheran; “[Obituary notice] Charles Sotheran,” *NY Times* (June 29, 1902) 9, with follow-up on July 5 at BR9.

354. Malcolm H. Stern, *First American Jewish Families: 600 Genealogies, 1654–1977*, 3rd ed. (Cincinnati: Amer Jewish Archives, 1991) 123; H. P. Blavatsky, *Isis Unveiled II. Theology*, 6th ed. (NY, 1891) 373–74; J. H. Wiggin, “Rosicrucianism in New York,” *The Liberal Christian* (Sept. 4, 1875), excerpted by H. P. Blavatsky, Scrapbooks, in *Collected Writings Online*, comp. Boris de Zirkoff, website by Ton den Hartog (Wheaton: Quest) I, 121, at www.tonh.net/theosofie/hpb_cw_online/articles/v1/y1875_o23.htm; Johnson, *The Masters Revealed*, 82–84; Leon Hyneman Barnett, *The Commandment of Love* (NY, 1925) dedicated “to the Memory of a great lover of humanity, My Mother”; Leon Elias Barnett, *Cosmic Christianity* (NY, 1935); Young, *Emma Lazarus*, 204, 208 on Bijur, and “Auspicious for the Reading,” *NY Times* (Sept. 12, 1893) 8 on Bijur and Rice; United Hebrew Charities of the City of New York, *Thirteenth Annual Report and Proceedings* (NY, 1904) 135; “Celebrate as epochal Bible translation,” *ibid.* (Feb. 11, 1914) 20; “Mrs. I. L. Rice gives million to hospital,” *ibid.* (Nov. 2, 1915) 1.

355. Joseph W. Slade, “Rice, Isaac Leopold,” *Amer Natl Biog*, XVIII, 415–17; William B. Shaw, “Rice, Isaac Leopold,” *Dict of Amer Biog* (NY, 1935) VIII, 541; Forum advertisement, “Why is The Forum one of the very best and most profitable mediums for Publishers to use?” *The Book Buyer* 10 (1893–1894) 131; Isaac L. Rice, “A remedy for railway abuses,” *North Amer R* (Feb. 1882) 134–48; *idem*, “Legalized plunder of railroad properties,” *The Forum* 17 (Aug. 1894) 676–89, discussed widely, as in “Legalized robbery,” *Chicago Daily Trib* (Aug. 25, 1894) 13; “Who is Isaac L. Rice?” *Wall Street J* (Sept. 8, 1893) 2, something of a capstone piece to seven years of articles on Rice’s labors with the Texas & St. Louis,

Richmond, Texas Pacific, Georgia Central, and Reading railroad companies, also followed in detail by *NY Times*, as in “Railway management” (April 12, 1890) 2, “An extraordinary answer” (Dec. 18, 1893) 4, “Protecting Reading’s funds: subway charges not to be ahead of the bonds thanks to Isaac L. Rice’s protest,” (June 13, 1894) 1, and “Pleading for Reading” (Dec. 19, 1894) 7; In re Rice, 155 US 396 (1894), argued in front of the Supreme Court by Nathan Bijur; E. G. Campbell, *The Reorganization of the American Railroad System, 1893–1900: A Study of the Effects of the Panic of 1893, the Ensuing Depression, and the First Years of Recovery on Railroad Organization and Financing* (NY: AMS, 1968 [1938]) 117, 119, 175–79, 182; U.S. Congress, Select Committee under House Resolution 288, *Hearings Beginning March 9, 1908—April 30, 1908* (DC, 1908) I, 426. Cf. “Ryan, the ‘most noiseless’ man of American finance,” *NY Times* (May 19, 1907) Mag, SM2, on Thomas Fortune Ryan and his behind-the-scenes role in railroad reorganizations pitting Drexel and Morgan against Rice and friends; William G. Roy and Philip Bonacich, “Interlocking directorates and communities of interest among American railroad companies, 1905,” *Amer Sociological R* 53 (1988) 368–79; John Whiteclay Chambers, II, *The Tyranny of Change: America in the Progressive Era, 1890–1920*, 2nd ed. (Rutgers U, 1992, 2000) ch. 3.

356. S. Wyman Rolph, “Exide”: *The Development of an Engineering Idea. A Brief History of the Electric Storage Battery Company* (NY, 1951); Richard H. Schallenberg, “The anomalous storage battery: an American lag in early electrical engineering,” *Tech and Culture* 22 (1981) 723–52; Slade, “Rice, Isaac Leopold”; idem, “Bringing invention to the marketplace,” *Amer Heritage of Invention and Technology* 2 (Spring 1987) 8–15; Isaac L. Rice, “Success with the storage battery,” *NY Times* (April 22, 1895) 3; Clément Payen, clusters of U.S. patents at 415,328–415,333 and 415,348–415,349 (1889) and at 440,267–440,277 (1890).

357. John Taliaferro, *Tarzan Forever: The Life of Edgar Rice Burroughs* (NY: Scribner, 1999) 30, 35, 45, q. 55; Edgar Rice Burroughs, *Tarzan of the Apes* (NY: Penguin, 1990 [1914]) 63, 226; Peter Salwen, *Upper West Side Story* (NY: Abbeville, 1989) 131 on Diamond Jim’s electric brougham in 1895; Sims, *Curiouser and Curiouser*, 41–43, giving priority to her father; “Automobile cabs barred; Jefferson Seligman and Isaac L. Rice lose park permits,” *NY Times* (Dec. 16, 1899) 1; “Rice calls Clausen a despot,” *Brooklyn Daily Eagle* (Dec. 17, 1899) 5; Financial News Association, *Manual of Statistics: Stock-Exchange Handbook* (NY, 1908) 476. For further analyses of Rice’s taxi enterprise, consult John B. Rae, “The Electric Vehicle Company: a monopoly that missed,” *Business H R* 29 (1955) 298–311; David Kirsch, *The Electric Vehicle and the Burden of History* (Rutgers U, 2000) 29–84; Mom, *The Electric Vehicle* (→ n.252) esp. 79–91; “Industrial notes,” *Brooklyn Daily Eagle* (Oct. 13, 1899) 12, Rice withdrawing as president but remaining on the Executive Committee, with John Jacob Astor. See also James J. Flink, *America Adopts the Automobile, 1895–1910* (MIT, 1970) 19, 28 on the Electrobat, built in Philadelphia; C. B. Glasscock, *The Gasoline Age* (Indianapolis, 1937) esp. 16 on William Morrison’s early electric carriages, one of which Burroughs was driving. The cinematic Tarzan cry was devised for *Tarzan the Ape Man* by sound-effects designer Douglas Shearer, who used an alpine yodel, sped up and played in reverse: http://en.wikipedia.org/wiki/Tarzan_the_Ape_Man.

358. Mom, *The Electric Vehicle*, 101 for *Electric R* (1902), and cf. 128, *La Vie automobile* (1909) on the barbarous gas engine, whose defects could be seen, felt, smelled, and heard,

and also Hiram P. Maxim, *Horseless Carriage Days* (NY: Dover, 1962 [1936]) 47, 55, 62; Edmund L. Zalinski, “Submarine navigation,” *The Forum* 2 (Jan. 1887) 470–83; Slade, “Bringing invention to the marketplace”; Jeffrey L. Rodengen, *Serving the Silent Service: The Legend of Electric Boat* (Fort Lauderdale: Write Stuff, 1994) 17–54; Richard K. Morris, *John P. Holland: Inventor of the Modern Submarine* (U South Carolina, 1998) 67–94; Simon Lake, *The Submarine in War and Peace* (Phila, 1918) 85–113, 188–90. Like too many other historians, I am slighting the importance and inventiveness of Lake, who was an early proponent of the double hull and the hydrophone, both of which affected submarine acoustics: John J. Poluhowich, *Argonaut: The Submarine Legacy of Simon Lake* (Texas A & M, 1999).

359. Thomas Parrish, *The Submarine: A History* (NY: Penguin, 2005) 34–40, 165–70; Rodengen, *Serving the Silent Service*, q. 26 Admiral Sir Arthur Wilson, 29 Barton and Holland, 43–50, q. 53 “rock crushers,” 54 sales; Morris, *John P. Holland*, 102–103 for Barton and Holland, and throughout; “In Leo Tolstoi’s honor,” *NY Times* (Sept. 9, 1898) 2; Nicholas Halasz, *Nobel: A Biography* (L, 1960) 67, 158; Robin Chew, “Alfred Nobel, Swedish Industrialist” (1995) at www.lucidcafe.com/library/95oct/alfnobel.html for exact quote; Slade, “Bringing invention to the marketplace,” 14–15; Robert A. Hamilton, “A century of innovation” and Gary McCue, “The Centennial Connection: USS Holland and Electric Boat,” both at www.navyleague.org/seapower/electric_boat.htm; Victor Appleton, *Tom Swift and His Submarine Boat* (NY, 1910) chs. 4–5; “[Obituary notice] Maurice Barnett,” *NY Times* (Oct. 28, 1933) 15. Poluhowich, *Argonaut*, 72, notes that Rice’s Electric Launch company had built boats for Commodore Vanderbilt, John Jacob Astor, Nathan Meyer Rothschild, and Russia’s Grand Duke Alexander. On arms peddling in Rice’s time, Jonathan A. Grant, *Rulers, Guns, and Money: The Global Arms Trade in the Age of Imperialism* (Harvard U, 2007), with no mention of Rice.

360. “Says the Germans copied submarine,” *NY Times* (Sept. 27, 1914) X2; “Sailing on the Lusitania,” *ibid.* (Sept. 8, 1912) C2; “Rice realizes \$3,500,000 from Electric Boat rise,” *Wall Street J* (July 26, 1915) 1; “Millionaire in a month by Electric Boat stock rise,” *Chicago Daily Trib* (July 14, 1915) 1; “Isaac L. Rice, financier, dies,” *NY Times* (Nov. 3, 1915) 15; “Car Lighting & Power,” *Wall Street J* (Aug. 5, 1915) 5; J. Herbert Duckworth, “A war-made millionaire,” *Amer Mag* 81 (Jan. 1916) 48; “Value Rice estate at only \$981,698,” *NY Times* (Aug. 16, 1916), but contrast “Mrs. Peirce gets divorce,” *ibid.* (April 28, 1918) 10, value of Rice estate at \$40,000,000. The latter figure seems inflated but may make more sense, given the charitable bequests made by Julia in the following years, although this would put her in the company of the seventy richest American families (fortunes over \$35,000,000: Chambers, *Tyranny of Change*, 89); it is most likely that the Rices in their heyday were in the second tier of wealthy families. For more on the Electric Boat Company: Select Committee, *Hearings Beginning March 9, 1908—April 30, 1908*, esp. I, 425–66, 665–67; “Electric Boat Co. About \$205,000 working capital secured by withholding dividends,” *Wall Street J* (Jan. 14, 1911) 5; “Rise in Electric Boat and the reasons for it,” *ibid.* (July 14, 1915) 6; “Submarine Boats’ dividends were all paid-out,” *ibid.* (Feb. 15, 1917) 6. At Isaac’s death, Isaac Jr. became Vice-President of Consolidated Railway, Electric Lighting and Equipment Company, and Julia and the children retained significant shares of Electric Boat (later, General Dynamics) stock: “Car Lighting and Power,” *Wall Street J* (Nov. 15, 1915) 5;

"Ex-Submarine Boat director supports Rice Committee," *ibid.* (March 31, 1922) 3; "Rice stockholders lose," *NY Times* (April 20, 1922) 32.

361. "Marconi system here," *NY Times* (Nov. 24, 1899) 8; "Marconi wireless telegraph," *Wall Street J* (Nov. 27, 1899) 6; "A Marconi Wireless Telegraph Company for America," *Electrical World and Engineer* (Dec. 2, 1899) 870-71; "Dorothy Rice—a contradiction," *NY Herald* (May 8, 1910) Mag sect., 10 on Isaac L. Rice, Jr.; Sims, *Curiouser and Curiouser*, 46-47; "We lead submarine ideas," *NY Times* (July 30, 1907) 4. The company was berthed in New Jersey, as were many of Rice's enterprises, because an 1889 law enabled a new corporate instrument, the holding company, to operate effectively from New Jersey shores, owning, managing, and capitalizing companies in other states: Maury Klein, *The Genesis of Industrial America, 1870-1920* (Camb U, 2007) 127.

362. Paul Butel, *The Atlantic*, tr. Iain Hamilton (NY: Routledge, 1999) 213-57; James B. Elsner and A. Birol Kara, *Hurricanes of the North Atlantic: Climate and Society* (Oxford U, 1999) 38, 48-49, 54-55, 141; Marc d'Orgeville and W. Richard Peltier, "On the Pacific Decadal Oscillation and the Atlantic Multidecadal Oscillation: might they be related?" *Geophysical Research Letters* 34 (2007) L23705; J. W. Verdier, "The interpretation of statistics relating to shipping casualties and loss of life at sea," *J Royal Statistical Soc* 85 (1922) 561-96, esp. 569; Louis V. King, "On the propagation of sound in the free atmosphere and the acoustic efficiency of fog-signal machinery: an account of experiments carried out at Father Point, Quebec, September, 1913," *Phil Trans Royal Soc of L: Ser. A* 218 (1919) 211-93; Arthur H. Dutton, "Robbing fog of its terrors," *Overland Mo* 54,2 (1909) 151-55, q. 151; Radau, *Wonders of Acoustics* (→n.1) 60; "Great noise makers," *B Advertiser* (Aug. 5, 1904) in Morse Papers, Box 88, f. 1/18; G. De W. Green, "Improvement of fog horns," *Sci Amer* 93 (Sept. 16, 1905) 219; Charles C. Bates and Richard H. Fleming, "Oceanography in the Hydrographic Office," *Military Engineer* 39 (Aug. 1947) 338-44; Robert G. Skerrett, "The development of submarine signalling," *Cassier's Mag* 34 (1908) 126-31; Walter Hines Page and Arthur Wilson Page, *The World's Work* (NY, 1914) 432-34; Linwood S. Howeth, *History of Communications: Electronics in the United States Navy* (DC: Bureau of Ships and Office of Naval History, 1963) xi, 5-117, 167-68, 177, 195, 299-300; Willem Hackmann, *Seek and Strike: Sonar, Anti-Submarine Warfare and the Royal Navy, 1914-54* (L: HMSO, 1984) q. 3 Henry's siren, 5 on Gray's hydrophone, 6-7; Elisha Gray, "Electrical ringing of bells for submarine signalling," U.S. Patent 744,336 (Nov. 17, 1903); Frank J. Sprague, Papers 1874-1939, Box 104, "Principles involved in submarine and other detectors" (May 13, 1919 but detailing earlier schemes) in Division of Manuscripts and Archives, NY Public Lib; Agnes Giberne, *The Romance of the Mighty Deep* (L, 1910) 40; Lake, *The Submarine in War and Peace*, 27-28, q. 28 on paddlewheels, etc. For the Submarine Signal Company: *Submarine Signal Bull* 42 (May 1913) 1-2; Raytheon Company, Seapower Capability Center, Research Library, Portsmouth, RI, Submarine Signal Company Archives, Item AR 141, obituary of H. J. H. Fay, an engineer who helped perfect the system, further improved when Fessenden oscillators were introduced in 1912. I am also using here the Submarine Signal Company Correspondence, 1906-1908, in the Henry Lee Higginson Papers, Series v. VIII-1, f. 1, W. T. Turner to the Company, March 19, 1906, ocean snow storm; f. 2, Charles Moore to Maj. H. M. Chittenden, July 8, 1907, tripod, and Moore to

Charles J. Bonaparte, Secretary of the Navy, Oct. 31, 1906, on the unreliability of airborne fog signals; Series VIII-2, clipping folder, "Reduction in marine rates to be anticipated," *B Standard* (April 7, 1906); Series VIII-2, Misc. Reports, "Submarine sound signals," *Pilots Charts and Hydrographic Bull* 5 (June 30, 1909), all in Baker Library Historical Collections, Harvard Business School, Harvard U.

363. "Submarine danger signals," *NY Sun* (July 27, 1906), in Series VIII-2, clippings folder, Henry Lee Higginson Papers, as just above; "Startling possibilities for the Navy in Wireless Telephone," *NY Times* (Oct. 13, 1907) V, SM1. On Riverside Park and Villa Julia: Christopher Gray, "A 1902 memorial to the fallen of the Civil War," *ibid.* (Oct. 13, 2002) Sect.11,1:7; *idem*, "A fading reminder of turn-of-the-century elegance," *ibid.* (Aug. 24, 1997) R5; Thomas Cady, "New York's Riverside Park," *Munsey's Mag* 20 (1899) 73-89; Salwen, *Upper West Side Story*, 73-85, 111, 120-21; James Trager, *West of Fifth: The Rise and Fall and Rise of Manhattan's West Side* (NY: Atheneum, 1987) 49; Sims, *Curiouser and Curiouser*, 18-19, q. 33, 51, 54-56, 60; Marion Rice Hart, *I Fly As I Please* (NY, 1953) 225; "Odd palace in Riverside Drive," *NY Sun* (Oct. 27, 1902) and "Six children who never hear don't," *ibid.*, undated clipping, both in "Isaac Rice" file of the *NY Sun* morgue, Annex, NY Public Lib (as of March 2008 being processed for a storage facility in New Jersey); "The Electric Boat winner," *Wall Street J* (Aug. 7, 1915) 2 on the chessboard. I thank Lenore Richter for an extensive tour of the house (Nov. 6, 1995), then owned by Yeshiva Ketana.

364. "The noise on the elevated railroad," *Manufacturer and Builder* 10 (Aug. 1878) 170; Sims, *Curiouser and Curiouser*, 53, 54; "Obituary: Egbert L. Viele," *Bull Amer Geographical Soc* (1902) 384; Gen. Egbert L. Viele, "Lincoln as a story-teller," *Abraham Lincoln: Tributes from His Associates, Reminiscences of Soldiers*, ed. William H. Ward (NY, 1895) 116-24; David Schuyler, *The New Urban Landscape: The Redefinition of City Form in Nineteenth-Century America* (Johns Hopkins U, 1986) 81, q. 116 for Prospect Heights; "In the real estate field," *NY Times* (Oct. 11, 1899) 12; "Altman Estate sells Riverside Drive corner to operator," *ibid.* (Feb. 14, 1914) 16; "New palace of the automobile king, Isaac Rice," *Chicago Daily Trib* (Aug. 5, 1900) 6; Salwen, *Upper West Side Story*, 72-74; Rebecca W. Corrie, "Here's the book on Coram Library's theatrical degree," *Bates Mag* (Winter 2004), at www.bates.edu/x47803.xml, citing the research of Peter Donhauser on Herts, Rice, and the Harmonie Club, as also "Harmonie Club celebrates its sixtieth anniversary," *NY Times* (Nov. 24, 1912) SM14.

365. Corrie, "Here's the book"; [Thomas W. Herringshaw, ed.], *Builders of Our Nation: Men of 1914* (Chicago, 1915) 357; Mary C. Henderson, "Scenography, stagecraft, and architecture," *Cambridge History of American Theatre*, eds. C. W. E. Bigsby and Don B. Wilmeth (Oxford U, 1999) 493; Sims, *Curiouser and Curiouser*, 54, 55, 60; "The Brooklyn Academy of Music," *Amer Architect and Building News* 94 (Oct. 7, 1908) 115-17; Hugh Talant, "Acoustical design in the Hill Memorial Auditorium, University of Michigan," *The Brickbuilder* 22 (Aug. 1913) 169; *idem*, "Architectural acoustics. The effect of a speaker's voice in different directions," *ibid.* 22 (Oct. 1913) 225; Muriel Rice, *Poems* (NY, 1906) 51.

366. Gray, "A fading reminder"; James D. McCabe, *Lights and Shadows of New York Life* (Bridgeport, 1877) 126, 130-31 on traffic congestion; John C. Van Dyke, *The New New York* (NY, 1909) 32; M. Ribière, "Compressed air sound signals," *Engineering* [L] 56 (Nov. 10,

1893) 588-89; Morse Papers, Box 88, f. 3/125, O'Brien Electrophone Company advertisement; George Matteson, *Tugboats of New York* (NYU, 2005) 76, 84-86, 166 for peanut whistle. Van Dyke's travelogues were influential, especially his praise for the stark, silent desert of the Southwest, so his soundscape of the harbor had more than a casual import: Peter Wild and Neil Carmony, "The trip not taken: John C. Van Dyke, heroic doer or arm-chair seer?" *J Arizona H* 34,1 (1993) 65-80; Peter Wild, "Sentimentalism in the American Southwest: John C. Van Dyke, Mary Austin, and Edward Abbey," in *Reading the West: New Essays on the Literature of the American West*, ed. Michael Kowaleski (Camb U, 1996) 127-43.

367. "Horrid beyond endurance," *Milwaukee Sentinel* (Aug. 31, 1861) 1:5; "Are too many noises," *ibid.* (Sept. 13, 1896) 22:4; "The noiseless city campaign," *ibid.* (Sept. 27, 1896) 13:3; Milwaukee Dept. of Health, *Annual Report of the Commissioner of Health* 20 (April 1897) 25-27, esp. 25, Kempster on the fact that small tugs, blowing six long blasts on the approach to a bridge at night, could be "as loud as transAtlantic steamer foghorns"; Morse, *Steam Whistle*, 3, 5; Matteson, *Tugboats*, 82, 91, 95, q. 97. A short biography of Kempster appears in *Natl Cyclopaedia of Amer Biography* (NY, 1894) V, 21-22.

368. Naomi Cohen, *Encounter with Emancipation: German Jews in the United States, 1830-1914* (Phila, JPS, 1984) 329-36; Gerald Kurland, *Seth Low, The Reformer in an Urban and Industrial Age* (NY: Twain, 1971) 120-23; Stephen P. Erie, *Rainbow's End: Irish-Americans and the Dilemmas of Urban Machine Politics, 1840-1985* (UC Berkeley, 1988) esp. 46-55; Edward T. O'Donnell, "Hibernians versus Hebrews? A new look at the 1902 Jacob Joseph funeral riot," *J Gilded Age and Progressive Era* 6,2 (2007) 209-26.

369. "Plenty of laws to stop noises if they were only enforced," *Brooklyn Daily Eagle* (Oct. 27, 1901) 20; Kurland, *Seth Low*, chs. 6-7; Seth Low, "Obstacles to good city government," *The Forum* 5 (1887) 260; *idem*, "The great democratic opportunity," *ibid.* 14 (April 1893) 242-46; Morris, *John P. Holland*, 13-48, 129-30; "Bill of Complaint filed by Electric Boat Company, in Chancery of New Jersey, 1905," against Holland, supplied by Gary W. McCue to www.dutchsubmarines.com/rd/r&d_bill_of_complaint.htm; Lake, *The Submarine in War and Peace*, 114-18; *City of New York v. Isaac L. Rice*, 198 NY 124, 91 NE 283 (NY 1910) 375-80; "Fight Rice terrace. City appeals to Court. Anti-noise crusader's grounds said to encroach on pavement," *NY Sun* (June 11, 1907) in newspaper morgue, NY Public Lib; "Hauls up another tooter," *NY Times* (June 21, 1907) 7 for the Shamrock Line.

370. Sims, *Curiouser and Curiouser*, 60, 63 on the family's servants, none of whom seemed to have complained, but see "Gems lost, girl in river. Police scare Mrs. Rice's maid, who was not suspected," *NY Times* (March 1, 1906) 1; "Mr. Murphy needed in anti-noise war," *ibid.* (June 9, 1907) 6; Robinson, *Improvement of Towns and Cities* (→ n.247) 73. On public transport: Calvin Tompkins et al., City Planning Committee, "Report on the Passenger Transportation System of New York," *Bull Municipal Art Soc of New York* 3 (1903). On the rent strikes and the Socialist Anti-rent Agitation Bureau: Day, *Urban Castles* (→ n.348) 76-79. For another perspective: Thompson, *Soundscape of Modernity* (→ n.293) 120-22. Much more research is needed on the relationship of African-American communities to anti-noise movements and noise nuisance prosecutions; the Rices' friend Edwin R. A. Seligman was the first chair of the National League on Urban Conditions among Negroes (1911-1913), and among the founding members of the National Association for

the Advancement of Colored People in 1909, as were a number of other New York German Jews in whose circle Isaac and Julia Rice moved: William Stueck, "Progressivism and the Negro: White Liberals and the early NAACP," *Historian* 38 (Nov. 1975) 58-76. The "Urban Noise Counselor Program" initiated by the National Urban League in 1982 (Box III, f. 318 of the League's Papers, Division of Manuscripts, Lib of Congress) was preceded by earlier efforts to deal with noise in the urban black environment, beginning perhaps in Baltimore.

371. Sims, *Curiouser and Curiouser*, q. 2, 19-20, 29, 73-74; Landsberger, *William Steinitz* (→ n.350) 1, 285-99; Annie Nathan Meyer, *Barnard Beginnings* (B, 1935) 115-27 and Appendix F; "Poets organize a union," *Chicago Daily Trib* (Feb. 23, 1910) 1; "No union, salon for poets; Mrs. Rice is to corral 'em with the editors—why there'll be no trust," *NY Times* (Feb. 24, 1910) 18, with response by Elsa Barker, "Poetry Society's meeting," *ibid.* (Feb. 26, 1910) 6; "The poets' circle and syndicate open," *ibid.* (Jan. 2, 1911) 7.

372. On class and ideology: Stromquist, *Re-Inventing "The People"* (→ n.90) 7, 9, 107-30. I am indebted to Dr. Charles Brashear, a distant descendant of Imogen Brashear Oakley, for genealogical details provided in an e-mail of Jan. 5, 2008, and quoting from Henry S. Brashear, *The Brashear-Brashears Family, 1449-1929* (Texarkana, 1929) 63-64. I am also using L. Walker Donnell, "Imogen Brashear Oakley, 1854-1933," *Notable Women of Pennsylvania*, eds. G. B. Biddle and S. D. Lowrie (U Penn, 1942) 254-55; Daughters of the American Revolution, *Lineage Book* 10 (1899) 112; Angela Gugliotta, "'Hell with the Lid Taken Off': A Cultural History of Air Pollution—Pittsburgh," Ph.D. thesis, U Notre Dame, 2004, pp. 185, 190, 269, and n.221 on civic clubs; W. J. Holland, "John Brashear, the beloved," *J Royal Astron Soc of Canada* 22 (1928) 3-6, including material on Basil (Bela) Brashear, Imogen's father; Chapman Publishing Co., *Portrait and Biographical Record of Stark County, Ohio* (Chicago, 1892) 463-64 for Charles W. Roepper, husband of Imogen's sister Nina; George H. Thurston, *Allegheny County's Hundred Years* (Pittsburgh, 1888) 272 on John N. Oakley; "Oakley, Thornton," *Natl Cyclopaedia Amer Biog* 42 (1950) 69-70, Imogen's son, who perpetuated her concern for working folk in his own illustrated verses (e.g. "The Divinity of Toil," 1927) distributed by the American Federation of Labor. For Imogen's noise-abatement work: Civic Club of Philadelphia, *Annual Report* 13 (1907) q. 14; "A war on noise to aid the poor," *Lit Digest* 51 (Nov. 6, 1915) 1005-1006, quoting at length from an interview in *The Housewives' League Mag* (Oct. 1915). For her writings: Imogen B. Oakley, "Protest against noise," *Outlook* [NY] 90 (Oct. 17, 1908) 351-55, q. 351; eadem, "Women's fight against the smoke nuisance," *NY Times* (March 30, 1913) VII, x9; eadem, "The Spread of Civil Service Reform Principles through the Agency of Women's Clubs," a National Civil Service Reform League pamphlet of 1902. Oakley's D.A.R. connections did come clear in a posthumous work illustrated by her son Thornton: *Six Historic Homesteads* (Phila, 1935). Finally, on "municipal housekeeping," begin with Daphne Spain, *How Women Saved the City* (U Minnesota, 2000).

373. Oakley, "Protest against noise," q. 351; eadem, "Public health versus the noise nuisance," *Natl Municipal R* 4 (April 1915) 231-37, q. 232; eadem, "The noise nuisance," *Civic Comment* 4 (Feb. 16, 1920)—"Noise is bluster and brag in industry"; and with Lucretia L. Blankenburg, "The ideal city," in *Woman and the Larger Citizenship* (Chicago, 1913)

I, 2211–55, q. 2235, q. 2240, and note just above. For Oakley's noise committee: Civic Club of Philadelphia, *Annual Report* 13 (1907) q. 14; 14 (1908) 5, 27; 15 (1909) 37–38; 19 (1913) 70–71; 22 (1916) 33; 23 (1917) 42. In 1919, risen to chair the Committee on Noise Nuisance of the American Civic Association, Oakley was still referring to the complaints of tenement women: “Do noises make us ill? The ‘yelling peril’ one of the greatest we have,” *Ladies' Home J* 36 (Sept. 1919) 63. Mary R. Beard, *Woman's Work in Municipalities* (NY: Arno, 1972 [1915]) 93–95, acknowledged the anti-noise work of Edward Abbott and Julia Rice but was most encouraged that many women, realizing “that the anti-noise movement must not be purely a middle-class movement,” had acted on behalf of workers to reduce “prolonged hours of work amid the whirl of factory machinery”; she cited Louis Dembitz Brandeis and Josephine Goldmark, *Women in Industry* (NY: Arno, 1969 [1908]). On unions: Sharon Smith, *Subterranean Fire: A History of Working-Class Radicalism in the United States* (Chicago: Haymarket, 2006) 67 and throughout.

374. Civic Club of Philadelphia, *Annual Report* 14 (1908) 27, correspondence with Julia Rice, and see Clinton R. Woodruff, “Woman and her larger home,” *Good Housekeeping* 48 (Jan. 1909) 7 for photos of both Rice and Oakley; Edwin L. Godkin, “Noise,” *Nation* 56 (June 15, 1893) 433–34; William M. Armstrong, ed., *The Gilded Age Letters of E. L. Godkin* (SUNY Albany, 1974) ch. 10; idem, *E. L. Godkin: A Biography* (SUNY Albany, 1978) esp. 194–97; Howells, “Editor's easy chair” (→ n.318) q. 959, 960; “Mark Twain: a humorist's confession,” *NY Times* (Nov. 26, 1905) SM1, as well as thirteen letters from Mrs. Rice to Twain, and two from Twain to Mrs. Rice, between Dec. 13, 1906 and Feb. 20, 1908, at UCLC 37457, 35767, 35773, 36272, 37442, 37493, 37535, 37680, 39242–45, 48856, and UCCK 07886 and 07943, Mark Twain Papers and Project, Bancroft Lib, UC Berkeley. For Bishop Potter: Frank M. Colby, ed., *The International Year Book: A Compendium of the World's Progress During the Year 1901* (NY, 1902) 557 for quote and chronology; Elmer Lee, M.D., “The abuse should be stopped,” *NY Daily Trib* (Dec. 2, 1900) II,10, a letter to the editor suggesting that Bishop Potter's Committee of Fifteen, created by the Chamber of Commerce after Potter sent his famous letter of outrage to Mayor Van Wyck, take up “the plague of noise,” starting with the nightly crying of fake “extras” by newsboys; Lawrence G. Charap, “‘Accept the truth from whomsoever [sic] gives it’: Jewish-Protestant dialogue, interfaith alliances, and pluralism, 1880–1910,” *Amer Jewish H* 89,3 (2001) 261–62. On women and reform: Sandra E. Addickes, *To Be Young Was Very Heaven: Women in New York before the First World War* (NY: St. Martin's, 1999); Rheta C. Dorr, *What Eight Million Women Want* (NY: Kraus rept., 1971 [1910]), addressed to the members of the General Federation of Women's Clubs; Ellen S. More, *Restoring the Balance: Women Physicians and the Profession of Medicine, 1850–1995* (Harvard U, 1999) 70–94; Robyn Muncy, *Creating a Female Dominion in American Reform, 1890–1935* (Oxford U, 1991); Theda Skocpol, *Protecting Soldiers and Mothers: The Political Origins of Social Policy in the United States* (Harvard U, 1992)—citing Oakley on civil service reform (p. 360).

375. Raymond A. Schroth, *The Eagle and Brooklyn: A Community Newspaper, 1841–1955* (Westport: Greenwood, 1974) 91–117; “St. Clair McKelway,” *NY Times* (July 25, 1897) SM11; William S. Pelletreau, *A History of Long Island* (NY, 1903) III,1–2; “Brooklyn a noisy town and the reason why,” *Brooklyn Daily Eagle* (June 26, 1901) 20; “Useless city noises,”

ibid. (July 2, 1901) 6; “Plenty of laws to stop noises if they were only enforced,” ibid. (Oct. 27, 1901) 20, and many earlier articles, e.g., “Noises in Brooklyn” (May 21, 1896) 14; Tired, “Unnecessary noises: one step further in the crusade against them” (April 27, 1897) 6; “Morning noise must stop: Health Department serves notice upon the Horton Ice Cream Co.” (July 30, 1897) 1, milk trucks and ice wagons; H. C. F., “Useless noise of the city” (Aug. 9, 1897) 9, ragmen’s cowbells; “Auto-trucks and wagons” (Jan. 17, 1899) 4; “Crusade against noises” (July 28, 1900) 14; A Resident of Brooklyn, “Catalogue of noises” (Aug. 27, 1900) 2; “Noises of the city: surpassed by a steam apparatus for riveting boilers” (July 25, 1902) 2, all available online at www.brooklynpubliclibrary.org/eagle. On Isaac Rice and the Brooklyn El: “Reviving the Bruff road,” *NY Times* (Jan. 5, 1884) 8.

376. Sara Josephine Baker, *Fighting for Life* (NY, 1939) 10, 30, 36–37, 51–58, 68–69, q. 134–35; Luther Holt, “The cry,” *The Care and Feeding of Children* (1923) as excerpted in *Childhood in America*, eds. P. S. Fass and M. A. Mason (NYU, 2000) 52–53. Julia Rice was one of the sponsors of the Little Mothers’ League: Ina B. Roberts, ed., *Club Women of New York, 1910–1911* (NY, 1910) 307.

377. “To watch the anti-noise law: West Siders to be present in the council chamber to keep an eye on the vote,” *NY Daily Trib* (Feb. 13, 1900) 12:1, and referring, it would seem, to Girdner’s Anti-Noise Society as later mentioned in “Girdner against noise,” ibid. (June 15, 1901) 10:1; “The noise nuisance,” *B Transcript* (March 2, 1904) in Morse Papers, Box 88, f. 2/14 on Girdner, “formerly president of the Anti-Noise Society,” as also Box 88, f. 1, “For a noiseless New York,” *NY Sun* (Feb. 25, 1906), West End Woman’s Republican Club declares itself against noise; “New-Yorker endures many unnecessary noises,” *NY Daily Trib* (Sept. 10, 1905) 8, Morningside and Riverside Heights Association (upper West Side) “making warfare recently against blasting on the Jersey shore” and intending to take up cudgels against Els with flat wheels, hucksters, hoodlums, and hurdy-gurdy musicians. On the proposal for a SSUN: Philip G. Hubert, Jr., “The abuse of applause,” *Century Mag* 38 (May 1889) 158–59; idem, “For the suppression of city noises,” *North Amer R* 159 (Nov. 1894) 633–35; idem, *Liberty and a Living* (NY, 1889; 2nd ed., 1904); Lawrence Buell, “The Thoreauvian pilgrimage: the structure of an American cult,” *Amer Lit* 61 (May 1989) 175–99 at 186, and cf. David E. Nye, *America as Second Creation: Technology and Narratives of New Beginnings* (MIT, 2003) q. 119. Hubert’s father, a French architect, designed some of the first cooperative apartment buildings in New York, several on the West Side. As for ways to reduce the noise of elevated trains: “Noise on the elevated,” *B Herald* (Oct. 20, 1903), reporting on experiments in Berlin, in Morse Papers, Box 88, f. 2/36.

378. Gilbert L. Noble, “Joseph Mayer Rice: Critic of the Public Schools and Pioneer in Modern Educational Measurements,” Ph.D. thesis, SUNY Buffalo, 1970; Patricia A. Graham, “Joseph Mayer Rice as a founder of the Progressive Education movement,” *J Educ Measurement* 3,2 (1966) 129–33; Margaret J. Marshall, *Contesting Cultural Rhetorics: Public Discourse and Education, 1890–1900* (U Michigan, 1995) 23–68, 121–22, 133–34, 211–19; Joseph Mayer Rice, *The Public School System of the United States* (NY: Arno, 1969 [1893]) q. 5, q. 20, 21–22, q. 23.

379. Rice, *The Public-School System*, q. 6, 20, 21–22, q. 23, q. 26, and 37 (“Even a good part of a lesson in music is devoted to drilling the children in definitions”); idem, “The

futility of the spelling grind, I, II,” *The Forum* 23 (1897) 163–72, 409–19, q. 416, q. 418–19; Herbert M. Kliebard, “Education at the turn of the century,” *Educ Researcher* 11 (Jan. 1982) 16–24. Rice’s articles appeared when *The Forum*’s circulation was reaching its apex of 30,000 under the editorship of Walter Page, on whom see Robert J. Rusnak, *Walter Hines Page and the World’s Work, 1900–1913* (U Presses of America, 1982) 98, 111; Burton J. Hendrick, *Life and Letters of Walter H. Page* (Garden City, 1922) 1, 49; Walter Hines Page, three letters from Isaac L. Rice (Aug. 3, 1888; July 12, 1894; July 23, 1895) in MS Am 1090, Letters from Various Correspondents, f. 938, at Houghton Lib, Harvard U. When Isaac Rice forced him out in 1895, ostensibly for financial reasons, Page went on to edit *The Atlantic Monthly*, and in 1897 Joseph took over *The Forum*’s editorial reins for the next decade.

380. Joseph Mayer Rice, *Scientific Management in Education* (NY: Arno, 1969 [1914]) esp. 57–58, 61; idem, *The People’s Government* (Phila, 1915) esp. 23; “German experts laud American teachers,” *NY Times* (Oct. 22, 1904) 10.

381. Mrs. Isaac L. Rice, “An effort to suppress noise,” *The Forum* 37 (April 1906) 552–70, q. 552; “What one public-spirited woman can do—Mrs. Isaac L. Rice’s campaign,” *NY Times Mag* (Jan. 14, 1906); “Mrs. Isaac L. Rice,” *The Part Taken by Women in American History*, eds. John A. Logan and Mary S. C. Logan (NY: Arno, 1982 [1912]), 602–603, which also reports what Julia wanted her audiences to believe, that until her anti-noise work, she “had hitherto been unaccustomed to any public effort, having lived a quiet, domestic, home life.” At a meeting of the Massachusetts Boards of Health, reported in *Amer J Public Hygiene* 15 (1905) 299–300, Morse had repeated his reference to the Pompei poster in yet another talk on noise, followed by Philip C. Knapp, “The effect of noise upon weak and nervous people,” pp. 301–304, and James J. Putnam, “Some considerations concerning city noises,” pp. 304–10, with commentary by Prof. W. T. Sedgwick, Dr. Samuel H. Durgin, and Dr. Agnes C. Vietor. Noting that a suit to limit the noise of a circular saw had failed in state court, and bemoaning the din of Boston streets, Durgin was “intensely interested to learn who is responsible for stopping the noise. I hope that it is the State of Board of Health.” Julia might have anticipated the bureaucratic problem of purview in anti-noise reform and exploited a domestic “lone womanness” to her advantage.

382. “Europe too wants quiet,” *NY Sun* (Oct. 18, 1908) 6 on the fan; Rice, “An effort,” 558; H[enry] W[illiam] H[urlbut], “Unnecessary noises: an American woman’s campaign,” *Christian World [L]* (1907) clip appended to letter from Mrs. Rice to Samuel Clemens, Nov. 25, 1907 (UCLC 37457), in Mark Twain Collection, Bancroft Lib, UC Berkeley; “Statement of scow captains” [1905–1906], and letters from Supt. E. C. Dent (Jan. 11, 1906), Dr. M. S. Gregory (undated), and Hermann M. Biggs (Dec. 21, 1905) to Mrs. Isaac L. Rice, in Box 88, f. 7, Morse Papers, as also “West End war on whistles,” *The [West End] News Letter* (Jan. 6, 1906) clip in Box 88, f. 1/93B; C.-E. A. Winslow, *The Life of Hermann M. Biggs* (Phila, 1929) 193; “Fight on harbor noise,” *NY Daily Trib* (Nov. 29, 1905) 5:4; “Riverside Drive may now sleep,” *ibid.* (Dec. 17, 1905) 7:6; “Noise,” *ibid.* (Nov. 26, 1906) 6:3–4, “amorous toots” and bacilli, and cf. Duncan, *Whitelaw Reid* (→ n.152) 209; “Woman starts a war on tooting river tugs,” *NY Times* (Dec. 10, 1905) 8; “What one public-spirited woman can do—Mrs. Isaac L. Rice’s campaign,” *NY Times Mag* (Jan. 14, 1906) on the 13,000, the 33, and the 1,116; “Oppose whistling nuisance,” *NY Times* (Jan. 26, 1906) 1:4, Capt.

White on rowdyism; "Whistling not yet suppressed," *ibid.* (Jan. 26, 1906) 8. Whistling by humans was also being suppressed at this time by monitors of public manners, despite a long tradition of whistling performers that continued on in early phonograph recordings and vaudeville. Cf. Carl Engel's survey of whistling in his *Musical Myths and Facts* (L, 1876) 1,90-92; Mutoscope postcard, "Whistler's Diploma" (1907?) granting permission to recipient to "WHISTLE whenever he so desires. . . . blowing double notes during a conversation, and ABOVE ALL be the 'life of the party,' by getting up and whistling loudly and shrilly as often as possible," in TOP 35—"Sayings," John R. and Jane Adams Postcard Collection, Special Collections, Malcolm A. Love Library, San Diego State U.

383. For earlier published protests: "The fire department," *NY Times* (Sept. 13, 1859) 4; "Churches opposing Sunday trains," *NY Daily Trib* (June 14, 1879) 10; "City night noises," *ibid.* (June 28, 1885) 6:4; "Civilization and noise," *ibid.* (June 18, 1893) 6:4; Lillie E. Warren, "Improvement of hearing by noise," *ibid.* (July 3, 1893) 7:5; "The plague of noise," *ibid.* (Nov. 25, 1900) 10:2; V.H.B., "Effect on children and invalids. Fright and nervous prostration caused by the howlers," *ibid.* (Dec. 2, 1900) 11,10, ruffians; "Tintinnabulation of the streets," *ibid.* (Aug. 4, 1901) supplement, 9:4; "Noise makes pastor resign," *ibid.* (April 24, 1902) 7:6; "The noises that spring brings," *ibid.* (May 2, 1902) 9:3; "Tunnel noise problem," *ibid.* (Dec. 9, 1902) 4:4; "The noise is too great: why the congregation of the Park Avenue P.M.E. Church want to sell out," *Brooklyn Daily Eagle* (Feb. 16, 1886) 1; "Control of city noises," *NY Times* (July 19, 1895) 9; "The noise nuisance," *ibid.* (May 3, 1900) 8:4—wondering about its correspondents' odd linkage of the ice trust, in which Mayor Van Wyck was involved, and intolerable street noises; "Noisy laborers arrested," *ibid.* (June 23, 1900) 3:3; "A benefactor of the city," *NY Evening Sun* (Nov. 27, 1907) on tugboat sounds, a clip sent by Julia Rice to S. Weir Mitchell and bound with other clips as Pam F160, "Report on Unnecessary Noise, 1907" in the papers of the Soc of Medical Jurisprudence, NY, in the Lib of the College of Physicians, Phila.

For Norbert Wiener: "On the Measurement of Sensory Qualities" in his Papers, 1910-1963, Box 27, f. 477, pp. 2-3, Institute Archives and Special Collections, MIT—a paper which, judging from his *Ex-Prodigy: My Childhood and Youth* (NY, 1953) 191, must have been written around the time he took Bertrand Russell's course on sense-data at Cambridge University, June 1913-April 1914. Consider also a second essay of the same era, "On the Nature of Sensation-Intensities and Qualities," f. 478, and a letter to Russell of June/July 1914 in *The Autobiography of Bertrand Russell 1914-1944* (B: Little, Brown, 1968) 39-41.

384. George W. Jacoby, undated letter (1905-1906) to Mrs. Isaac L. Rice, in Morse Papers, Box 88, f. 7; William S. Bennet, "Immigrants and crime," *Annals Amer Acad of Political and Social Sci* 34 (1909) 117-24; "Riverside Drive may now sleep: Revenue cutter to stop promiscuous tootings of tugs on Hudson," *NY Daily Trib* (Dec. 17, 1905) 6; Dana Gatlin, "Mrs. Isaac L. Rice," *Amer Mag* 75 (Feb. 1913) 34, soundway.

385. Imogen Brashear Oakley, "The Prohibition law and the political machine," *Annals Amer Acad Political and Social Sci* 110 (1923) 165-74; Theodore Roosevelt, "Big game disappearing in the West," *Forum* 16 (Aug. 1893) 767-74, as well as "What 'Americanism' means," 17 (April 1894) 196-206, "The manly virtues and practical politics," 18 (July 1894) 651-57, "The enforcement of law," 20 (Sept. 1895) 1-10, and "The law of civilization

and decay,” 24 (1897) 575–80; “The cable chess tourney,” *NY Times* (April 22, 1899) 7; “Miss Roosevelt in a submarine boat,” *ibid.* (Sept. 11, 1903) 6; “Secretary Taft as Cupid,” *ibid.* (Dec. 24, 1905) 1; “Staten Island charity ball,” *ibid.* (Jan. 26, 1893) 5—the S. R. Smith infirmary in New Brighton became Staten Island Hospital—and in 1906 prominent Staten Islanders formed an Anti-Nuisance league that went after noise: “Needless noise,” *Dallas Dispatch* (Nov. 1, 1906) in Morse Papers, Box 88, f. 1; “J. Swagar Sherley 1880–1969,” biography to Finding Aid for J. Swagar Sherley Papers, U Louisville Lib, Kentuckiana Digital Lib, <http://kdl.kyvl.org>; *Congressional Record* (Jan. 14, 1907) 1093; *House Report*, 59th Congress, 2nd Session, vol. 1, no. 5625 (Dec. 19, 1906), quotation from Sherley; HR 17624, “Act to Amend Revised Statutes [Sect. 4405],” *House J* (Jan. 11–31, Feb. 5, and Feb. 11, 1907) 200, 358, 398; *Statutes of the United States*, 59th Congress, 2nd Session, 1906–1907, vol. 35, pt. I, ch. 892, p. 881; “River craft ordered to end their noise,” *NY Times* (Nov. 25, 1906) 7; “Anti-whistling fight is won by Mrs. Rice,” *ibid.* (Feb. 3, 1907) 12; “Stops noisy tug whistle,” *ibid.* (July 29, 1907) 4.

386. Julia Barnett Rice to Edward Morse, Oct. 29 1906, in Morse Papers, Box 11, f. 13, as also Box 88, f. 3, “Anti-noise society meets,” *NY Sun* (Jan. 15, 1907) on “shivering the evening air,” as also Salwen, *Upper West Side*, 85; “The new Health Commissioner,” *The Sanitarian* [NY] 52 (Jan.–June 1904) 171–72; [Dr. Thomas Darlington], “Noise in cities,” *Outlook* [NY] 84 (Oct. 20, 1906) 392; “Noise,” *NY Daily Trib* (Oct. 10, 1906) 6:3; Granville Nicholson, “Favors crusade against noise,” *ibid.* (Oct. 13, 1906) 7:2; *idem*, “Ready to lead an anti-noise crusade,” *NY Herald* (April 10, 1906[?]) unsourced clip, with additional letter from A. G. W., “To suppress noises,” calling for the formation of an anti-noise organization, in Morse Papers, Box 88, f. 1. At the same time, Dr. J. M. McWharf, “Noise: its relation to health, disease, and longevity,” *Trans Kansas Acad Sci* 20,2 (Dec. 1906) 239, proposed that noises be classified as “necessary, partially necessary, and totally superfluous.”

387. State of the Union address at www.theodore-roosevelt.com/sotu6.html; “Crusade on noises,” *NY Daily Trib* (Dec. 4, 1906) 8:3; An American Citizen, “Reform for milk men,” *NY Times* (Dec. 19, 1906) 10; Mrs. Isaac L. Rice, “The Anti-Noise Society,” *NY Times* (Dec. 23, 1906) SM4. Cf. Raymond W. Smilor, “Cacophony at 34th and 6th: the noise problem in America, 1900–1930,” *Amer Studies* 13 (Spring 1977) 23–38, treated at greater length in his “Confronting the Industrial Environment: The Noise Problem in America, 1893–1932,” Ph.D., U Texas at Austin, 1978, esp. pp. 56–81.

388. “Seek to quiet city,” *NY Daily Trib* (Dec. 9, 1906) 9:5; “Mrs. Rice now attacks all needless noise,” *NY Times* (Dec. 9, 1906) 12; Mrs. Isaac L. Rice, “Our most abused sense—the sense of hearing,” *The Forum* 38 (April 1907) 559–71. On members of the SSUN boards: Julia Barnett Rice, letters of Oct. 16, 1907 and Dec. 9, 1907 to Richard Gilder, in Series 1.C. Box 83, Century Company Records, Manuscripts and Archives Division, NY Public Library; House of Representatives, Committee on Merchant Marine and Fisheries, Hearings on H.R. 225, 10458, 13463, “Complement of Crews of Vessels” (Jan. 23, 1908) 3–4, 57–58, testimony of Luther Dow; Thomas J. Shelley, “John Cardinal Farley and Modernism in New York,” *Church H* 61 (1992) 350–61; Cyrus Veaser, *A World Safe for Capitalism: Dollar Diplomacy and America’s Rise to Global Power* (Columbia U, 2002) 5–6, 105–107, q. 111, on Moore; Seifer, *Wizard* (→n.228) 44–45 on Martin; Francis B. Crocker and

Morton Arendt, *Electric Motors* (NY, 1910), and Morton Arendt, *Storage Batteries: Theory, Manufacture, Care, and Application* (NY, 1928); Lisa Anderson, “James T. Shotwell: A life devoted to organizing peace,” www.columbia.edu/cu/alumni/Magazine/Winter2005/llshotwell.html; Frank Snyder, “Today in History,” http://lawprofessors.typepad.com/contractsprof_blog (Dec. 4, 2005), on John Jerome Rooney, as also his *Collected Poems* (NY, 1938), esp. the famous “The Men Behind the Guns.”

389. “Seeks to quiet city,” *NY Daily Trib* (Dec. 9, 1906) 9:5; “Mrs. Rice now attacks all needless noise,” *NY Times* (Dec. 9, 1906) 12. Charles E. Russell indicted the syndicate running the trolleys for robbing the system of its cash: *Lawless Wealth: The Origin of Some Great American Fortunes* (NY, 1908) esp. 205–207, 237.

390. Standard two-way traffic rules (and rules for using whistles to direct traffic) were just being propounded at century’s turn, along with the introduction of stop/go semaphors and, soon, traffic lights: Baldwin, *Domesticating the Streets*, 215–18; Peter D. Norton, *Fighting Traffic: The Dawn of the Motor Age in the American City* (MIT, 2008) 49–57, 135; John A. Montgomery, *Eno—The Man and the Foundation* (Wesport: ETF, 1988) on William Phelps Eno, who devoted his life to getting standard traffic rules implemented in North America and Europe and was much offended (p. 93) by the honking of automobile horns, for this was evidence that rules were either not in place or going unobserved. Cf. also Flink, *America Adopts the Automobile*, 184–92 on speed limits. For the rest: Frank M. Colby, ed., “Strikes and lockouts,” *The New Intl Year Book* (NY, 1908) 746–48; Alan M. Kraut, “Plagues and prejudice: Nativism’s construction of disease in nineteenth- and twentieth-century New York City,” in *Hives of Sickness: Public Health and Epidemics in New York City*, ed. David Rosner (Rutgers U, 1995) 70–71, as also Naomi Rogers, “A disease of cleanliness: polio in New York City, 1900–1990,” 115; Rice, “Our most abused sense,” 561.

391. Victor H. Emerson, “Sound-Record and Sound-Record Tablet,” U.S. Patent No. 838,968 (Dec. 18, 1906); Allan R. Sutton, “The other sides of Victor H. Emerson,” www.mainspringpress.com/emerson.html, and cf. Cheryll Bauer and Randy McNutt, *Talking Machine Madness: The Story of America’s Early Phonograph Shows* (Fairfield: Hamilton Hobby, 1985) 12, mention of a recording of “Uncle Josh on a Street Car” which may also have foregrounded the noise; “Seeks to quiet city,” *NY Daily Trib* (Dec. 9, 1906) 9:5; “Mrs. Rice now attacks all needless noise,” *NY Times* (Dec. 9, 1906) 12; “Mrs. Rice put at head of anti-noise society. Her graphophone reproduces city’s hideous sounds,” *ibid.* (Jan. 15, 1907) 7:3; “A great cry of less noise!” *NY Sun* (Oct. 20, 1908), in Morse Papers, Box 88, f. 3/52.

392. Julia Rice to Morse, letters of Jan. 16, 1907 and Dec. 7, 1907, in Morse Papers, Box 11, f. 13; “The campaign against noise: a priest’s objection,” *NY Times* (Dec. 23, 1906) III,4, for Searle’s grievances about trolley noise near his home at 59th St. across from Roosevelt Hospital and Sloane Maternity Hospital; “This enchanted isle,” *NY Evening Post* (April 16, 1926) in *NY Sun* morgue, NY Public Lib, and the obituary, “A crusader for quiet,” *ibid.* (Nov. 6, 1929); http://en.wikipedia.org/wiki/Steamboat_Willie; “Mrs. Isaac L. Rice, foe of noise, dies,” *NY Times* (Nov. 5, 1929) 29. By 1930 tugboats had resumed much of their noisy whistling and interrupted the production of early Talkies in Manhattan: Alexander Walker, *The Shattered Silents: How the Talkies Came to Stay* (NY: Morrow, 1979) 92–93.

393. For details of one such proceeding: “Two skippers up for loud tooting,” *NY Times*

(May 9, 1907) 2.

394. "A great cry of less noise!" *NY Sun* (Oct. 20, 1908) in Morse Papers, Box 88, f. 3/52; Duplex Phonograph Co. advertisement, "Let us send you this two-horn Duplex Phonograph on trial," *NY Daily Trib* (Oct. 7, 1906) Sunday Mag, p. 17; "Canned din by phonograph," *NY Times* (Oct. 31, 1908) 4; "Pass quiet zone ordinance," *ibid.* (June 26, 1907) 6; "Little Tim Sullivan is dead at forty," *ibid.* (Dec. 23, 1909) 1-2; Dan Czitrom, "Underworld and underdogs: Big Tim Sullivan and metropolitan politics in New York, 1889-1913," *J Amer H* 78,2 (1991) 536-58, supplemented by http://en.wikipedia.org/wiki/Timothy_Sullivan.

395. *OED*, s.v. "Zone," "Zoned," "Zonation," "Zonal," "Zoning"; J.P. Whitney, "Zone systems of railway fares, workings in England and Hungary described," *NY Times* (May 17, 1891) 20:5; "Corea—'zones of influence' is applicable to Japan," *NY Times* (Sept. 28, 1894) 4:6; Daniel T. Rodgers, *Atlantic Crossings: Social Politics in a Progressive Age* (Camb, Mass: Belknap, 1998) 177, 184-87; Jon A. Peterson, *The Birth of City Planning in the United States, 1840-1917* (Johns Hopkins U, 2003) 308-17; Michael Holleran, *Boston's "Changeful Times": Origins of Preservation and Planning in America* (Johns Hopkins U, 1998) 211, 257-60; Eric Sandweiss, "Paving St. Louis's streets: the environmental origins of social fragmentation," in *Common Fields: An Environmental History of St. Louis*, ed. Andrew Hurley (St Louis: Missouri H Soc, 1997) 90-106; Sam Bass Warner, Jr., *The Urban Wilderness* (NY: Harper and Row, 1972) 85-112; Peter Baldwin, *Domesticating the Street* (→ n.50) 45, 249-55; Schuyler, *New Urban Landscape*, 93-96, q. 144 on parks, from Charles Sprague Sargent, 1888; Charles A. Israel, *Before Scopes: Evangelicalism, Education and Evolution in Tennessee, 1870-1925* (U Georgia, 2004) 69, 90, q. 91; Timothy J. Gilfoyle, "The moral origins of political surveillance: the preventive society in New York City, 1867-1918," *Amer Q* (1986) 637-52; David Hammack, *Power and Society: Greater New York at the Turn of the Century* (NY: Russell Sage, 1982) ch. 9, q. 280; "New-Yorkers endure many unnecessary noises," *NY Daily Trib* (Sept. 10, 1905) V,8; "Makes quiet zones for city hospitals," *NY Times* (June 24, 1907) 7; "Pass quiet zone ordinance," *ibid.* (June 26, 1907) 6; "Plenty of laws to stop noises if they were only enforced," *Brookly Daily Eagle* (Oct. 27, 1901) 20. Cf. George A. Parker, "The housing question," *Bull Municipal Art Soc of Hartford* (1911) 36-41.

396. "Barkers at Coney squelched by police," *NY Times* (June 24, 1907) 2; Robert D. Heinl, "The woman who stopped noises," *Ladies' Home J* 25 (April 1908) 19; Society for the Suppression of Unnecessary Noise, *Annual Reports* (NY, 1908-1910) 1,3 on patrolmen, as also Christopher Thale, "Assigned to patrol: neighborhoods, police, and changing deployment practices in New York City before 1930," *J Social H* 37 (2004) 1037-64, esp. 1049-50; "Pass quiet zone ordinance," *NY Times* (June 26, 1907) 6.

On the Telharmonium: "Electrical music," *Sci Amer* 94 (March 31, 1906) 268-69; John Grant, "The electrical generation of music," *Amer Telephone J* 14 (Oct. 27, 1906) 268; Thomas B. Holmes, *Electronic and Experimental Music* (NY: Scribners, 1985) 31-39; Reynold Weidenaar, *Magic Music from the Telharmonium* (Metuchen: Scarecrow, 1995); Joel Chadabe, *Electric Sound: The Past and Promise of Electronic Music* (Upper Saddle River: Prentice Hall, 1997) 5, telephone-line crosstalk interfering with Cahill's transmissions; "Twain and the telephone," *NY Times* (Dec. 23, 1906) 2; "Mark Twain and twin cheer New Year's

Eve party,” *ibid.* (Jan. 1, 1907) 1. Cf. Hamlin Hill, *Mark Twain: God’s Fool* (NY: Harper and Row, 1973) 97–99, 118–26, 152–53, 161–62.

397. On the panic: Oliver M. W. Sprague, “The American crisis of 1907,” *Econ J* 18 (Sept. 1908) 353–72; Jon Moen and Ellis W. Tallman, “The bank panic of 1907: the role of the trust companies,” *J Econ H* 52 (Sept. 1992) 611–30; “Rice gets an injunction,” *Brooklyn Daily Eagle* (Jan. 17, 1902) 1, his connections with Manhattan Trust; Isaac L. Rice, “Every man his own banker. I,” *The Forum* 48 (March 1912) 257–74, a retrospective analysis of the Panic of 1907 blaming the same cartel of bankers, headed by J. P. Morgan, as was now pushing for a Federal Reserve Bank, and cf. the review, “Would the Aldrich monetary scheme result in ‘scab’ banks?” *Current Lit* 52 (June 1912) 657–59.

On the house sale: “The Rice Mansion sold for \$600,000,” *NY Times* (Dec. 18, 1907) 5; Sims, *Curiouser and Curiouser*, q. 64–65, 70.

On the Congressional hearings: Select Committee, *Hearings Beginning March 9, 1908—April 30, 1908* (→ n.355), based on charges by George H. Lilley, who opposed the submarine “monopoly” and spoke on behalf of Rice’s chief competitor, Simon Lake; “House flays Lilley for boat scandal; Williams denounces Representative as guilty of treason and advocates his expulsion,” *ibid.* (May 21, 1908) 3; “Lilley, George L.,” *Natl Cyclopaedia of Amer Biog* (NY, 1910) Suppl I, 474–75.

On the Ansonia, which later housed Elmer Rice and Flo Ziegfeld and is still in place: Andrew Alpern, *Luxury Apartment Houses of Manhattan* (NY: Dover, 1993) 33–37; Stephen Gaines, *The Sky’s the Limit: Passion and Property in Manhattan* (NY: Little, Brown, 2005) 173–205; Mary K. Fons, “Inside the Ansonia,” *The Cooperator: The Co-op and Condo Mo* (Sept. 2005) at <http://cooperator.com/articles/1200/1/Inside-the-Ansonia/Page1.html>; “Europe too wants quiet: Paris especially calls on Mrs. Rice for help,” *NY Sun* (Oct. 18, 1908) 6 for statuette. See also historical postcard display in the lobby (as of 2008).

398. Keith D. Revell, “Regulating the landscape: real estate values, city planning, and the 1916 zoning ordinance,” in *The Landscape of Modernity: Essays on New York City, 1900–1940*, eds. D. Ward and O. Zunz (NY: Russell Sage, 1992) 19–45; City Club of New York, Records, 1896–1925, Box 1, f. 3 on pushcarts, in Division of Manuscripts and Archives, NY Public Lib; Rodgers, *Atlantic Crossings*, 181–85; Stanislaus J. Makielski, Jr., *The Politics of Zoning: The New York Experience* (Columbia U, 1966); Benjamin C. Marsh, “Economic aspects of city planning,” *Proc Municipal Engineers of the City of New York Paper* no. 57 (1910) 73–87, ed. and pref. by John W. Reys, at www.library.cornell.edu/Reps/DOCS/marsheco.htm. On literature and zones, consider Hans-Robert Jauss, tr. Robert Blood, “1912: threshold to an epoch: Apollinaire’s *Zone* and *Lundi Rue Christine*,” *Yale French Studies* 74 (1988) 39–66; on commerce: “Free trade zones in Italy,” *NY Times* (Aug. 11, 1903) 6; “Newest telephone rates, city divided into zones with rates from 5 cents to 15,” *ibid.* (May 28, 1906) 1.

399. On the motorcycle incident: “Rice children arrested,” *NY Sun* (Nov. 19, 1907); Sims, *Curiouser and Curiouser*, 8–9; “Motor cycling fad strikes fair sex,” *NY Times* (Jan. 15, 1911) C5, Dorothy the first girl in New York to ride a motorcycle. On city efforts: “Bide-A-Wee home ordered to move,” *NY Times* (May 27, 1908) 16; “Opens war on noises, asks Bingham’s aid,” *ibid.* (June 27, 1908) 4; “Putting noise lid down,” *ibid.* (July 21, 1908) 1;

"Noise edict hits Ft. George," *ibid.* (July 23, 1908) 1; "Bingham hears of noises," *ibid.* (July 24, 1908) 12:6. On the new ordinance: "New York needs better noise law," *ibid.* (Oct. 18, 1908) 20; "Noise crusaders face the aldermen," *ibid.* (Oct. 20, 1908) 9; "New anti-noise law," *ibid.* (Dec. 2, 1908) 1; "The anti-noise ordinance," *ibid.* (Dec. 3, 1908) 8; "Of the right to make some noise," *ibid.* (March 5, 1909) 8; "A great cry of less noise!" *NY Sun* (Oct. 20, 1908) in Morse Papers, Box 88, f. 3/52. Shortly after the ordinance was passed, "noiseless burglars" robbed "anti-noise Marx's flat" as silently as "a broken snowflake falling into an ash barrel": "An anti-noise visit," *ibid.* (Nov. 17, 1908) in Morse Papers, Box 88, f. 3/32. On the politics: Richard L. McCormick, *From Realignment to Reform: Political Change in New York State, 1893-1910* (Cornell U, 1981).

400. On the children: Mrs. Isaac L. Rice, "Children's band for quiet," *NY Times* (Jan. 26, 1908) 5; "Anti-noise society reviews progress," *ibid.* (Feb. 27, 1908) 2; "Letting the children help," *ibid.* (April 6, 1908) 7; Mrs. Isaac L. Rice, "Children's Hospital branch of the Society for the Suppression of Unwanted Noise," *The Forum* 39 (April 1908) 560-67, q. 565-66; eadem, letter of Dec. 9, 1907 to Richard Gilder, Series 1.C. Box 83, Century Company Records, Manuscripts and Archives Division, NY Public Library Cf. David C. Sloane, "A (better) home away from home: the emergence of children's hospitals in an age of women's reform," in *Designing Modern Childhoods: History, Space, and the Material Culture of Children*, eds. M. Gutman and N. de Coninck-Smith (Rutgers U, 2008) 42-60; Elizabeth M. R. Lomax, *Small and Special: The Development of Hospitals for Children in Victorian Britain* (L: Wellcome Inst, 1996). The "HUMANITY" motto may have been suggested by John Bassett Moore, who in a 1907 paper on "Arbitration" quoted a teacher of his to the effect that "Above all nations is humanity": Moore, *Collected Papers* (Yale U, 1944) III, 274-75.

401. Imogen Oakley, *Awake, America! And Other Verse* (Phila, 1934) 59-60 and cf. 65, "The Ash-Cart Jolts"; "Canned din by phonograph," *NY Times* (Oct. 31, 1908) 4, Rice invited to lecture in Boston and Pittsburgh, taking along Emerson's recordings; "Canned Gotham startles Boston," *Chicago Daily Trib* (Nov. 14, 1908) 6; James J. Putnam, "Some considerations concerning city noises," *Amer J Public Hygiene* 15 (1905) 304-14 (and → n.380); "Physicians combine to abolish noise," *NY Times* (Aug. 5, 1912) 9. On Hollis Godfrey: *The Health of the City* (B, 1910) ch. 8, q. 232; Edward D. McDonald and Edward M. Hinton, *Drexel Institute of Technology 1891-1941* (Phila, 1942) 53-63; "Boston gossip of latest books," *NY Times* (Nov. 20, 1909) BR725. Much of the rest comes from the Morse Papers: "Mrs. Rice talks in Boston," *Salem Evening News* (March 2, 1909) in Box 88, f. 1; Edward E. Hale, "Noise," *The Christian Register* (July 12, 1906) in Box 88, f. 1/60B; William Everett, "Noise," *B Transcript* (June 16, 1909) in Box 88, f. 3; "Muffle the fire engines," *B Post* (March 12, 1906) and, same sheet, "Firemen must go to fires noiselessly," unsourced clip, Box 88, f. 1; Stoughton Bell, "Existing laws concerning unnecessary noise," *Trans 15th Intl Congress on Hygiene and Demography* (Sept. 23-28, 1912) sect. IV, 1-4, in Box 87, f. 5; "War on noise to start here," *B Evening Record* (Aug. 6, 1912) in Box 88, f. 1; "War on noise will be steady," unsourced clip (ca. 1913), in Box 88, f. 3; Committee on Abatement of Noise, Women's Municipal League, *To the Residents of the Back Bay* (circular of 1913?), Box 87, f. 5. Also: "Ask poor women to join. Aristocratic Women's Municipal

League of Boston open to servants,” *NY Times* (Jan. 17, 1909) 1; “Abatement of unnecessary noise,” *Women’s Municipal League Bull* 7 (April 1916) 24–26. Finally, I have used the Elizabeth Lowell (Mrs. William) Putnam Papers, Series II B, f. 206, “Abatement of Noise, 1912–1917,” from which I quote Putnam’s letter to *B Herald* (Jan. 26, 1915) on quiet zones, and f. 209, Putnam’s letter to “Miss Virgin,” March 14, 1914, on the Mayor, as well as f. 220, Marion Peabody’s 1914 description of the work of her Committee for the Abatement of Noise, all in MC 360, Arthur and Elizabeth Schlesinger Library on the History of Women, Radcliffe Institute, Harvard U. On Putnam’s reform work in context: Sonya Michel and Robyn Rosen, “The paradox of maternalism: Elizabeth Lowell Putnam and the American welfare state,” *Gender and H* 4,3 (1992) 364–86.

402. “To silence church bells,” *NY Times* (Oct. 28, 1912) 1; William T. Watson, “Baltimore’s anti-noise crusade,” *Natl Municipal R* 3 (July 1914) 585–89; idem, “Eliminating noise from Baltimore,” *Bull Med and Chirurgical Faculty of Maryland* 5 (Jan. 1913) 106–21, q. 110 from Mabbett; idem, “The noise nuisance in Baltimore,” *Baltimore Evening Sun* (July 21, 1913) in Morse Papers, Box 88, f. 2/59; Francis G. Wickware, ed., *American Year Book. . . 1913* (NY, 1914) 231; Alice M. Holden, “Current municipal affairs,” *Amer Political Sci R* 8 (1914) 456; Carl H. Nightingale, “The transnational contexts of early 20th-century American urban segregation,” *J Social H* 39,3 (2006) 667–702, at 667–68 and nn.3–5; Marion E. Warren and Mame Warren, *Baltimore: When She Was What She Used To Be, 1850–1930* (Johns Hopkins U, 1983) 123–44; Sherry H. Olson, *Baltimore: The Building of an American City* (Johns Hopkins U, 1980) 245–48, 276; Charles Hirschfeld, *Baltimore, 1870–1900: Studies in Social History* (Johns Hopkins U, 1941) esp. 32–33 on population, as also http://en.wikipedia.org/wiki/New_International_Encyclopedia#_ref-3; Marion Grubb, “An’ran’l t’mats’ and ‘Wa-a-termillon,” *Baltimore Sun* (May 7, 1933), clippings file, “Peddlers and Peddling—Baltimore,” Maryland Room, Enoch Pratt Free Lib, Baltimore; James B. Crooks, *Politics and Progress: The Rise of Urban Progressivism in Baltimore, 1895 to 1911* (Louisiana State U, 1968) ch. 6; Alice M. Holden, “Current municipal affairs,” *Amer Political Sci R* 8 (1914) 452–68 at 456 for cop, as also “An anti-noise policeman,” *Outlook* (June 27, 1914) 438–39; Thompson, *Sound of Modernity* (→n.293) 126. Chicago may have had an earlier cop: in 1899 Detective Charles F. Gross had been appointed by the Chief of Police to report on infringements of anti-noise ordinances: “Plan crusade to stop noise,” *Chicago Trib* (Sept. 5, 1899) 1.

403. “Ocean travelers: the Adriatic sails to-day with a big list of cabin passengers,” *NY Times* (July 17, 1907) 9; “Toot farewell to Mrs. Rice,” *ibid.* (July 18, 1907) 7; Hart, *I Fly As I Please* (→n.364) 101; “H[arry] B[owly] Hollins,” http://en.wikipedia.org/wiki/H._B._Hollins.

404. H. Heathcote Statham, letter on “The London street-organ nuisance,” *L Times* (Oct. 23, 1893) 4, laws elsewhere; C. V. Stanford, letter on “Street bands and organs,” *ibid.* (Oct. 25, 1893) 14, deaths caused by stubborn street bands; Editorial [on street organs], *ibid.* (Oct. 26, 1893) 4; Editorial, “[Mr. Hartlett of the Temple-chambers],” *ibid.* (Nov. 30, 1895) q. 9, Martini-Henry rifle; Charles Fox, Hon. Sec. Assn for the Suppression of Street Noises, letter on “The nuisance of noise,” *ibid.* (Dec. 5, 1895) 4f; Distracted of Blackheath, *ibid.*; Charles Fox, letter on “Street music,” *ibid.* (Dec. 28, 1895) 3e; G[eorge] S[lythe]

Street, “A grievance,” *ibid.* (June 20, 1906) 3e, construction men and civilized Australians; “Mrs. Chant’s new crusade,” *Chicago Daily Tribune* (June 17, 1900) 9, and see Joseph Donohoe, *Fantasies of Empire: The Empire Theatre of Varieties and the Licensing Controversy of 1894* (Iowa U, 2005); “The Prime Minister and street noises,” *L Times* (Feb. 1, 1909) 4c, Betterment of London Association; exchange of letters on “Chauffeur’s nocturnal noises,” prompted by the honking regulations of the Motor Noise Bill (July 1911) and initiated by Sir Henry Morris, President of the Royal Society of Medicine, *ibid.* (starting Aug. 8, 1911). For much of the rest: “Our street music and its regulation,” *Mag of Music* 13 (May 1896) 340–41, Jacoby bill and regulations in other countries; “[Dateline: London July 28],” *NY Times* (July 29, 1907) q. 4, Arendt; “Noise in cities,” *Outlook* [NY] 84 (Oct. 20, 1906) 393 for Hyslop; “New York is plagued by needless noises,” *NY Daily Trib* (Oct. 28, 1906) V:4 on the junkmen; Society of Medical Jurisprudence, *Report on Unnecessary Noise* (→ n.382), clip from the *Daily Telegraph* (Jan. 4, 1908) on Rice playing “canned noises”; Emily Janes, ed., *The Englishwoman’s Year Book and Directory 1899* 19 (1899) 211 on Fox and his Association, as also John Springhall, “‘Disseminating impure literature’: the ‘penny dreadful’ publishing business since 1860,” *Econ HR* 47,3 (1994) 567–84, esp. 570; “Mauretania sails, silent. A minimum of noise in deference to Mrs. Isaac L. Rice,” *NY Times* (May 6, 1909) 2; “Fair anti-noiser stills ship siren,” *Chicago Daily Trib* (May 6, 1909) 5; *American Jewish Year Book for 1910–11* (1911) 332, “American Delegate,” at www.ajarchives.org; “Noises we hope to lose,” *NY Times* (April 7, 1907) 11, Rice quoting Shaw; “Unnecessary noises,” *Littell’s Living Age* 254 (Sept. 7, 1907) 615–19, reprinted from *Chambers’s Journal*, on Noise Abatement Committee; J. A. Spender and Cyril Asquith, *Life of Henry Herbert Asquith, Lord Oxford and Asquith* (L, 1932) 1,488–89, and 203, 211 on Asquith’s attitudes toward noise and symphonic music, both of which annoyed him; Clive Elmsley, “‘Mother, what did policemen do when there weren’t any motors?’ The law, the police, and the regulation of motor traffic in England, 1900–1939,” *Historical J* 36 (1993) 357–81. The remaining sources for this paragraph are clippings from the Morse Papers: “The night hideous,” unsourced (July 26, 1907[?]), Box 88, f. 2/67; C[aleb] W[illiam] Saleeby, “The effect of noises on human life,” unsourced (after 1904), Box 88, f. 3/103; “The tyranny of noise that controls cities,” unsourced, reprinted from *L Mail* (1906–1907?), Box 88, f. 2/2A; “London so noisy they hate it,” unsourced (1906), on Pemberton and other authors, Box 88, f. 3/151. Finally: Janet Achurch, “S.S.S.S. A Society for the Suppression of Senseless Sounds,” *The New Age* [L] n.s. 7,4 (1910) 316–17 on the bobbies, and cf. Jack Collings Squire, “The Practical Journalist. A vade-mecum for aspirants. No. 1.—The model leading article,” *ibid.* 9 (Aug. 31, 1911) 424, on a putative Mechanical Music Noise Abatement Society.

405. “Au jour le jour,” *Journal des Débats*, undated clip (ca. 1907) on Mrs. Rice as “l’Ange du Silence,” in Society of Medical Jurisprudence, *Report on Unnecessary Noise* (→ n.382), as also a clip from an article by Rémi in *Le Figaro* (Aug. 25, 1907); George E. Walsh, “When science banishes city noises,” *Harper’s Weekly* 51 (July 27, 1907) 1098, new steam whistle; “Earlids,” *B Herald* (Feb. 20, 1905), for Retté, in Morse Papers, Box 88, f. 2/8; William K. Cornell, *Adolphe Retté* (NY: AMS, 1973) esp. 30–31 on his highly-charged and ambivalent use of church-bells in his symbolist poetry; Michel Pierrsens, “Vae Victis! Adolphe Retté,” *Nineteenth-Century French Studies* 32 (March 2004) 345–52; Mrs. Isaac

L. Rice, "The Anti-Noise Society," *NY Times Sunday Mag* (Dec. 23, 1906) SM4; Marcel Prévost, "A philippic against noise," unsourced clip (Jan. 26, 1907) translated from an article in *Le Figaro*, in Morse Papers, Box 88, f. 3/40; Frederick Wedmore, *On Books and Arts* (L, 1899) 11, intriguing; Mary L. Roberts, *Disruptive Acts: The New Woman in Fin-de-Siècle France* (U Chicago, 2002) 3-7, 25, and throughout; "New York is noisy, but Paris—oh, my!" *NY Sun* (Oct. 12, 1907); "Mrs. Rice's Anti-Noise [Campaign]," *ibid.* (Feb. 26, 1908); "Europe too wants quiet," *ibid.* (Oct. 18, 1908) 6 on Prévost and church-bells; Adrian Rifkin, *Street Noises: Parisian Pleasure, 1900-1940* (Manchester U, 1993) 173 on barrel organs, 131 on Charpentier, as also Steven Huebner, "Between anarchism and the box office: Gustave Charpentier's *Louise*," *Nineteenth-Century Music* 18 (1995) 136-60, esp. 156; Casual Comment, "Noise and the book trade," *Dial* 53 (Dec. 16, 1912) 479-80. For more: Balaÿ, *L'espace sonore de la ville* (→n.75) 94-114.

406. Bates College, *Bulletin: Circular of Information*, 13th ser., 2 (March 15, 1916) on the Rice collection; Muriel Rice, *Von Zwei Ufern, Gedichte*, tr. Theodor Lessing (Göttingen, 1909); "Germans to war on street noises," *NY Times* (Aug. 9, 1908) III, C3; "Less noise in Germany," *ibid.* (Aug. 21, 1909) 4. For Lessing and other German and Continental anti-noise activities, see notes 309-18, 322-23, 325-26, as well as The Cosmopolitan, "Now the noiseless city," *B Transcript* (Jan. 18, 1913) on Berlin, in Morse Papers, Box 88, f. 2; "Abatement of unnecessary noises," unsourced clipping on noise regulations in Vienna, in Morse Papers, Box 88, f. 1/19A; C. S., "The reign of noise," *NY Times* (Sept. 20, 1913) 10, contrasting New York unfavorably with European cities that had successfully silenced elevated trains, surface cars, and trolleys.

407. "Church bells too noisy," *NY Times* (Feb. 5, 1907) 8; "Progress toward quiet," *ibid.* (March 5, 1907) 16; "M. [Anatole] France quits Paris. Famous author moves to Versailles on account of city's noise," *ibid.* (Nov. 16, 1913) C2; "For silencing auto horns," *ibid.* (Aug. 6, 1911) C4 on Piccadilly, as also "Paris the noisiest city, declares New York woman," *Chicago Daily Trib* (Aug. 6, 1911) A1; Flink, *America Adopts the Automobile* (→n.357) 75; "Save the children by killing noise," *NY Times* (April 2, 1914) 11; "Would silence the school blocks," *ibid.* (June 7, 1914) 10; Selma C. Berroll, "William Henry Maxwell and a new educational New York," *H Education Q8* (1968) 215-28, as also Maxwell's testimony before the aldermen in "A great cry of less noise!" *NY Sun* (Oct. 20, 1908), in Morse Papers, Box 88, f. 3/52; Mrs. Isaac L. Rice, "'Quiet zones' for schools," *The Forum* 46 (Dec. 1911) 731-42; [Mrs. Isaac L. Rice], *Report of the [President of the] Society for the Suppression of Unnecessary Noise* (NY, 1914); SSUN, *Annual Reports* 3 (1910) 3, 5.

408. [Editorial], *NY Trib* (Oct. 13, 1907); "D. U. R. noise must cease," *Detroit Free Press* (Feb. 21, 1907) in Morse Papers, Box 88, f. 3/145; "A 'poser' for Mrs. Rice," *NY Times* (Aug. 22, 1909) 8; "No reason for 'nerves,'" *ibid.* (Aug. 20, 1909) 6; E. S. D., "Psychotherapy under analysis," *ibid.* (May 1, 1909) BR271; "Psychology of telephone girls," *ibid.* (April 4, 1912) 12; Hugo Münsterberg, *Psychology and Industrial Efficiency* (B, 1913) 173, 210-11; D. W. Griffith (dir.) *Schneider's Anti-Noise Crusade* (EC: American Mutoscope and Biograph, April 8, 1909), plot synopsis at www.imdb.com/title/tt000103. The strength of contemporary fears about the consequences of any psychophysiological "accommodation" to noise was articulated in 1895 by Kenneth Grahame, years before he published *The Wind*

in the Willows: “To all of us journeymen in this great whirling London mill, it happens sooner or later that the clatter and roar of its ceaseless wheels—a thing at first portentous, terrifying, nay, not to be endured—becomes a part of our nature, with our clothes and our acquaintances; till at last the racket and din of a competitive striving humanity not only cease to impinge on the sense, but induce a certain callosity in the organ, while that most sensitive inner ear of ours . . . from lack of exercise drops back to the rudimentary stage.” To Grahame, such a deafness disables our hearing “the real facts of sound” in the natural world, which are of so amazing a vitality that, once heard, we would realize how “entirely superfluous” humans are to the whole enterprise: “The inner ear,” *The Yellow Book* 5 (April 1895) 73–76.

409. “The Housewife,” *Pictorial R* 7 (April 1906) 49, silence cloths; “Publishers’ Department,” *Forest and Stream* 71 (Sept. 19, 1908) 445, E. A. Buck still-hunting shoe; Farr & Bailey Manufacturing Co., advertisement for “Corkolin,” *Amer Architect* 95 (March 17, 1909) 52; Trenton Potteries Co. advertisement, “The Noiselessness of the Siwelclo is Valued in the Homes of Refinement,” *Current Opinion* 56 (Jan. 1914) 71; “Absolute silence,” *Toronto Mail and Empire*, unsourced clip of Oct. 2, 1910 on the “only absolutely noiseproof room in the world,” built by Prof. Zwaardemaker in Utrecht, from Morse Papers, Box 88, f. 2/70; “Triumph in bird study,” *Chicago Daily Trib* (Sept. 11, 1904) 4, Worthington Society’s soundproof rooms in Shawnee (Penn); “This woman’s [Miss M. E. McCalmont’s] unique profession is hospital planning,” *NY Times* (May 25, 1913) X7; “Building business house,” *Washington Post* (Dec. 6, 1908) SM6, soundproof listening rooms for O. J. DeMoll & Co., dealers in pianos and player pianos.

410. For context: James R. Heintze, “Washington, George,” in his *Fourth of July Encyclopedia* (Jefferson: McFarland, 2007) 303–304; Len Travers, *Celebrating the Fourth: Independence Day and the Rites of Nationalism in the Early Republic* (U Mass, 1997); David Waldstreicher, *In the Midst of Perpetual Fetes: The Making of American Nationalism, 1776–1820* (U North Carolina, 1997); Simon P. Newman, *Parades and Politics of the Street: Festive Culture in the Early American Republic* (U Penn, 1997); Brooks McNamara, *Day of Jubilee: The Great Age of Public Celebrations in New York, 1788–1909* (Rutgers U, 1997). For quotations: Berthold Fernow, ed. and tr., *Records of New Amsterdam from 1653 to 1674* (Baltimore: Genealogical Co., 1976) I, 421; Eric Sloane, *Diary of an Early American Boy: Noah Blake, 1805* (NY: Ballantine, 1965) 56–57; Leverett Saltonstall, *Papers* (B: Mass H Soc, 1978) 202; Hiram Haines, letter of July 6, 1826, in *Papers 1826–1838*, Rare Book, Manuscript and Special Collections Library, Duke U; Mary E. Dewey, ed., *Life and Letters of Catherine M. Sedgwick* (NY, 1871) 446; Gabriel Furman, “How New York City used to celebrate Independence Day,” *New-York H Soc Q* 21 (1937 [1845]) 93–96, q. 94; “The celebration of the Fourth,” *The National Era* 1 (July 15, 1847) 3; Maria Dyer Davies, entry for July 4, 1854 (p. 274) in her *Diary 1850–1856*, in Rare Book, Manuscript and Special Collections Library, Duke U; Daniel H. Brush, *Growing Up with Southern Illinois, 1820–1861*, ed. Milo M. Quaife (Herrin: Crossfire, 1992) 203–204; Pat Pflieger, ed., *Letters from Nineteenth-Century American Children to Robert Merry’s Museum Magazine* (Lewiston: Edwin Mellen, 2001) 354–55.

411. Brush, *Growing Up with Southern Illinois*, 204; Hannah C. Hicks, File 2, Diaries, January 1, 1863–1866, entries for Feb. 14, 1863, July 4, 1863, and April 19, 1865, in Safe,

Maine State Lib, Augusta; George to Susan, letter of July 5, 1864, in *Soldiers' Letters, 1847-1902*, in U.S. Army Officers' and Soldiers' Miscellaneous Letters, Special Collections Lib, Duke U; Benjamin Brown French, *Witness to the Young Republic: A Yankee's Journal, 1828-1870*, eds. D. B. Cole and J. J. McDonough (U Press of New England, 1989) 482. For an overview: Heintze, "Artillery accidents," *Fourth of July Encyclopedia*, 20-22, as also "Fireworks," 97-101, and "Pyrotechnics and fireworks accidents," 234-36.

412. Ryan, *Civil Wars* (→ n.29) 235 on the *Tribune*; Smith, *Listening to Nineteenth-Century America* (→ n.36) 21, 178 for "national sound"; "Public celebration," *NY Daily Trib* (July 6, 1842) 1; Alfred Cately & Co., *The New and Improved "Family" Shuttle Sewing Machine* (NY, 1876) 13, from the *Independent*; Rosenzweig, *Eight Hours for What We Will* (→ n.49) ch. 3, q. 65; Mrs. Isabella Maude Mayne Rittenhouse, *Maud*, ed. Richard L. Strout (NY, 1939) 410, a quiet Fourth and Temperance; Edwin L. Barney, entry for July 5, 1858 (p. 21) on New Bedford's city fathers refusing to appropriate money to ring the bells and fire a salute during the Revival, in vol. 1 of *Diaries 1858-1871*, Edwin L. Barney Papers, Massachusetts Historical Society, Boston; Stephen Albro, *Age of Progress* 2 (July 12, 1856) 1, quoted and discussed by Bret E. Carroll, *Spiritualism in Antebellum America* (Indiana U, 1997) 35-36; Lawrence W. Levine, *Highbrow/Lowbrow: The Emergence of Cultural Hierarchy in America* (Harvard U, 1988); *Antique & Horrible Blofisticating Squizzileers of Newburyport and Vicinity Will Celebrate the 99th Anniversary of American Independence!* (Broadside, 1874); *Fantastical Celebration of the 4th of July in Georgetown, A.D. 1855* (Haverhill, 1855) 5 for the rhetorical "flummo"; *Programme of Anniversary Exercises, York, Pennsylvania* (July 4, 1876) in Fourth of July folder, Amusements file, Warshaw Collection, as also *Prospectus and Program for Display of Sterlingworth Fireworks* (1912); Julia Ward Howe, "How the Fourth of July should be celebrated," *The Forum* 15 (July 1893) 567-74, q. 572, and cf. "Ready for the Fourth. Crowds leave the city," *NY Daily Trib* (July 3, 1904) 10.

413. Lucretia P. Hale, *The Peterkin Papers* 2nd ed. (B, 1886) 90-103; M. Warner to her dear friend, July 12, 1876, in Meriam-Adams Family Papers, Correspondence 1875-1879, in Rare Book, Manuscript and Special Collections Library, Duke U; Masten & Wells Fireworks Manufacturing Co., *Catalog* (B, ca. 1892) q. 16, in Fireworks file, Warshaw Collection; Consolidated Fireworks of America, *Illustrated and Descriptive Catalogue* (NY, 1892) 6-7; Unexcelled Fireworks Co. (NY), *Illustrated Campaign Hand Book . . . for the Presidential Campaign of 1888* on Crowing Roosters and The Surprise Whistle for rallies and conventions, and (p. 51) Bomb Rockets, "largely used at political meetings"; W.D. Howells, *A Boy's Town* (NY, 1890) 109-12 on Christmas firecrackers, as also Hartley Davis, "Siss! Boom!! Ah-h-h," *Everybody's Mag* 25 (July 1911) 2-12, 4-5 on Christmas in the South. For African-American celebrations of the Fourth and of "Juneteenth" (13 June, on which the American slave trade was abolished in 1808): Mitch Kachun, *Festivals of Freedom: Memory and Meaning in African American Emancipation Celebrations, 1808-1915* (U Mass, 2003); "Our grand periodical sham!" *Frederick Douglass Paper* (June 16, 1854), anti-noise. For the growing noisiness of, and increasing use of private fireworks during Guy Fawkes' Day, the English counterpart: Robert D. Storch, "'Please to remember the fifth of November': conflict, solidarity, and public order in Southern England, 1815-1900," *Popular Culture and Custom in Nineteenth-Century England*, ed. Storch (L: Croom Helm, 1982) 83-99.

414. "Fourth of July," *Brooklyn Daily Eagle* (June 21, 1877) 2; "Observing the Fourth," *NY Daily Trib* (July 5, 1878) 1; Davis, "Siss! Boom!! Ah-h-h," 4 for Adams; Will Carleton, "The Burning of Chicago," *Farm Legends* (NY, 1878) 118; Murray F. Tully, comp., *Laws and Ordinances* (Chicago, 1873) ch. 41.6; Chicago City Council, *Proceedings* (Chicago, 1882) 27 for June 6, 1881, amending ch. XV, par. 1974; Samuel A. Ettelson, comp., *Chicago Municipal Code* (1922) ch. XXXVII, pars. 1722-26 and ch. L, pars. 2649-54; "A patriot's lament," *Chicago Daily Trib* (June 23, 1878) 8; Dr. Willis O. Nance, "The noise problem in Chicago," *City Club Bull* 6,11 (July 23, 1913) 4 for vetoed ordinance of 1884; "Anti-Fourth noise," *Brooklyn Daily Eagle* (June 15, 1904) 9, Amusement Association; Rosenzweig, *Eight Hours for What We Will* (→ n.49) 156-57; "Havoc of the Fourth," *Chicago Trib* (July 5, 1899) 1, as well as "Chicago's July 4 plans" (July 2, 1899) 5, 8, 11, and "Fourth of July is here. Chicago surrenders to patriotism, pleasure, and din" (July 4, 1899) 1; "Plan crusade to stop noise" (Sept. 5, 1899) 1; "Latest Fourth is most bloody" (July 5, 1903) 1; "Celebration is a noisy one" (July 5, 1903) 2 on the caps; "Will give away fireworks," *NY Times* (April 19, 1904) 1; "Small boys and fireworks," *ibid.* (June 10, 1904) 2; "25 die; 1,977 hurt in celebrations," *Chicago Trib* (July 5, 1904) 1; "Fourth of July death list grows," *ibid.* (July 6, 1904) 7; Smilor, "Confronting the Industrial Environment" (→ n.388) 165-69 on lockjaw, or tetanus.

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On Jones himself, who died in 1901: Samuel J. Jones, "Notes of some recent cases of deafness, following cerebro-spinal meningitis," *Chicago J Nervous and Mental Disease* 1 (1874) 171-75; *Who Was Who in America. I. 1897-1942* (Chicago, 1943) 650; Joseph C. Gordon, ed., *Education of Deaf Children* (DC, 1892) 139; "News items," *Ophthalmic Record* 9 (1900) 262, anti-noise proclivities; "Handbook," *Bull Amer Acad Med* 4 (1900) 391-92; [Obituary], *Med Record* 60 (1901) 579.

For later anti-noise campaigns (and anti-anti-noise protests) of 1911-1913 in Chicago: Vaillant, "Peddling noise" (→ n.349); "Racked by noise," *Chicago Trib* (July 4, 1911) 10, and also Nance near top of this note. Cf. "Mrs. Rice seeks noise and finds it, plenty of it, on the East Side—suggests a remedy," *NY Times* (Nov. 7, 1908) 14 for Julia's approach to street peddlers.

415. Viviana A. Zelizer, *Pricing the Priceless Child: The Changing Social Value of Children* (Princeton U, 1994) esp. 56, 57ff., 115-31; Alain Corbin, "Backstage," in *A History of Private Life* (→ n.282) 525-26 on dolls; Gary Cross, *Kids' Stuff: Toys and the Changing World of American Childhood* (Harvard U, 1997) 22-24 on mechanical toys, q. 24, 33-34 for family size; *Playthings* 6 (Feb. 1908) 86 for crying dolls, and throughout; Blair Whitton, *Toys: The Knopf Collectors' Guides to American Antiques* (NY: Knopf, 1984) esp. plates 113-18, 164-95; Sears, Roebuck and Co., *Consumers Guide Fall 1900* (repr. Northfield: Digest, 1970) 635-41;

Smilor, "Confronting the Industrial Environment," 174-85.

416. Zelizer, *Pricing the Priceless Child*, 32ff., q. 70-71 Adler, 76; Postcard, Topical-40, Fourth of July, "Fotograph your boy," in series with one postmarked 1909, a young girl running from a lit firecracker ("The giant cracker is a big red brute / With a tail that's like a snake / You can easily tell when they're about / By the awful noise they make") in Adams Postcard Collection, Special Collections, Malcolm A. Love Lib, San Diego State U; Rosenzweig, *Eight Hours for What We Will* (→ n.49) 157 for Southwick; Hubert, "For the suppression of city noises" (→ n.377) 634, and cf. "Fireworks in plenty: large supply on the market and the prices are low," *NY Times* (June 14, 1895) 9, imports from China; Norton, *Letters of Charles Eliot Norton* (→ n.291) II,344; Morse, *Can City Life Be Made Endurable?* (→ n.330) 14. Cf. Nan Goodman, *Shifting the Blame: Literature, Law, and the Theory of Accidents in Nineteenth-Century America* (Princeton U, 1998).

417. "Don't celebrate near hospitals," *NY Times* (June 30, 1907) II, q. 7, and cf. [J. A. Pickett, Mayor] *NOTICE 3 July 1884* (Broadsheet, New Britain, CT, 1884); J. Henry Clark, *Sight and Hearing: How Preserved and How Lost*, new ed. (NY, 1859) 286; Mrs. Isaac L. Rice, *Our Barbarous Fourth* (NY, 1908); eadem, *For a Safe and Sane Fourth* (NY, 1910) for health commissioners, mayors and governors; Raymond W. Smilor, "Creating a national festival: the campaign for a Safe and Sane Fourth, 1903-1916," *J Amer Culture* 2 (1979) 611-22, based upon his dissertation, "Confronting the Industrial Environment," 156-216; William Orr, "An American holiday," *Atlantic Mo* 103 (June 1909) 782-89, 783 for Springfield; Helen S. Gray, "The Fourth as a national nuisance," *Ladies' Home J* 24 (July 1907) 34; David Glassberg, *American Historical Pageantry: The Uses of Tradition in the Early Twentieth Century* (U North Carolina, 1990) 24-25, 55-56, 63-66, 71-74 pass.; Percy MacKaye, "The new Fourth of July," *Century Mag* 80 (July 1910) 394-96; Luther Gulick (President, American Playground Association), "The new and more glorious Fourth," *The World's Work* 18 (July 1909) 11784-87; "How to celebrate 'a safe and sane fourth,'" *NY Times* (June 25, 1911) V,10, Sage Foundation film. Cf. Heintze, "Safe and Sane Celebrations," *Fourth of July Encyclopedia*, 246-47, as also "Women and the Fourth of July," 318-20.

418. "Rice, Mrs. Isaac L.," *Natl Cyclopaedia of Amer Biog* (1910) XIV,508; "Don't celebrate near hospitals," as above, and "Remember the sick on firecracker day," *NY Times* (June 21, 1908) 16; "Pleased by sane Fourth," *ibid.* (July 10, 1913) 16 for Gaynor; Sane Fourth of July Association of Chicago, *Reports of the Officers... concerning the Historical Pageant and Army Tournament of July 4th, 1910* (Chicago, 1910); "Taft makes plea for sane Fourth," *Chicago Trib* (July 4, 1911) 6; "The woman who reformed the 'Fourth,'" *The Pictorial R* (July 1910) 22 in Morse Papers, Box 87, f. 5, as also George Fitch, "Vest Pocket Essays: Noise," *B Herald* (undated clip), Box 88, f. 2/66. To follow Chicago's reformed Fourths: "For a sane Fourth," *Chicago Daily Trib* (July 3, 1908) 10, as also "Hail 4th of July in riot of noise" (July 4, 1908) 7, "Sane Fourth meeting today" (July 1, 1909) 6, "Speakers plead for sane Fourth" (July 2, 1909) 5. For cartoons: "The Picnic" and "Young America's Way," illustrations to "How to Spend the Fourth," *Harper's Weekly* 1 (July 4, 1857) 424-25; E. A. Abbey, "The Glorious Fourth—The First Gun—Time, 5 a.m.," *ibid.* 15 (July 8, 1871) 625; Homer Winslow, "Fourth of July Scene, on Boston Common," *Ballou's Pictorial Drawing Room Companion* (July 9, 1859); John W. Grove Co., "Wishing you a glorious Fourth

of July” postcard (Pittsburgh, postmarked 1911), in “Fireworks–General Images” file, Warshaw Collection, reproduced by James R. Heintze, “Fourth of July Postcards,” www.american.edu/heintze/postcards.htm, relying on “A Bang-Up Fourth: A Portfolio,” *Amer H Illustrated* 15 (July 1980) 26–28; Harvey Ginsberg, “Siss! Boom! Bah!: Postcards from a Patriotic Past,” *Smithsonian* 25 (July 1994) 34–37. Cf. Heintze’s *Fourth of July Encyclopedia* (Jefferson, NC: McFarland, 2008).

419. Julia Barnett Rice, letter of July 21, 1908 to Robert Underwood Johnson, in Box 83, Century Company Records, Manuscripts and Archives Division, NY Public Library; Rice, *For a Safe and Sane Fourth*, 13. As for Riis and noise: Jacob A. Riis, *Neighbors: Life Stories of the Other Half* (NY, 1914) 13 on “Old Black Joe” played on the street by a young woman whose fiddling could be heard “through the rattle and roar of a train passing overhead, through the calls of cabmen and hucksters.”

420. “Noise-worried man dies,” *NY Times* (July 21, 1904) 1; “To stop the noise,” *Chicago Trib* (Oct. 11, 1896) 25; Dayton S. Miller, *The Science of Musical Sounds* (NY, 1916) 78–91; L. S. Lloyd, “Electronic organs and the phonodeik,” *Musical Times* 79 (Sept. 1938) 682–85; H. P. Blavatsky, *The Voice of the Silence* (Kila: Kessinger, 1998 [1889]); Ernest S. Simpson, “The wisdom of the dogs,” *San Francisco Chronicle* (May 6, 1906).

421. Mrs. Isaac L. Rice, “Hoodlumism in holiday observance,” *The Forum* 41 (April 1909) 317–22; Rice, *For a Safe and Sane Fourth*, 16; “Fireworks expert held,” *NY Times* (Nov. 6, 1902) 2, and cf. Davis, “Siss! Boom!! Ah-h-h,” 5–12 on fireworks manufacturers and their dislike of giant firecrackers; “Crackers’ noise kills baby,” *ibid.* (June 14, 1904) 1. Cf. Saturday Saunterer column, *B Budget and The Beacon* (April 23, 1910) 8, for more pageantry and less noise, esp. by “hoodlums.” Cf. “The Glorious Fourth—Bang!” *Playthings* 6 (July 1908) 84; G. M. Schwartz, “The future of the fireworks business,” *ibid.* 6 (Dec. 1908), and contrast the many advertisements throughout for “Big Racket Makers.”

422. Rice, *Our Barbarous Fourth*, 5 for *Utica Press* and *Minneapolis Press*, 8 on the Swiss, 11 for Twain and Howells, 12 for early celebrations and patriotism; eadem, “The child and the Fourth,” *The Forum* 50 (July 1913) 37–47, q. 45; Civic Club of Philadelphia, *Annual Report* 16 (1910) 5, q. 13 Oakley; Edward J. Ward, “Old significance of the new Fourth,” *The Survey* 26 (June 24, 1911) 459–62, esp. 460 opposing “the senseless noise, the ugly warplay in which children are killed or maimed for life, or at best taught lessons of violence and destruction.” Leigh Eric Schmidt notes that private or familial fireworks for the Fourth were unusual before the Civil War, and that they spread in good measure due to the promotions of the Boston firm of Masten and Wells: *Consumer Rites: The Buying and Selling of American Holidays* (Princeton, 1995) 34–37.

ROUND THREE

1. Alexander Dalrymple, tr., *Relation of Luis Vaez de Torres . . . Manila, July 12, 1607*, reported in his *An Account of the Discoveries made in the South Pacifick Ocean, previous to 1764. Part I* (L, 1767 [i.e., 1769]), printed in James Burney, *A Chronological History of Voyages and Discoveries in the South Sea* (L, 1806) II, 467; Diego de Prado y Tovar, *New Light on the Discovery of Australia* (Nendeln: Kraus, 1967 [*Relación sumaria*, wr. 1607/1608]) 156ff.; Brett Hilder, *The Voyage of Torres* (U Queensland, 1980) ch. 6; J. E. Heeres, *The Part Borne*

by the Dutch in the Discovery of Australia (L, 1899); Robert L. Jack, *Northmost Australia* (L, 1921) 1,95; Raymond Evans, *A History of Queensland* (Camb U, 2007) 15–17, 23; John Singe, *The Torres Strait: People and History* (U Queensland, 1979) 15–23 (noting, p. 16, that Malays knew the Strait long before Europeans); Henry Reynolds, *Aboriginal Sovereignty: Reflections on Race, State and Nation* (St. Leonards: Allen & Unwin, 1996) ix–xi, 17–20, 23–24, 49 on *terra nullius* as applied to Australia, “thinly inhabited, even to admiration” for such an “immense tract of land...considerably larger than all Europe,” wrote Joseph Banks, accompanying Cook in 1770. Prior usage had “Straits”; currently it is singular.

Debate continues on who “found” Australia and when, much of it hinging on issues of language—as if the continent had literally to be sounded out: William A. R. Richardson, *Was Australia Charted before 1606? The Jave la Grande Inscriptions* (Canberra: Natl Lib of Australia, 2006), reviewed by Roy Schreiber in *Amer H R* 113 (2008) 481–82, with retort by Richardson at 1301. Cf. Paul Carter’s sound-sensitive analyses of European contacts with aborigines in “Speaking pantomimes: notes on *The Calling to Come*,” *Leonardo Music J* 6 (1996) 95–98, and his *The Sound In-Between* (New South Wales U, 1992); Tony MacGregor, “Sympathetic Vibrations: Effecting Sound Histories,” MA thesis, Faculty of Humanities and Social Sciences, U Technology, Sydney, April 2000, 56–82.

On the convicts and Bligh: A. G. L. Shaw, “English convicts,” *The Australian People*, ed. James Jupp (Camb U, 2001) 279–82; William Bligh, *The Bligh Notebook . . . 28 April to 14 June 1789*, ed. John Bach (Sydney: Allen & Unwin, 1987) with references throughout on God’s grace; idem, *Log of H.M.S. Providence, 1791–1793* (Surrey: Genesis, 1976) entries for Sept. 16–25, 1792; Dulcie Powell, *The Voyage of the Plant Nursery, H.M.S. Providence, 1791–1793* (Kingston: Institute of Jamaica, 1973) esp. 16–17; Emma Spary and Paul White, “Food of paradise: Tahitian breadfruit and the autocritique of European consumption,” *Endeavour* 28 (June 2004) 75–80.

2. David S. Trigger, *Whitefella Comin’: Aboriginal Responses to Colonialism in Northern Australia* (Camb U, 1992) esp. 19; Singe, *Torres Strait*, 27 on ghosts, 129 for dugongs; Nils M. Holmer, *Notes on Some Queensland Languages* (Australian Natl U, 1988) 1–23; Vincent A. Genova, “Torres Strait Island Music,” Ph.D. thesis, U Pittsburgh, 1991, pp. 26, 64, 348; Walter E. Roth, *North Queensland Ethnography: Bulletin No. 5, Superstition, Magic, and Medicine* (Brisbane, 1903) 8, 19, 26; David R. Moore, *Arts and Crafts of Torres Strait* (Aylesbury: Shire, 1989) 30, 36–37. Cf. Alfred Gell, “The language of the forest: landscape and phonological iconism in Umeda,” in his *The Art of Anthropology*, ed. Eric Hirsch (L: Athlone, 1999) 232–58, on the ontological priority of sound among forest-dwelling Papuans whose language, related to that of the Meriam, evokes “a reality which is itself ‘heard’ and imagined in the auditory code.” Listen also to Steven Feld, *Sound and Sentiment: Birds, Weeping, Poetics, and Song in Kaluli Expression*, 2nd ed. (U Penn, 1990). Peter Doyle, *Echo and Reverb: Fabricating Space in Popular Music Recording, 1900–1960* (Wesleyan U, 2005) 17, 38–39, on the spatial claim-staking of reverberant sounds such as those ritually produced by the Meriam.

3. Sven Lindqvist, *Terra Nullius: A Journey Through No One’s Land*, tr. Sarah Death (NY: New Press, 2005) throughout, on the reformatories, as also Judy Thomson, ed., *Reaching Back: Queensland Aboriginal People Recall Early Days at Yarrabah Mission* (Canberra:

Aboriginal Studies Press, 1989) esp. 16–20; Genova, “Torres Strait Island Music,” 6, 41; Douglas F. Fraser, *Torres Straits Sculpture: A Study in Oceanic Primitive Art* (NY: Garland, 1978) 98–108; Singe, *Torres Strait*, 57–66; Roth, *Bulletin No. 3, Food, Its Search, Capture, and Preparation* (Sept. 1901) 30 on cannibalism, and *Bulletin No. 4, Games, Sports, and Amusements* (March 1902) 20–21 on songs; Noel Loos, *Invasion and Resistance: Aboriginal-European Relations on the North Queensland Frontier, 1861–1897* (Australian Natl U, 1982) 153 on Roth and the Islanders.

4. Moore, *Arts and Crafts*, 10–11, 29; idem, *The Torres Strait Collections of A. C. Haddon* (L: British Museum, 1984) 36; Jeremy Beckett, *Torres Strait Islanders: Custom and Colonialism* (Camb U, 1987) 113–14; idem, “Haddon attends a funeral,” in *Cambridge and the Torres Strait: Centenary Essays on the 1898 Anthropological Expedition*, eds. A. Herle and S. Rouse (Camb U, 1998) 36–40; Albrecht C., graf von der Schulenberg, *Grammatik, Vocabularium, und Sprachproben der Sprache von Murray Island* (Leipzig, 1892) 10; Singe, *Torres Strait*, ch. 3, esp. 60–62; Holmer, *Notes*, 15. Cf. Norman Simms, “L’ellipse dans le livre naïf du Pacifique Sud (XIXe siècle),” in *Ellipses Blancs Silences*, ed. Bertrand Rougé (U de Pau, 1992) 179–84 on sonic relations between Samoan “teachers” or missionaries and their Australasian flocks.

5. Beckett, *Torres Strait Islanders*, 113, 118; Margaret E. Lawrie, ed., *Myths and Legends of Torres Strait* (U Queensland, 1970) 297–366, esp. 326–36 for Malo (often, Malu); Alfred C. Haddon, *Head-Hunters Black, White, and Brown*, abridged ed. (L, 1932 [1901]) esp. 33 on bullroarer, 41 on clam shells; Moore, *Arts and Crafts*, 7–9, 12, 41–42, and noting (p. 11) that archaeological data suggests two thousand years of settlement on Mer; idem, *Torres Strait Collections*, 17, 27, 31, 45, and plates 45, 290, 293–95; Singe, *Torres Strait*, 64, 145 on outlander presence in 1880, as also Anna Shnukal and Guy Ramsay, “Tidal flows: an overview of Torres Strait Islander—Asian contact,” in *Navigating Boundaries: The Asian Diaspora in the Torres Strait* (Canberra: Pandanus, 2004) 32–51.

6. Herle and Rouse, “Introduction,” *Cambridge and the Torres Strait*, 3, 15; George W. Stocking, *After Tylor: British Social Anthropology, 1888–1951* (U Wisconsin, 1995) 98–102, 115–23; A. Hingston Quiggin, *Haddon, the Head Hunter* (Camb, 1942) 3–6, 79, 88; H. J. Fleure, “Alfred Cort Haddon, 1855–1940,” *Obituary Notices of Fellows of the Royal Soc* 3,9 (Jan. 1941) 449–65, q. 453.

7. Herle and Rouse, “Introduction”; Kate Ross and John Taylor, “Improving life expectancy and health status: a comparison of indigenous Australians and New Zealand Māori,” *J of Population Research and New Zealand Population R: Special Joint Issue* (Sept. 2002) 219–38 at 221, by extrapolation from early data for the Māori and recent data for Australian indigenes, in fig. 1, “Life expectancy at birth by Indigenous status and sex, 1901–1996.” On the invention of fields, always fraught: Henrika Kuklick, *The Savage Within: The Social History of British Anthropology, 1885–1945* (Camb U, 1991) 162–78; Keith Hart, “The place of the 1898 Cambridge Anthropological Expedition to the Torres Straits in the history of British social anthropology” (1998) at www.human-nature.com/science-as-culture/hart.html; Alan Costall, “Dire straits: the divisive legacy of the 1898 Cambridge Anthropological Expedition,” *J H Behavioral Sci* 35,4 (1999) 345–58; Paul Whittle, “W. H. R. Rivers and the early history of psychology at Cambridge,” in *Bartlett, Culture and Cognition*, ed. Akiko

Saito (L: Taylor & Francis, 2000) 21–35.

8. Richard Slobodin, *W. H. R. Rivers* (Columbia U, 1997) 15, 18, 21; W. H. R. Rivers, “Visual acuity,” *Reports of the Cambridge Anthropological Expedition to Torres Straits: Volume II [Pt I]. Physiology and Psychology*, ed. A. C. Haddon (L, 1901) q. 12, and cf. his later “Observations on the senses of the Todas,” *Brit J Psych* 1 (1905) 321–96, esp. 389–91, the audiometrics redone by Y. P. Kapur and A. J. Patt, “Hearing in Todas of South India,” *Archives of Otolaryngology* 85 (April 1967) 400–406; Myers, “Hearing,” *ibid.* (L, 1903) pt. II, 141–68, q. 145, q. 148; *idem*, “Music,” *Volume IV. Arts and Crafts*, 238–69, q. 260; Quiggin, *Haddon*, 19; Henrika Kuklick, “Islands in the Pacific: Darwinian biogeography and British anthropology,” *Amer Ethnologist* 22 (1996) 611–38 at 620. During the 1890s, the exploitation of Islanders for the harvesting of mother-of-pearl had accelerated: Loos, *Invasion and Resistance*, 139. One may also have to take into account the possibly genetic vulnerability of the Meriam to ear infections: Val Asche, “Microbiology of otitis media in Aboriginal Australians,” in *Conference Proc Medical Options for Prevention and Treatment of Otitis Media in Australian Aboriginal Infants 16–18 February 1992*, at www.adf.com.au/contents.php?subdir=library/1992/otitis_media/&filename=val_asche.

9. Haddon, *Head-Hunters*, 46; Quiggin, *Haddon*, 15, 62; Slobodin, *W. H. R. Rivers*, 4–8; Charles S. Myers, entry in *A History of Psychology in Autobiography*, ed. Carl Murchison (NY, 1961) III, 215–30; *idem*, “On the permanence of racial mental differences,” in *Papers on Inter-Racial Problems Communicated to the First Universal Races Congress*, ed. G. Spiller (Miami: Mnemosyne, 1970 [1911]) 73–79, q. 74; *idem*, “Dr. A. C. Haddon, F. R. S.,” *Nature* 145 (June 1, 1940) 848–50, q. 849; F. J. West, “Charles Gabriel Seligman,” *Dict Natl Biog*, eds. H. C. G. Matthew and B. Harrison (Oxford U, 2004) XLIX, 709–11; Charles G. Seligman, *Anthropological Perspective and Psychological Theory* (L, 1932) q. 195–96, q. 203, 206. Cf. Johannes Fabian, *Time and the Other: How Anthropology Makes Its Object* (Columbia U, 1983).

10. Todd M. Endelman, “Anglo-Jewish scientists and the science of race,” *Jewish Social Studies* 11 (2004) 52–92; Charles S. Myers, “Is there a Jewish race?” *Jewish R* 2 (1911) 120–25; *idem*, with Lizzie Hands, eds., *Judaism and the Beginnings of Christianity, A Course of Lectures Delivered in 1923 at Jews’ College, London* (L, 1924); *idem*, chair [i.e., author], *Attitudes to Minority Groups: A Report Prepared by a Committee of Psychologists and Sociologists . . . With Special Reference to the Psychology and Sociology of Anti-Jewish Prejudices* (L, 1946). Robert J. Holton, “Cosmopolitanism or cosmopolitanisms? The Universal Races Congress of 1911,” *Global Networks* 2,2 (2002) 153–70 puts the Congress in global perspective. For the “semitic” features of the Kuwai and Eastern Islanders, early noted by a naturalist for the *H.M.S. Fly* (1845): Singe, *Torres Strait*, 29. In one of his last projects, Haddon collaborated on a book refuting the “scientific Aryanism” of the Nazis: Julian S. Huxley and A. C. Haddon, *We Europeans: A Survey of ‘Racial’ Problems* (L, 1935). *Per contra*: Stocking, *After Tylor*, 382n., arguing that Haddon’s and Seligman’s critiques of racism developed belatedly, in the 1930s, after decades of investment in racial ethnology.

11. Haddon, *Head-Hunters Black, White, and Brown*, 5, 12, q. 61; Stocking, *After Tylor*, 101–103; Beckett, “Haddon attends a funeral,” 46–47; Slobodin, *W. H. R. Rivers*, 79–82, 185–86; W. H. R. Rivers, “An address on socialism and human nature,” *Psychology and*

Politics, and Other Essays (L, 1923) 81-94, q. 84; Peter Pels, "The trickster's dilemma: ethics and the technologies of the anthropological self," in *Audit Culture: Anthropological Studies in Accountability, Ethics, and the Academy*, ed. Marilyn Strathern (L: Routledge, 2000) 135-72, at 151-53.

12. Herle and Rouse, "Introduction," 13, 18-19; Haddon, *Head-Hunters*, 173; Beckett, *Torres Strait Islanders*, 112-13, 118; idem, "Haddon attends a funeral," q. 30, 39-44; Evans, *A History of Queensland*, 179, 192, 212; Singe, *Torres Strait*, 99, 231; Noel Loos and Koiki Mabo, *Edward Koiki Mabo: His Life and Struggle for Land Rights* (U Queensland, 1996) xiv-xviii; Nonie Sharp, *No Ordinary Judgment: Mabo, The Murray Islanders' Land Case* (Canberra: Aboriginal Studies, 1996) esp. 171-74; Lesley Head, *Second Nature: The History and Implications of Australia as Aboriginal Landscape* (Syracuse U, 2000) 146-51; Reynolds, *Aboriginal Sovereignty*, 53-54, brigandage. On precedents for and controversy over the Mabo decision: Paul Patton, "The translation of indigenous land into property: the mere analogy of English jurisprudence . . .," *Parallax* 6 (2000) 25-38; Tim Rowse, "Terra nullius," *Oxford Companion to Australian History*, eds. Graeme Davison et al. (Oxford U, 2001) 638; Lorenzo Veracini, "Terra nullius and the 'history wars'" (Feb. 10, 2006) at www.onlineopinion.com.au/view.asp?article=4141; David A. Roberts, "They would speedily abandon the country to the new comers: the denial of Aboriginal rights," in *The Great Mistakes of Australian History*, eds. M. Crotty and D. A. Roberts (U New South Wales, 2006) ch.1. The legal debate was conditioned by the trope of Australian silence in the outback and Western problems with oral tradition: Jane Belfrage, "The Great Australian Silence: inside acoustic space" (Australia Sound Design Project, U Melbourne, May 1994) at www.sounddesign.unimelb.edu.au/site/papers/AusSilence.html; Elizabeth Povinelli, "Do rocks listen? The cultural politics of apprehending Aboriginal law," *Amer Anthropologist* 97,3 (1995) 505-18; Bruce Chatwin, *The Songlines* (L: Vintage, 1998); Ernest C. Buley, *Australian Life in Town and Country* (NY, 1905) 10 on the "profound melancholy" of Whites in the outback "wastes," where "the wailing cry of the curlew is never silent," and contrast Henry Handel [= E. F.] Richardson, *Ultima Thule* (NY, 1929) 78 on the violation of the outback by "the pestilential screech of the mill-whistle." Vice versa: Lee-Ann Martin, ed., *Making a Noise! Aboriginal Perspectives on Art, Art History, Critical Writing and Community* (Banff: Banff Intl Curatorial Inst, 2005).

13. Blaise Cendrars, *The Astonished Man*, tr. Nina Rootes (L: Peter Owen, 1970) 18-19, cited and discussed by Leonard V. Smith, *The Embattled Self: French Soldiers' Testimony of the Great War* (Cornell U, 2007) 5.

14. Peter Warwick, *Black People and the South African War, 1899-1902* (Camb U, 1983) 3, belief on both sides in a speedy war; Joel D. Howell, "'Soldier's heart': the redefinition of heart disease and specialty formation in early twentieth-century Great Britain," *Emergence of Modern Cardiology*, eds. W. F. Bynum et al. (L: Wellcome, 1985) 34-52; Allan M. Hamilton, *Recollections of an Alienist* (NY, 1916) 44-46, 260-61 on Civil War and later "battle shock"; John Eric Erichsen, *On Concussion of the Spine, Nervous Shock, and Other Obscure Injuries of the Nervous System* (NY, 1875) q. 2, 154, 162; Thomas Keller, "Railway spine revisited: traumatic neurosis or neurotrauma?" *J H Med and Allied Sci* 50 (1995) 507-24; Ralph Harrington, "The railway accident: trains, trauma, and technological crises

in nineteenth-century Britain,” in *Traumatic Pasts: History, Psychiatry, and Trauma in the Modern Age*, eds. M. S. Micale and P. Lerner (Camb U, 2001) 31–56; Eric Caplan, “Trains, brains, and sprains: railway spine and the origins of psychoneuroses,” in his *Mind Games: American Culture and the Birth of Psychotherapy* (UC, 1998) 11–36; George F. Shrady, “Shock and collapse,” *Twentieth Century Practice*, ed. Thomas L. Stedman (NY, 1895) III,141–71; Morgen I. Finucane, “General nervous shock, immediate and remote, after gunshot and shell injuries in the South African campaign,” *Lancet* (Sept. 15, 1900) 807–809, discussed by Robert David Ritchie, “One History of ‘Shellshock,’” Ph.D. thesis, UC San Diego, 1986, p. 100; Denis Judd and Keith Surridge, *The Boer War* (NY: Palgrave Macmillan, 2003) 125–26, q. 127 officer (Earl de la Warr), 131–35; Richard A. Gabriel and Karen S. Metz, *A History of Military Medicine* (NY: Greenwood, 1992) II, 217–22; Capt. Walter Norris Congreve, “The first V.C. of the war,” *War Pictures* 1 (March 17, 1900) 167.

15. Matthew Hendley, “‘Help us to secure a strong, healthy, prosperous and peaceful Britain’: the social arguments for compulsory medical service in Britain, 1899–1914,” *Canadian J of H* 30 (Aug. 1995) 261–88, q. 238; Jon E. Lewis, ed., *Mammoth Book of War Diaries and Letters* (NY: Carroll and Graf, 1999) 241 Isherwood, 245–46 Lt. David Miller; Jerrold N. Moore, *Sound Revolutions: A Biography of Fred Gaisberg, Founding Father of Commercial Sound Recording* (L: Sanctuary, 1999) 55; Sol T. Plaatje, *The Boer War Diary*, ed. John L. Comaroff (Johannesberg: Macmillan, 1973) 63–65, q. 75, q. 76–77, 78, q. 96.

16. Esme W. Howard, *Theatre of Life. I. Life Seen from the Pit, 1863–1905* (L, 1935) 286; David J. Barnes, “The British Army in the Anglo-Boer War,” for casualty statistics, at www.rfc-rnas-raf-register.org.uk/Boer%20War%20Casualties.htm; Anne Summers, *Angels and Citizens: British Women as Military Nurses, 1854–1914* (L: Routledge and Kegan Paul, 1988) 205–206, 219, more statistics; Hendley, “Help us to secure . . .,” 237–38; Emanoel C. G. Lee, *To the Bitter End: A Photographic History of the Boer War, 1899–1902* (NY: Viking, 1985) 144, 157, 186ff. on concentration camps; Warwick, *Black People and the South African War*, 4 on blockhouses, barbed wire, and deaths; Editorial, “Pax Pandemonica,” *Saturday R of Politics, Lit, Sci, and Art* 93 (June 7, 1902) 723–24; A. C. Swinburne, “The First of June,” *ibid.*, 724; Judd and Surridge, *The Boer War*, 298–301; Maj-Gen. Roger Evans, *The Story of the Fifth Royal Inniskilling Dragoon Guards* (Aldershot, 1951) ch. 5; Edgar Jones and Simon Wessely, “War syndromes: the impact of culture on medically unexplained symptoms,” *Med H* 49 (2005) 55–78; Edgar Jones, “Historical approaches to post-combat disorders,” *Phil Trans Royal Soc B: Biological Sci* 361 (April 29, 2006) 533–42. For Kipling: *Rudyard Kipling’s Verse: Definitive Edition* (L, 1940) 296–99, q. 468 “Columns,” and cf. Samuel Cabot Co. advertisement, “Invaluable as a deadener of noise,” *Amer Architect and Building News* 65 (July 8, 1899) v, testimonial from Kipling on his use of “Cabot’s Sheathing and Deafening Quilt in his house, through which previously every sound rang like a gong.”

17. Nicholas Reeves, “Egyptian antiquities from Eton,” *Burlington Mag* 130 (1988) 482–83 on William Joseph Myers; Charles Myers, entry in *History of Psychology in Autobiography*, III, 218–19; *idem*, “Myasthenia gravis,” *J Pathology and Bacteriology* 8 (1903) 306–45.

18. Byron E. Wall, “John Venn, James Ward, and the Chair of Mental Philosophy and Logic at the University of Cambridge,” *J H of Ideas* 68,1 (2007) 131–55; Slobodin, *W. H. R.*

Rivers, 35, noting that Ward and Rivers would co-found the *British Journal of Psychology* in 1904 and that Ward, as “the most influential British psychologist of the time,” supported Myers in his struggles at Cambridge for better experimental facilities; Charles S. Myers, “Naturalism and idealism,” *Phil R* 10 (Sept. 1901) 436–76, q. 468 hypermechanical, q. 471 continuum, q. 475 unity; idem, “Contributions to Egyptian anthropology,” *J Royal Anthropol Inst of Great Britain and Ireland* 38 (1908) 99–147, concluding a series begun in 1903. Cf. Stocking, *After Tylor* (→ n.6) 219–20 on Seligman’s advocacy of the “Hamitic hypothesis” with regard to the racial origins of Egyptians.

19. Patrick J. Mahony, *Freud and the Rat Man* (Yale U, 1986) 18; Frederick J. Wertz, “Freud’s case of the Rat Man revisited: an existential-phenomenological and socio-historical analysis,” *J Phenomenological Psych* 34 (Spring 2003) 47–78; Ernst L. Freud, ed., *The Letters of Sigmund Freud*, trs. T. Stern and J. Stern (NY, 1960) 275–76, letter of Aug. 4, 1908; Brenda Maddox, *Freud’s Wizard: Ernest Jones and the Transformation of Psychoanalysis* (L: John Murray, 2006) 39, 66; “J. M. Barrie seeks divorce from wife,” *NY Times* (Oct. 7, 1909) q. 1 from Charles Frohman; Thomas F. Meehan, “Eucharistic Congresses,” *Catholic Ency* (NY, 1909) online at www.newadvent.org/cathen/05592a.htm; Judith R. Walkowitz, “The ‘Vision of Salome’: cosmopolitanism and erotic dancing in central London, 1908–1918,” *Amer H R* 108 (April 2003) 337–76. On Freud’s Jewishness, I have benefitted from conversations with Eliza Slavet, author of *Racial Fever: Freud and the Jewish Question* (Fordham U, 2009). Cf. Yosef Hayim Yerushalmi, *Freud’s Moses: Judaism Terminable and Interminable* (Yale U, 1991); Emanuel Rice, *Freud and Moses: The Long Journey Home* (SUNY Albany, 1990); Moshe Gresser, *Dual Allegiance: Freud as a Modern Jew* (SUNY Albany, 1994).

20. Richard H. Armstrong, *A Compulsion for Antiquity: Freud and the Ancient World* (Cornell U, 2005) 1–2, 12, 72–75, 83, 110–11, 143, 184–90, 214, q. 215; Jeffrey M. Masson, tr. and ed., *The Complete Letters of Sigmund Freud to Wilhelm Fliess, 1887–1904* (Harvard U, 1985) 365–66, letter of Aug. 6, 1899; Peter Gay, *Freud: A Life for Our Time* (NY: Norton, 1998) q. 172, 324–25; Carl E. Schorske, “To the Egyptian dig: Freud’s exploration in Western cultures,” *Psychoanalysis and Culture at the Millennium*, ed. Roy Ginsburg (Yale U, 1999) 20–23, “intoxicated”; Edwin R. Wallace, IV, *Freud and Anthropology* (NY: International U, 1983) 7 pass.; Lorelei H. Corcoran, “Exploring the archeological metaphor: the Egypt of Freud’s imagination,” *Annual of Psychoanalysis* 19 (1991) 19–27; Donald Kuspit, “A mighty metaphor: the analogy of archeology and psychoanalysis,” in *Sigmund Freud and Art: His Personal Collection of Antiquities*, eds. L. Gamwell and R. Wells (SUNY Binghamton, 1989) 133–51, and the editors’ intro. (pp. 23–27) on Freud’s Egyptian collecting, as also 65–69 for *shabti*, 78–79 for the mummy portrait of a balding, bearded, middle-aged man. An entirely different interpretation of the role of Freud’s *shabti* and other furnishings would follow from Charles Rice’s intriguing *The Emergence of the Interior: Architecture, Modernity, Domesticity* (Routledge, 2007). On savages: Sigmund Freud, *Totem and Taboo*, tr. James Strachey (NY, 1950 [1912–1913]) 1.

21. Norman L. Munn, *An Invitation to Animal Psychology: The Behavior of the Rat* (B, 1933) 2–4 on the use of laboratory rats since 1894, a sound of scurrying (and squeaking) that still attaches to experimental psychology; Willis L. Gard, “Some neurological and

psychological aspects of shock,” *The Pedagogical Seminary* 15,4 (1908) 440–74; John B. Watson, *Animal Education: An Experimental Study on the Psychical Development of the White Rat* (U Chicago, 1903), focused on training rats to associate specific noises with danger.

22. Gamwell and Wells, *Sigmund Freud and Art*, 65, Senna and “deputies of the deceased.”

23. John Forrester, *Language and the Origins of Psychoanalysis* (Columbia U, 1980); Mahony, *Freud and the Rat Man*, ch. 5 on Freud’s orality, 138–39 on his “phonographic” memory; Paul Roazen and Bluma Swerdloff, *Heresy: Sandor Rado and the Psychoanalytic Movement* (Northvale: Jason Aronson, 1995) 39 on Freud as a lecturer; Hannah S. Decker, *Freud, Dora and Vienna 1900* (NY: Free Press, 1991) 65, 70, 171–72, 206–207; David Ellis, “Freud’s Dora,” *Cambridge Q* 9,3 (1980) 202–18; David Schur, “Compulsion as cure: contrary voices in early Freud,” *New Lit H* 32 (2001) 587–88 on Emmy von N.

24. “A new and terrible engine of war,” *Illustrated L News* (Oct. 31, 1908) 599; “A new war engine,” *NY Times* (Nov. 28, 1908) 12. The Kokoschka sculpture, held by the Museum of Fine Arts, Boston, may be viewed in color at www.mfa.org/collections; cf. Susanne Keegan, *The Eye of God: A Life of Oskar Kokoschka* (L: Bloomsbury, 1999) 91 on the many in his circle who would be shellshocked, wounded, or killed in the war. On the Russo-Japanese War: Capt. R. L. Richards, “Mental and nervous diseases in the Russo-Japanese War,” *Military Surgeon* 26 (1910) 177–93, q. 186, 187 for grenades; Gabriel and Metz, *History of Military Medicine* (→ n.14) 225–37; Peter J. Leese, *Shell Shock: Traumatic Neurosis and the British Soldiers of the First World War* (NY: Palgrave-Macmillan, 2002) 20; John Ellis, *The Social History of the Machine Gun* (NY: Random House, 1975) 65–68 for Japanese use of machine guns, another sort of shock; Claire Herrick, “‘The conquest of the silent foe’: British and American military medical reform rhetoric and the Russo-Japanese War,” in *Medicine and Modern Warfare* (Amsterdam: Rodopi, 1999) 99–129 on Japan’s “aseptic fighting,” which astonished Western observers, since Japanese forces were generally free of illnesses due to unsanitary conditions and the spread of infectious diseases, the primary source of casualties in most previous wars.

25. F. T. Marinetti, tr. R. W. Flint, “The founding and manifesto of Futurism 1909,” in *Futurist Manifestos*, ed. Umbro Apollonio (NY: Viking, 1973) 21; Harold B. Segel, *Body Ascendant: Modernism and the Physical Imperative* (Johns Hopkins U, 1998) 57–61 on “Der gelbe Klang,” as also Janet Tassel, “Staging a Kandinsky dream,” *NY Times* (Feb. 7, 1982) D4; Ferruccio Busoni, *Selected Letters*, ed. and tr. Anthony Beaumont (L: Faber and Faber, 1987) 389, and cf. 229 (to Leichtentritt, 1916: “I cannot agree with your concept of ‘wrong’ notes. . . . It is just as impossible for sounds to be ‘wrong’ in music as it is for stones, plants, or formations in a forest”); Bryan R. Simms, *The Atonal Music of Arnold Schoenberg, 1908–1923* (Oxford U, 2000) 89–99; Alexander Carpenter, “Schoenberg’s *Erwartung* and Freudian case histories,” *Discourses in Music* 3 (Winter 2001–2002) at www.discourses.ca/v3n2a1.htm. For musicological takes: Richard Cohn, “Uncanny resemblances: tonal signification in the Freudian Age,” *J Amer Musicological Soc* 72,2 (2004) 285–323; Ruth HaCohen, “Between noise and harmony: the oratorical moment in the musical entanglements of Jews and Christians,” *Critical Inquiry* 32 (Winter 2006) 250–77. For more on Breuer’s treatment and Freud’s analysis of Bertha Pappenheim: Mikkel Borch-Jacobsen,

Remembering Anna O.: A Century of Mystification, trs. K. Olson et al. (NY: Routledge, 1996).

26. Dennis B. Klein, “Freud’s little secret: birthday musings on ‘The Master’ at 150,” *Yale R* 95 (July 2007) 64–72; Nandor Fodor, “Jung, Freud, and a newly discovered letter of 1909 on the poltergeist theme,” *Psychoanalytic R* 50,2 (1963) 119–28; Carl Jung, *Memories, Dreams, Reflections*, ed. Aniela Jaffé, trs. R. Winston and C. Winston (NY: Vintage, 1973) 155, 158, 361–62; Sigmund Freud, *The Interpretation of Dreams*, tr. A. A. Brill (NY, 1950 [1900]) 29.

27. Jacqueline Rose, “Freud in the ‘Tropics,’” *H Workshop J* 47 (1999) 49–63, q. 50 for “phantom of psychoanalysis”; Joy Damousi, *Freud in the Antipodes: A Cultural History of Psychoanalysis in Australia* (U New South Wales, 2005); C. G. Jung, *Psychology of the Unconscious*, tr. Beatrice M. Hinkle (NY, 1916 [1912]) 167–68, and 181, where, after discussing Sanskrit etymologies related to sound and noise, Jung concludes that “Just as in archaic speech, fire and the speech sounds (the mating call, music) appear as forms of emanation of the libido, thus light and sound entering the psyche become one: libido.” Madelon Sprengnether claims that Freud’s reading of the drafts of Jung’s book convinced him of their irreconcilable differences and led him to shape *Totem and Taboo* as a rebuttal of and rebuff to Jung: *The Spectral Mother: Freud, Feminism, and Psychoanalysis* (Cornell U, 1990) 87–88. The split had been anticipated by Freud and Jung’s diametrically different experiences of and attitudes toward America—and its noises: Deirdre Bair, *Jung: A Biography* (NY: Back Bay, 2003) 158–70.

28. Freud, *Totem and Taboo*, q. 1, q. 66; Celia Brickman, *Aboriginal Populations in the Mind: Race and Primitivity in Psychoanalysis* (Columbia U, 2003) 46, 51–89. A musical journalist and composer would argue in 1921 against the common prewar prejudice that savages were by nature noisy: “the savage makes a noise only when required by a definite purpose, to overawe an enemy or at certain ceremonies and festivals. . . . Otherwise, the savage is quiet, even taciturn, and regards noisiness as incompatible with his manly dignity”: Constantin von Sternberg, “Noise, the disease of the century,” *The Étude* 39 (July 1921) 437–38.

29. Freud, *Totem and Taboo*, 38n., 78 n.2. I use “man” here advisedly: Freud’s story of originary violence was strictly gendered, with men as actors, women as objects of desire or exchange: Sprengnether, *The Spectral Mother*; Brickman, *Aboriginal Populations in the Mind*, 102–14; Juliet Mitchell, *Psychoanalysis and Feminism* (NY: Vintage, 1974) pt. I. For a set of major critiques of the psychoanalytic enterprise: Frederick C. Crews, ed., *Unauthorized Freud: Doubters Confront a Legend* (NY: Viking, 1998).

30. Freud, *Totem and Taboo*, 29–30, 56; Virginia L. Blum, “Ladies and gentlemen: train rides and other Oedipal stories,” in *Places Through the Body*, eds. H. J. Nast and S. Pile (L: Routledge, 1998) 270–73; Sigmund Freud, “Analysis of a phobia in a five-year-old boy,” in *Collected Papers*, tr. Joan Riviere (L, 1950) II,192, 196—an analysis conducted primarily through correspondence with the music critic and Freud adherent Max Grad, father of Herbert (i.e., Little Hans); Jennifer Stuart, “Little Hans and Freud’s self-analysis: a biographical view of clinical theory in the making,” *J Amer Psychoanalytic Assoc* 55,3 (2007) 799–817, and, more critically, Joseph Wolpe and Stanley Bachman, “Psychoanalytic evidence: a critique based on Freud’s case of Little Hans,” in *Critical Essays on Psychoanalysis*,

ed. Bachman (NY: Macmillan, 1963) 198–220; Sandor Ferenczi, “Introjection and transference” (1909) in his *Sex in Psychoanalysis*, tr. Ernest Jones (NY, 1950) 50–51, and “On obscene words” (1911), 132–53; Gilles Deleuze and Félix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia*, trs. R. Hurley et al. (U Minnesota, 1983) 56–61, 117; C. Barry Chabot, *Freud on Schreber: Psychoanalytic Theory and the Critical Act* (U Massachusetts, 1982), esp. ch. 2. Cf. René Girard, *Violence and the Sacred*, tr. Patrick Gregory (Johns Hopkins U, 1977). Herbert Graf went on to write a thesis about Richard Wagner and become a stage designer for the Metropolitan Opera in New York.

31. Sigmund Freud, “The antithetical sense of primal words. A review of a pamphlet by Karl Abel, *Über den Gegensinn der Urworte*, 1884,” in *Collected Papers*, IV, 184–91, and cited in *Totem and Taboo*, 67 and n.1; Gay, *Freud*, 324–25, q. 324. The ruckus example is mine; Abel offered some weak German examples.

32. Sigmund Freud, tr. E. Colburn Mayne, “Thoughts for the times on war and death” (early 1915) in *Collected Papers*, IV, 288–317, q. 292–93. Freud would have known by then that Ernst Lanzer, the Rat Man, had been taken prisoner (Nov. 21, 1914) but not of his death four days later, confirmed only in 1919: Mahony, *Freud and the Rat Man*, 17, and cf. the critical take on Freud’s work with the Rat Man by Frank J. Sulloway, “Reassessing Freud’s case histories: the social construction of psychoanalysis,” *Isis* 82 (June 1991) 245–75. On Freud’s elation during the first days of the war and his growing skepticism by December: Peter Loewenberg, *Sigmund Freud and His Impact on the Modern World* (NY: Routledge, 2001) 120–21.

33. Freud, *Totem and Taboo*, 93; idem, “Thoughts,” q. 293–94, q. 295, q. 300, q. 301; Karl Abraham, “The ear and auditory passage as erotogenic zones,” *Selected Papers*, trs. D. Dryan and A. Strachey (L, 1948) 244–47. Liran Razinsky provides an incisive analysis of Freud’s logical quandaries about death and war: “A psychoanalytic struggle with the concept of death: a new reading of Freud’s ‘Thoughts for the times on war and death,’” *Psychoanalytic R* 94 (2007) 355–87.

34. Freud, “Thoughts,” q. 303. *Per contra*, James Bourne has argued that the “culture of impassivity and mutual solidarity developed in response to the boredom, discomfort and subordination of peacetime industrial life” actually helped sustain British working men in the trenches: “The British working man in arms,” in *Facing Armageddon: The First World War Experience*, eds. H. Cecil and P. H. Liddle (L: Cooper, 1996) 342–50, quoted by Alexander Watson, *Enduring the Great War: Combat Morale and Collapse in the German and British Armies, 1914–1918* (Camb U, 2009) q. 4, and elaborated on, 66–72, 100–107.

35. Charles S. Myers, “A contribution to the study of shell shock,” *Lancet* (Feb. 13, 1915) 316–20; idem, “Contributions to the study of shell shock. II, Being an account of certain cases treated by hypnosis,” *ibid.* (Jan. 8, 1916) 65–69; idem, “Contributions to the study of shell shock [III], Being an account of certain disorders of cutaneous sensibility,” *ibid.* (March 18, 1916) 608–13; idem, “A final contribution to the study of shell shock: Being a consideration of unsettled points needing investigation,” *ibid.* (Jan. 11, 1919) 51–54; idem, *Shell Shock in France, 1914–1918, Based on a War Diary* (Camb, 1940); idem, entry in *A History of Psychology in Autobiography*, III, 223–24. According to Ritchie, “One History of ‘Shellshock,’” 33 n.18, Lt.-Col. Frederick W. Mott (author of *War Neuroses and Shell-Shock*

[1919]) in late 1914 may have been the first to use the phrase, and although he too continued to use the term, he soon abandoned a physicalist explanation, as in his “Mental hygiene in shell shock during and after the war,” *J Mental Sci* 63 (1917) 467–88.

36. Ben Shephard, *A War of Nerves: Soldiers and Psychiatrists in the Twentieth Century* (Harvard U, 2001) 58 for Johnson. Peter Barham emphasizes the civilian support for, and influence on, diagnoses of shellshock, a term that spread quickly among enlisted men, if indeed it did not originate with them: *Forgotten Lunatics of the Great War* (Yale U, 2004) esp. 4–6, 17–19. Cf. Ted Bogacz, “War neurosis and cultural change in England, 1914–22: the work of the War Office Committee of Enquiry into ‘Shell-shock,’” *J Contemporary H* 24,2 (1989) 234 on lay uses of the term.

37. Eric Leed, *No Man’s Land: Combat & Identity in World War I* (Camb U, 1979) esp. 20 on “a landscape saturated with invisible men”; John Keegan, “The Somme. July 1st, 1916,” in his *The Face of Battle* (NY: Viking, 1976) 204–68, machine guns; Mary Borden, *The Forbidden Zone* (1929), quoted by Noshean Khan, *Women’s Poetry of the First World War* (NY: Harvester, 1988) 120–21; Hans Binneveld, *From Shellshock to Combat Stress: A Comparative History of Military Psychiatry*, tr. John O’Kane (Amsterdam U, 1997), 28 for rates of fire, q. 33 from Richard Holmes, *Firing Line* (Suffolk, 1985) 186–87 for British officer; Joe H. Kirchberger, *The First World War: An Eyewitness History* (NY: Facts on File, 1992) 63; Mary Jacobus, “Palinurus and the tank: Bion’s war,” in her *The Poetics of Psychoanalysis in the Wake of Klein* (Oxford U, 2005) 173–99, q. 178; Groupe de poilus, *Au bruit du canon; contes véridiques* (P, 1916) 15; John H. Morrow, Jr., *The Great War: An Imperial History* (L: Routledge, 2005) 80, 130 for helmets, 120–21 for weapons, 192–93 for strafing; Sven Lindqvist, *A History of Bombing*, tr. Linda H. Rugg (NY: New Press, 2001) sects. 54–96; Edmund Blunden, *Undertones of War* (Oxford U, 1956 [1928]) 72–73, and 16 on the sound of the Very flare.

38. Melvin A. Hall, *Bird of Time* (NY, 1949) 108; Leed, *No Man’s Land*, 99 for Third Battle; John Ellis, *Eye-Deep in Hell: Trench Warfare in World War I* (L: Croom Helm, 1976) 63 for bricks; Amos N. Wilder, *Armageddon Revisited: A World War I Journal* (Yale U, 1994) 46, 101; Erich Remarque [born Remark], *All Quiet on the Western Front*, tr. A. Wheen (B, 1929) 53, 58, q. 62, and Margot Norris, *Writing War in the Twentieth Century* (U Press of Virginia, 2000) ch. 4 on Remarque; www.historylearningsite.co.uk/horses_in_world_war_one.htm. For the Eastern Front: Catherine Merridale, “The collective mind: trauma and shell-shock in twentieth-century Russia,” *J Contemporary H* 35,1 (2000) 39–55. Apt here is Steven Connor’s talk, “Seeing sound: the display of Marsyas,” lecture at the U Nottingham (Oct. 16, 2002) online at www.bbk.ac.uk/english/skc/marsyas.

39. Leed, *No Man’s Land*, q. 126 Graves; Ernst Jünger, *The Storm of Steel: From the Diary of a German Storm-Troop Officer on the Western Front*, tr. Basil Creighton (NY: Fertig, 1975 [1929]) 92–110, put in context by David Midgley, “The ecstasy of battle: some German perspectives on warfare between Modernism and reaction,” in *The Violent Muse: Violence and the Artistic Imagination in Europe, 1910–1939* (Manchester U, 1994) 113–23, and by Helmut Lethen, “Geräusche jenseits des Textarchivs: Ernst Jünger und die Umgehung des Traumas,” in *Hörsturze*, eds. Nicola Gess et al. (Würzburg: Königshausen und Neumann, 2005) 33–52; Glenn Watkins, *Proof Through the Night: Music and the Great War* (UC, 2003) 50–51

for Owen's "Dulce et Decorum Est," and cf. Daniel W. Hipp, *The Poetry of Shell Shock: Wartime Trauma and Healing in Wilfred Owen, Ivor Gurney, and Siegfried Sassoon* (Jefferson: McFarland, 2005); John Collie, *L Times* (Dec. 28, 1916) 3 on the "war-shaken," cited by Ritchie, "One History of 'Shellshock,'" 216; Stéphane Audoin-Rouzeau, *Men at War 1914–1918*, tr. Helen McPhail (Oxford: Berg, 1992) 40–41 from French newspapers printed near the Front; Ellis, *Eye-Deep in Hell*, 58, maggots, and cf. Watson, *Enduring the Great War*, 19, complaint about the noise of lice keeping the men awake. For more on Graves and "civilian incomprehension": Paul Fussell, *The Great War and Modern Memory* (Oxford U, 1975) 87–90, 169ff. For lingering connections between neurasthenia and shellshock, and the "nervousness" of lance-corporal Adolf Hitler in the Artois under "extremely hard artillery fire from eight in the morning till five in the afternoon": Joachim Radkau, "The neurasthenic experience in Imperial Germany: expeditions into patient records and side-looks upon general history," in *The Cultures of Neurasthenia from Beard to the First World War*, eds. M. Gijswijt-Hofstra and Roy Porter (Amsterdam: Rodopi, 2001) 199–217, at 213.

40. Joanna Bourke, *Dismembering the Male: Men's Bodies, Britain, and the Great War* (U Chicago, 1996) 169 Thorne; Amy G. Grant, *Letters from Armageddon* (B, 1930) 112–13 on the "crump"; Jacques d'Arnoux, *Paroles d'un revenant* (P, 1925), cited and discussed in John Terraine, *White Heat: The New Warfare, 1914–18* (L: Sedgwick and Jackson, 1982) 206 on listening; Walter B. Cannon Manuscripts, Box 136, f. 1923, Memoranda, Aug. 12, 1918, "The Warming of Shocked Men" and Aug. 20, 1918, "Treatment of Selected Shock Cases," f. 1937, "A Basis for Discussion of Traumatic Shock," and Box 165, bound volume, "Letters Home from France and England, 1917–18," q. 24, q. 52, q. 56, 61, 63, 64, 65 on "aeroplane bombs," q. 82, q. 86, q. 88, q. 115, in Harvard Medical Library Collection, Center for the History of Medicine, Francis A. Countway Medical Library, Harvard U, and cf. Walter B. Cannon, *The Way of An Investigator* (NY: Hafner, 1965 [1945]) 140, 144. For newer diagnosis: Onno van der Hart et al., "Somatoform dissociation in traumatized World War I combat soldiers: a neglected clinical heritage," *J Trauma and Dissociation* 1,4 (2000) 33–66. For lay understanding: Marty Tookey, "Blasts leave U.S. troops scarred by brain injury," *Austin American-Statesman* (Sept. 16, 2007) A1, A6–7. Recent research suggests that the "what" and "where" of sound are differently processed by the brain, a finding that helps explain the sonic disorientation of those traumatized by shell blasts: Stephen G. Lomber and Shveta Malhotra, "Double dissociation of 'what' and 'where' processing in the auditory cortex," *Nature Neurosci* 11 (2008) 609–16. The men in the 12,000 miles of shallow, crumbling Allied trenches shored up with corrugated iron would have been listening harder, and hearing more, than the men in the 13,000 miles of usually deep, solid, and cavernous German trenches. For more on "The Troglodyte World" of the war: Fussell, *The Great War and Modern Memory*, ch. 2; David L. Pike, *Metropolis on the Styx: The Underworlds of Modern Urban Culture, 1800–2001* (Cornell U, 2007) esp. 31–34, 286–97.

41. Martha Hanna, *Your Death Would Be Mine: Paul and Marie Pireaud in the Great War* (Harvard U, 2006) 105; Morrow, *The Great War*, 125, 129; J. S. Fraser and Capt. John Fraser, "The morbid anatomy of war injuries of the ear," *Proc Royal Soc of Med* 10,3 (1916) 101, Case 58; Leese, *Shell Shock* (→ n.24) 25; Dugald C. Jackson, Papers, World War I Personal Correspondence, Box 6, f. 425, letter of Oct. 24, 1918, in Institute Archives and Special

Collections, MIT; Alan Judd, *Ford Madox Ford* (L: Collins, 1990) 290, 292, 295. Gassed during the war, Ford thereafter always spoke “with many hr-r-r-rumphs and clearings of the throat”: George Antheil, *Bad Boy of Music* (Garden City, 1945) 146.

42. Robert B. Marchiò, “The vortex in the machine: Futurism in England,” in *International Futurism in Arts and Literature*, ed. Günter Berghaus (Berlin: Walter de Gruyter, 2000) 100–21; Antje Pfannkuchen, “The Unseen Universe of art: vortex motion in the ether,” at www.newvortex.de/vortexEnglishSum.pdf (June 2004); “Long Live the Vortex!” *Blast: Review of the Great English Vortex 1* (1914) 7; Ezra Pound, “Vortex,” *ibid.*, 153–54; Ford Madox Hueffer, “The Saddest Story,” *ibid.*, 87–97, q. 88; Lewis, “Our Vortex,” *ibid.*, 147; [Henri] Gaudier-Brzeska, “Vortex,” *ibid.* 2 (1915) 33; Rebecca West, *The Return of the Soldier*, ed. Samuel Hynes (L: Penguin, 1998 [1918]) vii–ix; Geoffrey Wagner, “Wyndham Lewis and the Vorticist aesthetic,” *J Aesthetics and Art Criticism* 13 (Sept. 1954) 1–17, q. 5 from Lewis in 1922; Lewis, *Blasting & Bombardiering*, 2nd ed. (L: Calder & Boyars, 1967 [1937]) q. 33, and pt. III, “A Gunner’s Tale”; Michael J. K. Walsh, “‘The eminent English Futurist’: C. R. W. Nevinson and English Futurism in peace and war,” in Jonathan Black et al., *Blasting the Future! Vorticism in Britain 1910–1920* (L: Philip Wilson, 2004) 18–27 at 25 and fig. 6; Samuel Hynes, *A War Imagined: The First World War and English Culture* (L: Bodley Head, 1990) 8–10, 63–67, 71–72; Luigi Russolo, *L’Arte dei Rumori* (1916) printed in its entirety in G. F. Maffina, *Luigi Russolo e l’Arte dei Rumori con tutti gli scritti musicali* (Torino: Martano, 1978) 129–76, q. 132 from a letter from Marinetti on Adrianopolis, part of a widely performed piece; F. T. Marinetti, “Déclamation d’un poème de guerre et tango voluptueux” (London, 1913) in *Le Théâtre futuriste italien et russe*, comps. Giovanni Lista and Claude Minot (Lausanne: La Cité, 1976) I, 162; Richard Cork, *Vorticism and Abstract Art in the First Machine Age* (L: Fraser, 1976) I, ch. 9, q. 224–25 on the concert and spirals; Watkins, *Proof Through the Night*, q. 86, Debussy. As for the acoustical physics of a vortex: M. S. Howe, *Theory of Vortex Sound* (Camb U, 2003).

43. Stephen Gaukroger, *Descartes: An Intellectual Biography* (Oxford: Clarendon, 1995) esp. 67–79; *idem*, *Descartes’ System of Natural Philosophy* (Camb U, 2002) 15, 125, 145–60; Peter Dear, “Circular argument: Descartes’ vortices and their crafting as explanations of gravity,” in *The Science of Nature in the Seventeenth Century*, eds. J. A. Schuster and P. R. Anstey (Dordrecht: Springer, 2005) 81–98; Kate van Orden, “Descartes on musical training and the body,” in *Music, Sensation, and Sensuality*, ed. Linda P. Austern (NY: Routledge, 2002) 17–38. Veit Erlmann, *Reason and Resonance: A History of Modern Auralities* (NY: Zone, 2010) 29–68 follows Descartes in his dilemma (p. 37) “of stabilizing truth by soundproofing thought while simultaneously taking for granted the percussive nature of self-reflection.”

44. Gaukroger, *Descartes*, 106–11; John R. Cole, *The Olympian Dreams and Youthful Rebellion of René Descartes* (U Illinois, 1992); Lewis S. Feuer, “The dreams of Descartes,” *The American Imago* 20 (1963) 3–26; Sigmund Freud, “Some dreams of Descartes,” in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, ed. and tr. James Strachey et al. (L, 1961) XXI, 203–204; Susan Bordo, *The Flight to Objectivity* (SUNY Albany, 1987) 4–5; Michael Keevak, “Descartes’s dreams and their address for philosophy,” *J H Ideas* 53,3 (1992) 373–96. The source for the dreams is Adrien Baillet, *La Vie de*

Monsieur Descartes (1691), conveniently reproduced in Cole, 52–58. On the poet Ausonius and his own distaste for noise: Finley Hooper and Matthew Schwartz, *Roman Letters: History from a Personal Point of View* (Wayne State U, 1991) 165–66, weary of crowds and brawls, and “No use to steal into the inner chamber and the recesses of your home: the cries penetrate through the house.”

45. For Descartes: *Discourse on the Method; and, Meditations on First Philosophy*, ed. David Weissman, trs. E. S. Haldane and G. R. T. Ross (Yale U, 1996) Meditation Six, p. 99; Grant Duncan, “Mind-body dualism and the biopsychosocial model of pain. What did Descartes really say?” *J Med and Phil* 25,4 (2000) 485–513; Peter Harrison, “Descartes on animals,” *Phil Q* 42 (1992) 219–27; Myers, “Naturalism and idealism” (→n.18); William McDougall, *Body and Mind: A History and a Defense of Animism* (L, 1911) esp. ch. 21 on “The Unity of Consciousness.” On the war: Ellis, *Eye-Deep in Hell*, 24–25, q. 65 Canadian private, Verdun, and q. 168 from “The Assault,” a poem by Robert Nichols on stumbling through no-man’s land; Paul F. Lerner, *Hysterical Men: War, Psychiatry, and the Politics of Trauma in Germany, 1890–1933* (Cornell U, 2003) q. 40 Kaiser, 54–55, 88–91, 102–11, 118, 120, 150–51; Andreas Killen, *Berlin Electropolis: Shock, Nerves, and German Modernity* (UC, 2006) 127–61.

46. Sandor Ferenczi, “Two types of war neuroses” (1916–1917), in his *Further Contributions to the Theory and Technique of Psycho-Analysis*, comp. John Rickman, trs. Jane I. Suttle et al. (NY: Basic, 1952) II, 124–41, q. 140. Before the war, Karl Abraham had observed that neurotic patients sometimes fixated upon their ears and used ear-cleaning as a surrogate for sexual activity; through the frequent insertion of fingers or other objects into the ear, they had found a fantastic pleasure but provoked eczema and tinnitus. Following this logic, increasingly fearful—and sex-starved—soldiers in the trenches may have experienced the noise of bombardment as, effectively, rape. Consider Karl Abraham, “The ear and auditory passages as erotogenic zones” (1913) in *Selected Papers*, trs. D. Bryan and A. Strachey (L, 1948) 244–47.

47. Lord Southborough et al., *Report of the War Office Committee of Enquiry into “Shell Shock”* (L, 1922) q. 9 Fortescue; Ellis, *Eye-Deep in Hell*, 63, 75; Barham, *Forgotten Lunatics* (→n.36) q. 16 medical officer, 233–37 for context of Southborough Report, which essentially repudiated the diagnosis of shell-shock; Bogacz, “War neurosis and cultural change in England” (→n.36) q. 234; T. B. Jobson, “Normal gun-deafness,” *Lancet* 2 (Oct. 13, 1917) 516; A. F. Hurst and E. A. Peters, “The pathology, diagnosis, and treatment of absolute hysterical deafness in soldiers,” *Lancet* (Oct. 6, 1917) 517–19; F. J. Salmon, “The voice of the guns,” *Cornhill Mag* 114 (Oct. 1916) 463–68. On shells and shrapnel: Hew Strachan, *The First World War. I. To Arms* (Oxford U, 2001) 1000–1003, 1057 pass. For a more recent rethinking of the otology and etiology of gun-deafness: Friedrich Pfander et al., *Das Knalltrauma* (Berlin: Springer, 1975).

48. “Urban Club holds birthday luncheon,” unsourced newsclip (April 1916), in Urban Club of Brooklyn, Records 1914–1956, Press Notes 1914–1926, Brooklyn Historical Soc, Brooklyn, NY; “Tenth Cavalry Roster,” http://people.coax.net/lwf/10th_saw.htm Hamilton; Joel Tarr, *The Search for the Ultimate Sin: Urban Pollution in Historical Perspective* (U Akron, 1996) 327, horses; Esther Nelson Behr, letter of Jan. 5/6, 1918 on “a most

complete system of trenches constructed here for training,” in her Papers, Correspondence, f. 2, Operational Archives, Naval Historical Center, DC; Bourne, *Dismembering the Male*, ch. 4 on drill; Mark E. Grotelueschen, *The AEF Way of Way: The American Army and Combat in World War I* (Camb U, 2007) 76, 113n., 350n.; Leese, *Shell Shock* (→n.24) 30; Elting E. Morrison, “Gunfire at sea,” *Men, Machines, and Modern Times* (MIT, 1966) 19–21; Joseph A. Guthrie, “Discordant sounds a menace to nerves,” *JAMA* 11 (Nov. 12, 1898) 1143–44; idem, “The unhealthfulness of noise,” *NY Med J and Phila Med J* (July 9, 1904) 60–62; G. B. Triple and S. S. Watkins, “Ear protection,” *U.S. Naval Med Bull* 13 (1919) 48–60, 49 for mustard gas, as also L. F. Haber, *The Poisonous Cloud: Chemical Warfare in the First World War* (Oxford U, 1986) 64, 119, 186, 189, 192; “Ear protector for gunners,” *Sci Amer* 107 (Oct. 19, 1912) 332; Jonson Horne, “Gun deafness and its prevention,” *Lancet* (Aug. 15, 1914) 464–64 on open mouth and dirty plugs; H. Bourgeois and M. Sourdille, *War Otitis and War Deafness*, tr. J. Dundas Grant (L, 1918) 106 on antiphones and cotton wool; T. Jefferson Faulder, “Injuries to the ear in modern warfare,” *JLO* 36 (1921) 279–80, plugs not used; William Yorke Stevenson, *At the Front in a Flivver* (B, 1917) 120. Also quoted, from Brigham Young U Lib’s WWI Document Archive, <http://net.lib.byu.edu/~rdh7/wwi/>; Edward Streeter, *Dere Mable: Love Letters of a Rookie* (NY, 1918) on gas machines; *A German Deserter’s War Experience*, tr. J. Koettgen (NY, 1917) on shouting; Frederick A. Pottle, *Stretchers: The Story of a Hospital Unit on the Western Front* (Yale U, 1929) ch. 5 on Belleau Woods. On lack of preparation both for the noise of war and the treatment of war neuroses: Martin Stone, “Shellshock and the psychologists,” in *The Anatomy of Madness*, eds. R. Porter and M. Shepherd (L: Tavistock, 1985) II, 242–71. Terraine (*White Heat*, 148) claims that this was the “only war fought without voice control,” for the noise overwhelmed megaphones, telephone lines were blasted, and commanders had little communication with men in planes or tanks (the loudest of environments). However, naval radio was in place, and field radios with ranges of five miles were used at command posts, on some airplanes, and in trenches: Frank Thomas, “Das Telefon während des Ersten Weltkriegs,” *Hessische Blätter für Volks- und Kulturforschung* n.s. 24 (1989) 91–104; Linwood S. Howeth, *History of Communications: Electronics in the United States Navy* (DC: Bureau of Ships and Office of Naval History, 1963) xii–xiv, 299–303; A. P. Corcoran, “Wireless in the trenches,” *Pop Sci Mo* (May 1917) 795–99; H. J. B. Ward, “Wireless waves in the world’s war,” *Yearbook of Wireless Telegraphy and Telephony* (1916) 625–44, these last two reproduced by Thomas H. White, “United States Early Radio History. 13. Radio during World War One,” online at <http://earlyradiohistory.us/seco13.htm>.

49. John E. Talbott, “Soldiers, psychiatrists, and combat trauma,” *J Interdisciplinary H* 27 (1997) 437–54 on reenactment; Smith, *The Embattled Self* (→n.13) 62, 71, 75, q. 76 Dubrulle, q. 79 Léger, 87, 98; Bourke, *Dismembering the Male*, 31–75; Seth Koven, “Remembering and dismemberment: crippled children, wounded soldiers, and the Great War in Great Britain,” *Amer H R* 99 (Oct. 1994) 1167–1202; Caroline Cox, “‘Invisible wounds’: the American Legion, shell-shocked veterans, and mental illness, 1919–1924,” in *Traumatic Pasts*, eds. Micale and Lerner (→n.13) 280–306; Shephard, *A War on Nerves* (→n.36) esp. 110–11, 143, 161; Bogacz, “War neurosis and cultural change” (→n.36); Leese, *Shell Shock* (→n.24) 9–10, 141, 152, 157 on numbers and continuation of “war

neuroses”; Watson, *Enduring the Great War* (→ n.34) 103, on numbers, as also Adrian Gregory, *The Last Great War: British Society and the First World War* (Camb U, 2008) 249–76; Jason Crouthamel, *The Great War and German Memory: Society, Politics, and Psychological Trauma, 1914–1945* (U Exeter, 2009) on parallel repercussions in Germany; “Friends of the Shell-Shocked,” *L Times* (March 1, 1920) 11; Lucian Johnston, “On living twice,” *Catholic World* 131 (June 1930) 257–66, q. 257, q. 259; Millais Culpin, “Noise and hearing—studied from the psychological aspect,” *Nineteenth Century and After* 105 (Aug. 1929) 512–22, q. 519 on projectile; Virginia Woolf, *Mrs. Dalloway*, ed. David Bradshaw (Oxford U, 2000 [1925]) xv–xviii, 83, q. 119; Melba Cuddy-Keane, “Virginia Woolf, sound technologies, and the new aurality,” in *Virginia Woolf in the Age of Mechanical Reproduction*, ed. Pamela L. Caughie (NY: Garland, 2000) 69–96 on “a new apprehension of sound” in *Mrs. Dalloway*, as also Kate Flint, “Virginia Woolf and modern noise,” in *Literature, Science, Psychoanalysis, 1830–1970*, eds. H. Small and T. Tate (Oxford U, 2003) 181–94; Evadne Price (Helen Zenna Smith), *Not So Quiet* (L: Virago, 1988 [1930]) 30, 34–35. The flu pandemic of 1918–20 brought with it ototoxic meningitis, which left many survivors deaf or hard of hearing: Pete Davies, *The Devil’s Flu: The World’s Deadliest Influenza Epidemic and the Scientific Hunt for the Virus that Caused It* (NY: Holt, 2000); Dan McKenzie, “Epidemic cerebro-spinal meningitis from the otolaryngological viewpoint,” *JLO* 37,8 (1922) 401–14. Data from the war in Iraq (2002–2010) suggest that concussions (from roadside bombs and mines) can indeed have neurophysiological effects on the brain: Caroline Alexander, “The shock of war,” *Smithsonian Mag* (Sept. 2000) at www.smithsonianmag.com/history-archaeology/The-Shock-of-War.

50. My main source here is Bourgeois and Sourdille, *War Otitis and War Deafness* (→ n.48) but I also use Fraser and Fraser, “The morbid anatomy of war injuries of the ear” (→ n.41) q. 57 on shells and noise, q. 119 Lt. Col. Goldsmith on battalions; Dundas Grant, “The organs of hearing in relation to war,” *Proc Royal Inst of Great Britain* 22 (1919) 91–99; Lionel Colledge, “Injuries to the ear in modern warfare,” *JLO* 36 (1921) 283–87; Hanau Wolf Loeb, *Military Surgery of the Ear Nose and Throat. Medical War Manual No. 8* (Phila, 1918) 17 on mastoid injuries; Stacy R. Guild, “War deafness and its prevention,” *J Laboratory and Clinical Med* 4 (1919) 153–80, 157–58 on organ of Corti; Grant, *Letters from Armageddon*, 112, Canadian; Oliver Lyttleton, Viscount Chandos, *Memoirs of Lord Chandos* (L: Bodley Head, 1962) 31–112, q. 42, salvos. On shellshock among medical personnel: Margaret R. Higonnet, “Authenticity and art in trauma narratives of World War I,” *Modernism/Modernity* 9,1 (2002) 91–107. On the metal helmets, designed to withstand shell fragments the size of a cherry pit, the cause of most brain injuries: Ludwig Baer, *The History of the German Steel Helmet, 1916–1945*, tr. K. Daniel Dahl (San Jose: Bender, 1985) 7–43; http://en.wikipedia.org/wiki/Brodie_helmet. There was debate on whether deafness was being feigned, but front-line medics could do little for the residual tinnitus of soldiers, and almost nothing for the toxic effects of poison gas on the inner lining of the ears. The long-term ototoxicity of poison gas, first studied in the 1920s, is still being investigated: H. L. Gilchrist, “The after effects of warfare gases,” *Medico-Military R* 5 (Oct. 1, 1927) 76–77; H. L. Gilchrist and Philip B. Matz, *The Residual Effects of Warfare Gases* (DC, 1933); H. Marshall Taylor, “Deafness from drugs and chemical poisons,” *Medicine of the Ear*, ed. E. P.

Fowler, Jr. (NY, 1939) 339-48, including phosphenes; Constance H. Pechura and David P. Rall, eds., *Veterans at Risk: The Health Effects of Mustard Gas and Lewisite* (DC: National Acad Press, 1993); Jack C. Dacre and Max Goldman, "Toxicology and pharmacology of the chemical warfare agent sulfur mustard," *Pharmacological R* 48,2 (1996) 289-326; M. J. Geraci, "Mustard gas: imminent danger or eminent threat?" *Annals of Pharmacotherapy* 42 (Feb. 2008) 237-46.

51. Oliver J. Lodge, *Raymond; or, Life and Death* (NY, 1916) 20, q. 21, 24, q. 50, 51, 59, 98, 100, 195, 249. Cf. Anthony Enns, "Psychic radio: sound technologies, ether bodies, and spiritual vibration," *The Senses & Society* 3 (July 2008) 137-52.

52. Juliet Nicolson, *The Great Silence: Britain from the Shadow of the First World War to the Dawn of the Jazz Age* (NY: Grove, 2009) 8, 42 for the tin masks and their "metallic ping"; Geoffrey Wolff, *Black Sun: The Brief Transit and Violent Eclipse of Harry Crosby* (NY: Random House, 1977) 31, q. 47, 54; T. Ritchie Rodger, "Noise deafness: a review of recent experimental work, and a clinical investigation into the effect of loud noise upon the labyrinth of boiler-makers," *JLO* 30 (1915) 91-105; idem, "The pathological effects of excessive sounds on the cochlear apparatus," *JLO* 38 (1923) 66-71, on research done during the war, following up on the work of his mentor, Thomas Barr, *Manual of Diseases of the Ear*, 2nd ed. (Glasgow, 1896); Florence H. Frankel, *Effect of Noise upon Hearing of Industrial Workers*, Spec. Bull. No. 166, Bureau of Women in Industry, New York Dept. of Labor (NY, 1930) 5, citing an article by Otto Glogau in *NY Med J* 101 (Mar. 27, 1915) 616; Women's Municipal League of Boston, Dept. of Sanitation and Health, Committee on Abatement of Noise, *Bulletin* 7 (April 1916) 24-26. On Kafka: Peter Maillous, *A Hesitation Before Birth: The Life of Franz Kafka* (U Delaware, 1989) esp. 125; Frederick R. Karl, *Franz Kafka: Representative Man* (NY: Ticknor and Fields, 1991) 394-96; Sander L. Gilman, *Franz Kafka: The Jewish Patient* (NY: Routledge, 1995); Martin Wasserman, "Changing minds, saving lives: Franz Kafka as a key industrial reformer," *East European Q* 35 (2001) 473-82. The manufacturers of Ohropax earplugs, still on the market, provide a chronology: www.ohropax.de/2-1-history.html.

53. Ellis, *Eye-Deep in Hell*, 63; Jessamine S. Whitney, Report from Special Agent, Dec. 9, 1915, "Eight Cases of Traumatism by Machine," Box 54, f. 6102.1 in Children's Bureau Records, NARA II, College Park, MD; Jay D. Coffman, *Raynaud's Phenomenon* (Oxford U, 1989) xi-xii, 90-94; Alice Hamilton, *Exploring the Dangerous Trades* (New England U Press, 1985 [1943]) ch. 12 on "Dead Fingers"; John Hargrave, *At Suvla Bay* (L, 1916) ch. 10; A.D. Waller, "The galvanometric measurement of 'emotive' physiological changes," *Proc Royal Soc of L: B* 90 (1918) 215-18; Reynold G. Spaeth, "The problem of fatigue," *J Ind Hygiene* 1 (1919) 22-53, 27-30 on adrenalin and psychogalvanism, as also E. Prideaux, "The psychogalvanic response: a review," *Brain* 43 (1920) 50-73; Henry J. Spooner, *Motors and Motoring* (NY, 1908) xi; idem, *Industrial Fatigue in Its Relation to Maximum Output* (L, 1917) 13; idem, *Wealth from Waste: Elimination of Waste a World Problem* (L, 1918) vi, 3, 51; idem, "The noise question," *Nineteenth Century and After* 104 (Sept. 1928) 302-11, his concern with noise sparked by his own "pathetic case of nervous breakdown while professionally engaged on industrial noise problems many years ago." For more: Richard Gillespie, "Industrial fatigue and the discipline of physiology," *Physiology in the American Context*,

1850–1940, ed. G. L. Geison (Bethesda: Amer Physiological Soc, 1987) 237–62.

54. James Dundas-Grant, “Obituary: Dr. Dan McKenzie,” *JLO* 51 (1936) 74–75; Editorial, “Noise-deafness and its prevention,” *JLO* 30 (1915) 89–91; Dan MacKenzie, *Guide to Diagnosis in Diseases of the Throat, Nose and Ear* (L, 1908); idem, *City of Din: A Tirade against Noise* (L, 1916) q. iv, q. 4, 25, q. 28, q. 31, q. 34, q. 35, 36, 42, 46 on Dr. Victor Delsaux and the soundproof chamber, 47, q. 52, 58, 62, 70, q. 78, , 86, 99, q. 102, 103–104, q. 105, and “Litany of Din” on last page; Jon Agar, “Bodies, machines, and noise,” *Bodies/Machines*, ed. Iwan Rhys Morus (Oxford: Berg, 2002) 197–220 at 200–202; Henry J. Spooner, “Health problems involved in noise and fatigue,” *Nation’s Health* 4 (1922) 91–95 on noise as pain, citing Henry Head, friend and colleague of Rivers, McDougall, and Myers.

For Julia Rice and family: “Rice hospital site to be in Tarrytown,” *NY Times* (April 23, 1916) 9; “From her sick bed plans new flights,” *ibid.* (Nov. 28, 1916) 24; “Mrs. P. Hal Sims, bridge star, dead,” *ibid.* (March 25, 1960) 27; “British war relief work,” *ibid.* (Jan. 8, 1917) 4; “Cercle Lafayette a unique canteen,” *ibid.* (Dec. 15, 1918); “Mrs. Peirce gets divorce,” *ibid.* (April 28, 1918) 10; William Gallagher, “Waldo Peirce and Ernest Hemingway, mirror images,” *Hemingway R* 23,1 (2003) 24–41; Robert F. Brown, “A new assessment,” in *Waldo Observed*, ed. Diane Emery (U Maine, 1984) 18–38, and listen to the wry letters Peirce wrote to his mother about his wedding and marriage to Dorothy Rice, and about Dorothy’s “umbilicus of a mother,” Julia, in Boxes 2, 20, and 27 of the Waldo Peirce Papers, 1889–1985, Division of Manuscripts, Lib of Congress, DC. A captioned photo of the *Isaac L. Rice* appears at www.history.navy.mil/photos/sh-civil/civsh-i/i-l-rice.htm.

55. McKenzie, *City of Din*, q. 86, 91, and “Litany of Din”; idem, “The clinical value of the labyrinthine nystagmus test,” *JLO* 24 (1909) 646–64; idem, “Discussion on labyrinth deafness,” *British Med J* (Nov. 10, 1923) 867–72; idem, “The crusade against noise,” *English R* 47 (Dec. 1928) 691–96, q. 692 on signalman; idem, “Noise and the Medical Research Council,” *JLO* 48 (1933) 110–13 on rigor in otological research, with rebuttal by F. C. Bartlett at 297–301; “Nature’s remedy against noise—will children be born deaf?” *L Telegraph* (undated clip from 1920s quoting McKenzie in Vertical File on “Noise,” Volta Bureau, DC); Guild, “War deafness and its prevention” (→n.50) 156, no injury to labyrinth; “War deafness,” *Lancet* 193 (1917) 576–77, with response by Arthur F. Hurst and E. A. Peters, 622; Loeb, *Military Surgery*, 31–33; Fraser and Fraser, “Morbid anatomy of war injuries of the ear” (→n.41) 60. Cf. D. J. Glibert, tr. S. A. Henry, “Influence of industrial noises,” *J Ind Hygiene* 3 (Jan. 1922) 264–75, a summary of what was known about noise and ear injury, prepared by the Chief Medical Inspector of Factories, Brussels, just as war broke out but published postwar with a preface claiming that since 1914 “nothing new appears to have been discovered, except that we have since learned of the idea that deafness following an explosion is usually temporary except when the auditory nerve is affected.” He reviews the effect of explosions on p. 266.

56. David Silbey, “Bodies and cultures collide: enlistment, the medical exam, and the British working class, 1914–1916,” *Social H of Med* 17,1 (2004) 61–76; R. E. Shuter, “Notes on war injuries of the ear,” *Med J Australia* (Sept. 29, 1917) 267–70; J. M. Winter, “Military fitness and civilian health: Britain during the First World War,” *J Contemporary H* 15 (1980) 211–44 at 220–22; U.S. War Dept., *Physical Examination for Entrance into the*

Army of the United States by Voluntary Enlistment or by Induction under the Selective Service Law (DC, 1918) 10–11 on ear tests and “tests for malingering in hearing”; Moe Bergman, “On the origins of audiology: American wartime military audiology,” *Audiology Today: Monograph No. 1* (Jan. 2002) 2.

57. Burton Alexander Randall Collection, Box 2, f. 10, “The detection of simulated deafness,” ca. 1898, Archives, John Q. Adams Center for the History of Otolaryngology—Head and Neck Surgery, Alexandria, Virginia; Sir John Collie, “[Comments],” *Lancet* (Aug. 15, 1914) 451–52, based on evaluating claims for injury under workmen’s compensation laws, summed up in his *Malingering and Feigned Sickness*, 2nd ed. (L, 1917); Phillip D. Kerrison, *Diseases of the Ear*, 2nd ed. (Phila, 1921) 74, 538–45 on “War Deafness.” On the wounded: Loeb, *Military Surgery*, q. 47 Wiltshire, as also Wiltshire’s “A contribution to the etiology of shell shock,” *Lancet* (June 17, 1916) 1207–12 at 1209, no shellshock in surgical wards “where are soldiers really struck by shells.” Prior to the war, public health officials worried as much about children, workers, and soldiers pretending to have *better* hearing than their diseased or damaged ears could manage, so as to avoid stigma or dismissal: Clarence J. Blake, *The Etiology of Acquired Deaf Mutism with Especial Reference to the Effects of Scarlet Fever* (B, 1870) 2; P. Stenger, “Simulation und Dissimulation von Ohr-Krankheiten und deren Feststellung,” *Deutsche medizinische Wochenschrift* 33,1 (1907) 970–73.

58. Ferdinand de Saussure, *Course in General Linguistics*, tr. Roy Harris, eds. C. Bally et al. (La Salle: Open Court, 1986 [posthumous, 1916]) 69; Jonathan Culler, *Ferdinand de Saussure*, rev. ed. (Cornell U, 1986) esp. 144–46; Jiří Krámský, *The Phoneme: Introduction to the History and Theories of a Concept* (Munich: Fink, 1974) 15–21; Jacques Derrida, *Glas*, trs. J.P. Leavey, Jr., and R. Rand (U Nebraska, 1986) 92–93 on Saussure; Daniel Heller-Roazen, *Echolalias: On the Forgetting of Language* (NY: Zone, 2008) 13–18 on exclamations; Lewis, *Blasting & Bombardiering*, 114, and cf. Fredric Jameson, *Fables of Aggression: Wyndham Lewis, the Modernist as Fascist* (UC, 1979) on the noisiness of his prose, which (p. 25, also 86) “blasts through the tissues of his novels like a steam whistle, breaking them to its will.”

59. Michael North, *Reading 1922: A Return to the Scene of the Modern* (Oxford U, 1999) 44; Ludwig Wittgenstein, *Letters to Russell, Keynes and Moore*, ed. G.H. von Wright (Oxford: Blackwell, 1974) 10 on Myers; idem, “The rejection of logical atomism,” in *The Wittgenstein Reader*, ed. Anthony Kenny (Oxford: Blackwell, 1994) 39; idem, *Remarks on the Philosophy of Psychology*, tr. G.E.M. Anscombe, eds. Anscombe and G.H. von Wright (Oxford: Blackwell, 1980) 1,139e–140e, no. 783; idem, *Notebooks 1914–1916*, tr. G.E.M. Anscombe, eds. G.H. von Wright and G.E.M. Anscombe (Oxford: Blackwell, 1961) 23e; Ray Monk, *Ludwig Wittgenstein: The Duty of Genius* (NY: Free Press, 1990) 112–66 on the war years, 118–19 for his use of military metaphors, 132 for nervous shock, 240 for auditory acuity; Béla Szabados, “Wittgenstein the musical,” *Æ: Canadian Aesthetics J* 10 (Autumn 2004), www.uqtr.quebec.ca/AE/Vol_10/wittgenstein/szabados.htm; Henry G. Anderson, *The Medical and Surgical Aspects of Aviation* (L, 1919) 33, q. 38, and cf. Isaac H. Jones, “The ear and aviation,” *JAMA* 69 (1917) 1607–1609 on requirements that pilots have acute hearing and a good sense of balance. Steven Connor, in “The Modern Auditory I,” in *Rewriting the Self: Histories from the Renaissance to the Present*, ed. Roy Porter (L: Routledge,

1997) 203–23, observes that air raids (p. 209) were “at once the reduction of sound to sight [for bombardiers]... and the epitomization of the disturbing self-sufficiency of sound in some kinds of modern experience [for victims on the ground].”

60. James Conant, “Varieties of scepticism,” in *Wittgenstein and Scepticism*, ed. Denis McManus (L: Routledge, 2004) 97–136, 101 on Descartes, which I closely paraphrase; M. R. M. Ter Hark, “The development of Wittgenstein’s views about the other minds problem,” *Synthese* 87,2 (1991) 227–53; Ludwig Wittgenstein, *Philosophical Occasions, 1912–1951*, eds. J. C. Klagge and A. Nordman (Indianapolis: Hackett, 1993) 52, 202; Sigmund Freud, “Preface” (to Sandor Ferenczi et al., *Psycho-Analysis and War Neuroses* [Vienna, 1919]), in *Collected Papers*, V, 83–87; idem, “The Uncanny,” in *Collected Papers*, IV, 368–407; idem, “Memorandum on the electrical treatment of war neurotics,” reproduced at Freud Museum, “Freud and the War Neuroses: Pat Barker’s ‘Regeneration,’” at www.freud.org.uk/warneuroses.html; Kurt R. Eissler, *Freud As an Expert Witness: The Discussion of War Neuroses between Freud and Wagner-Jauregg*, tr. Christine Trollope (Madison: Intl U Press, 1986), esp. 69–70 on boxing the ears and analogies to deafness; Sharon Romm, *The Unwelcome Intruder: Freud’s Struggle with Cancer* (NY: Praeger, 1983); Otto Rank, *The Double: A Psychoanalytic Study*, tr. and ed. Harry Tucker, Jr. (NY: New American Lib, 1979 [1925, wr. 1914]); Hillel Schwartz, *The Culture of the Copy* (NY: Zone/MIT, 1996) chs. 1–2. One must also take into account here, as so ably done by Laura Salisbury, the medico-cultural history of aphasia, in which Henry Head played a major role: “Sounds of silence: aphasiology and the subject of modernity,” in *Neurology and Modernity*, eds. L. Salisbury and A. Shail (NY: Palgrave, 2009) 204–30.

61. Lewis, *Blasting & Bombardiering*, 157 for the pill-box, as also Peter Oldham, *Pill Boxes on the Western Front* (L: Leo Cooper, 1995), esp. 28, 36, 41–42, 175 (on dying within a pill box due to heavy artillery pounding and concussions), 181–86; Otto Isakower, “On the exceptional position of the auditory lobe,” *Intl J Psycho-Analysis* 20 (1939) 340–48; Neil M. Cheshire, “The empire of the ear: Freud’s problem with music,” *ibid.* 77 (1996) 1127–68, an intriguing essay; Freud, *The Ego and the Id*, tr. James Strachey (NY: Norton, 1961 [1923]) 33, 36–37; John Forrester, *Language and the Origins of Psychoanalysis* (Columbia U, 1980) esp. 28–29. Cf. Jacques Derrida, “The voice that keeps silence,” in his *Speech and Phenomena and Other Essays on Husserl’s Theory of Signs*, tr. David B. Allison (Northwestern U, 1973) 70–87.

62. Myers, entry in *History of Psychology in Autobiography* (→ n.9); idem, “Individual differences in listening to music,” *The Effects of Music*, ed. Max Schoen (L, 1927) 10–37; idem, “The ethnological study of music,” in *Anthropological Essays Presented to Edward Burnett Tylor* (Oxford, 1907) 235–53, q. 239–40, offprint in John W. Layard Papers, General Correspondence, Box 10, f. 20, as also letter of Aug. 15, 1922 from Myers to Layard, in Mandeville Special Collections Lib, Geisel Lib, UC San Diego. For Myers on shellshock → n.35, esp. *Shell Shock in France*, q. 13, 28, q. 37, 41, 62, 69, 114, 120–21; Shephard, *A War of Nerves* (→ n.36) 21–27, 36–47. Rest and liquor were the chief prescriptions of the neurologist Gordon Holmes, who initially appointed Myers a specialist in “nerve shock” for the army: A. D. Macleod, “Shell shock, Gordon Holmes and the Great War,” *J Royal Soc Med* 97 (Feb. 2004) 86–89. For sinistrosis: Elmer F. Southard, *Shell-shock and Other*

Neuropsychiatric Problems (NY: Arno, 1973 [1919]) 311, but noting (p. 657) that “Functional disorders may simulate malingering”! On Seligman: Meyer Fortes, “Charles Gabriel Seligman,” *Man* 41 (Jan.–Feb. 1941) 1–11 at 4. I have not seen the papers of Brenda Zara Seligman and Charles Gabriel Seligman, Sections 10/1/1 “Shellshock case notes, 1917–18,” 10/1/2, “Shellshock reactions ca. 1914–20,” and 10/2/1, “Psychological notes, 1918,” at the British Lib of Political and Economic Science, London.

63. Myers, entry in *History of Psychology in Autobiography*, III, 224; idem, *Industrial Psychology* (NY: Arno, 1977 [1925]) 115; U.S. Naval Experimental Station, *Anti-Submarine Devices: Bulletin A* (New London, 1918), and *Mo Rept of Anti-Submarine Work* 1–3 (Sept.–Nov. 1918), in Box 3, f. 1 of Edward J. Fahy Papers, Naval Historical Collection, U.S. Naval War College, Newport, Rhode Island; Fred H. Spiess, “The War Years, 1917–18,” pp. 49–67 of diary in his Papers, Operational Archives Branch, Naval Historical Center, DC, and interview by author, SIO (Feb. 4, 1994), on the experiences of Spiess’s father as a listener in the U.S. Navy during the Great War; H. J. W. Fay, President, “Anti-Submarine Devices Developed at Nahant,” vol. I, unpaginated/undated, at Technical Information Center, Submarine Signal Division, Raytheon Company, Portsmouth, Rhode Island; idem, *Sub Sig Log* (Portsmouth: Raytheon, 1963) 19–37, q. 19; A. B. Wood, “Reminiscences of underwater sound research, 1915–1918,” *Sound* 1,3 (1962) 11–16; R. D. Fay, “Underwater-sound reminiscences: mostly binaural,” *ibid.* 2,6 (1963) 37–42; Gary L. Frost, “Inventing schemes and strategies: the making and selling of the Fessenden oscillator,” *Tech and Culture* 42 (2001) 462–88; Howeth, *History of Communications Electronics in the United States Navy* (→ n.48) 297–312; Willem Hackmann, *Seek and Strike: Sonar, Anti-Submarine Warfare and the Royal Navy, 1914–54* (L: HMSO, 1984) xxx–xi, 46, 55–56, 63, 68, 73, 77; idem, “Sonar research and naval warfare, 1914–1954,” *H Studies Physical Sci* 16 (1986) 83–110 at 90–99; G. Cady, “Piezoelectricity and ultrasonics,” *Sound* 2,1 (1963) 46–52; Franz Aigner, *Unterwasserschalltechnik* (Berlin, 1922) esp. ch. 6 on skills at listening underwater. Much of this is put in scientific and historical perspective by Frederick V. Hunt, *Electroacoustics: The Analysis of Transduction and Its Historical Background* (Harvard U, 1954) 40–49. See also n.254 below.

64. Lewis, *Blasting & Bombardiering*, 6; Monk, *Ludwig Wittgenstein*, 137–39, q. 138; John R. Innes, *Flash Spotters and Sound Rangers* (L, 1935) 127–39, 148, 181; National Research Council, Committee on Physics, Subcommittee on Location of Invisible Aircraft, letters of 1917, and NRC Projects, “Sound Ranging: Location of Aircraft by Sound” (April 1918), in Archives, National Research Council, DC; Richard N. Scarth, *Echoes from the Sky: A Story of Acoustic Defence* (Hythe: Hythe Civic Soc, 1999) 4–28, 35–38, 53, 70; H. Spencer Toy, “Physics in warfare: finding guns by photographing sound,” *Sci Progress* 16 (July 1921) 90–99; www.tutorgig.com/ed/Sound_ranging; Frederick A. Saunders, *A Survey of Physics for College Students* (NY, 1930) 246–47. Cf. Douglas Kahn, *Noise, Water, Meat: A History of Sound in the Arts* (MIT, 1999) 60, 63 on Russolo’s use of the battlefield as the model for modern listening while ignoring human and animal sounds, though Marinetti’s text about the siege of Adrianopolis was finished “while witnessing the machine-gunning of three thousand horses ordered by the Turkish general.”

65. For some of this, see Richard Leppert, *The Sight of Sound: Music, Representation,*

and *the History of the Body* (UC, 1993).

66. Kerry Brougher et al., *Visual Music: Synaesthesia in Art and Music Since 1900*, catalog to exhibition at Museum of Contemporary Art (LA, Feb. 13–May 22, 2005), esp. essays by Judith Zilcher, “Music for the eyes: abstract painting and light art,” 24–87, and Olivia Mattis, “Scriabin to Gershwin: color music from a musical perspective,” 210–29; William Moritz, “Abstract film and color music,” in *The Spiritual in Art: Abstract Painting 1890–1985*, eds. M. Tuchman and J. Freeman (NY: Abbeville, for LACMA, 1987) 297–312; Hajo Düchting, *Paul Klee—Painting Music* (Munich: Prestel, 1997) 11, 19–20, 28–29; Karin V. Maur, *The Sound of Painting*, tr. John W. Gabriel (Munich: Prestel, 1999); Irma B. Jaffe, *Joseph Stella* (Harvard U, 1970) 39–48, 55–58, q. 58 from Stella’s *Brooklyn Bridge, A Page of My Life* (1929), written as he was painting *Brooklyn Bridge* (1919–1920), a “Futurist” work; Barbara Haskell, *Joseph Stella* (NY: Abrams, 1994) esp. 43–46, q. 46 for critics, 97–102. On theosophical and aesthetic theories of vibration apt to the visual arts discussed in this paragraph and to music in the next: Douglas Kahn, “Ether ore: mining vibrations in American Modernist music,” in *Hearing Cultures: Essays on Sound, Listening and Modernity*, ed. Veit Erlmann (Oxford: Berg, 2004) 107–30. Lest these puns get out of hand, we should be reminded that mining vibrations were literally noisy and very dangerous: Mritunjay Sengupta, *Mine Environmental Engineering* (Boca Raton: CRC, 1990) 11, 1–58.

67. Donna Cassidy, *Painting the Musical City: Jazz and Cultural Identity in American Art, 1910–1940* (DC: Smithsonian, 1997) 38 for *Nation*, 62–68 on Varèse; Michael Hicks, *Henry Cowell, Bohemian* (U Illinois, 2002) 46–47, 52, 55–56, 60; Crétien van Campen, *The Hidden Sense: Synesthesia in Art and Science* (MIT, 2008) 49–50 on Rimington, 50–51 on Scriabin and Myers; David Lazell, “Colour music light (and a hint of British eccentricity),” *Lights!* (Jan. 1991) at www.strandarchive.co.uk/history/colourmusic1.htm; Fabion Bowers, *Scriabin*, 2nd ed. (Mineola: Dover, 1996) 92–97 on politics, q. 282 for Anton Arensky’s attack on the *Second Symphony*, 284, q. 301 for Drozdov; Karen Painter, *Symphonic Aspirations: German Music and Politics, 1900–1945* (Harvard U, 2008), esp. 6 off. on modern polyphony entailing a “new way of listening... between the lines”; Christopher Schiff, “Banging on the windowpane: sound in early Surrealism,” in *Wireless Imagination: Sound, Radio, and the Avant-Garde*, eds. D. Kahn and G. Whitehead (MIT, 1992) 139–89, 141 for Satie and Cocteau; Fritz Weber, “Heroes, meadows and machinery: fin-de-siècle music,” in *Fin de Siècle and Its Legacy*, eds. M. Teich and R. Porter (Camb U, 1990) 216–34 at 230; Louise Varèse, *Varèse: A Looking-Glass Diary I. 1883–1928* (NY: Norton, 1972) 150, and read aloud the composer Morton Feldman’s 1958 essay, “Sound, noise, Varèse, Boulez,” in *Audio Culture*, ed. C. Cox and D. Warner (NY: Continuum, 2004) 15–16. For an energetic overview that nearly lives up to the promise of its title: Alex Ross, *The Rest Is Noise: Listening to the Twentieth Century* (NY: Farrar Straus Giroux, 2007) 53 for the seat-rattling. On Duchamp: Jean Suquet, “Possible,” in *The Definitively Unfinished Marcel Duchamp*, ed. Thierry de Duve (MIT, 1991) 84–131, q. 113; Craig Adcock, “Marcel Duchamp’s gap music: operations in the space between art and noise,” in *Wireless Imagination*, 105–38, esp. 119–20 on *With Hidden Noise*.

68. Sigmund Freud, “A case of paranoia running counter to the psycho-analytical theory of the disease,” in *Collected Papers*, ed. Joan Riviere, II, 150–61; Guy Rosolato,

“Paranoïa et scène primitive,” *Essais sur le symbolique* (P: Gallimard, 1969) 199–241; Naomi Schor, “Female paranoia: the case for psychoanalytic feminist criticism,” *Yale French Studies* 62 (1981) 204–19. Of *With Hidden Noise* and Bram Stoker’s *Dracula* (1897), a novel concerned as much with sound in boxes/coffins as with blood: Michael D. Heumann, “Ghost in the Machine: Sound and Technology in Twentieth-Century Literature,” Ph.D. thesis, UC Riverside, 1988, ch. 2, and chs. 3–4 on Futurism. Ian Penman neatly historicizes and harmonizes telephony, microphony, phonography, and psychoanalysis in “On the microphone: how amplification changed the voice for good,” in *Undercurrents: The Hidden Wiring of Modern Music*, ed. Rob Young (L: Continuum, 2002) 25–34.

69. Mladen Dolar, “Freud’s voices,” *A Voice and Nothing More* (MIT, 2006) ch. 6; F. T. Marinetti, tr. Arundel del Ré, “Abstract onomatopoeia and numeric sensibility,” *The New Age* 15 (July 16, 1914) 255, an excerpt from his “Geometric and mechanical splendor and the numerical sensibility,” in full in *Marinetti: Selected Writings*, trs. R. W. Flint and Arthur A. Coppotelli (NY: Farrar Straus and Giroux, 1972) 97–103, but I am using also the translation in Luca Somigli, *Legitimizing the Artist: Manifesto Writing and European Modernism, 1885–1915* (U Toronto, 2004) 141. Throughout this paragraph I am working from Tim Armstrong’s essay, “Two types of shock in modernity,” *Critical Q* 42,1 (2000) 61, with regard to shock as a pivot (“from materialist to psychological accounts of mental life”). Douglas Kahn tracks the shocked voice back to Lautréamont’s *Les Chants de Maldoror* (1868), where a scream of horror at and of creation completes “the circularity of utterance and audition that the hearing world takes for granted,” a circularity then objectified in Edison’s speaking/listening machine, the phonograph: *Noise, Water, Meat* (→ n.64) 5–10.

70. On vision and modernity: Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (MIT, 1999); Michael Leja, *Looking Askance: Skepticism and American Art from Eakins to Duchamp* (UC, 2004); Martin Jay, *Downcast Eyes: The Denigration of Vision in Twentieth-Century French Thought* (UC Berkeley, 1993); Adele Horne, “Naturalizing Vision: Aesthetics of Immediacy in Nineteenth-Century Scientific Exploration Narratives and Current 3-D Scientific Visualization,” Ph.D. thesis, UC San Diego, 1998. On touch and the sense of space: Stephen Kern, *The Culture of Time and Space, 1880–1918* (Harvard U, 1983) 109–210. On Apollinaire: Hans-Robert Jauss, “1912: threshold to an epoch: Apollinaire’s *Zone* and *Lundi rue Christine*,” *Yale French Studies* 74 (1988) 39–66; Michael Benedikt, ed. and tr., *The Poetry of Surrealism* (B: Little, Brown, 1974) 11–12 for “*Zone*,” q. 32 for “It’s Raining.”

71. Cf. Karin Bijsterveld, “The diabolical symphony of the mechanical age: technology and symbolism of sound in European and North American noise abatement campaigns, 1900–1940,” *Social Studies of Sci* 31 (2002) 37–70; eadem, “A servile imitation: disputes about machines in music, 1910–1930,” in *I Sing the Body Electric: Music and Technology in the Twentieth Century*, ed. Hans Joachim Braun (Hamburg: Peter Lang, 1998) 121–34.

72. Apollonio, ed., *Futurist Manifestos* (→ n.25) 21–22 for Marinetti (1909), 25–26 for “Manifesto of the Futurist Painters 1910,” 31–38 for Pratella’s “Manifesto of Futurist Musicians 1910,” 74–88 for Russolo’s “The Art of Noises (extracts) 1913,” 115–18 for Prampolini’s “Chromophony—the Colours of Sounds 1913”; Luciano Folgore, “Il Futurismo,” in *Almanacco Italiano* (Firenze, 1923) 211 for *pandemonio sonore*; Kahn, *Noise, Water, Meat*

(→ n.64) 46, 56–67; Weber, “Heroes, meadows and machinery,” q. 224 on “musical soul”; G. F. Maffina, *Luigi Russolo e l’Arte dei Rumori con tutti gli scritti musicali* (Torino: Martano, 1978) 19–21 for 1913 concerts, 28–33 on first *intonarumori*, 129–76 for full text of Russolo’s musical manifestos (1916), q. 133 for families of instruments; Mark A. Radice, “‘Futurismo’: its origins, context, repertory, and influence,” *Musical Q* 73,1 (1989) 1–17, q. 7 for seven instruments; Rodney J. Payton, “The music of Futurism: concerts and polemics,” *ibid.* 62,1 (1976) 25–45; Jane Sharp, “Sounds, noises, and smells: sensory experience in Futurist art,” in *The Futurist Imagination*, ed. Anne C. Hanson (Yale U Art Gallery, 1983) 16–29, q. 19 on juxtapositions; Enrico Prampolini, “Construction absolue de moto-bruit” (1915) in *Le Théâtre futuriste italien et russe*, II, 157–58. For Mayakovsky: “Little Noises, Noises, Booms,” *Electric Iron*, trs. J. Hirschman and V. Erlich (Berkeley: Maya, 1971).

73. Enrico Prampolini, “Chromophony,” 115–118; Malcolm Tod, “To Marinetti,” *The New Age* 16 (Feb. 25, 1915) 446; Max Kozloff, *Cubism/Futurism* (NY: Charterhouse, 1973) esp. 124–31 but criticized by Marjorie Perloff, *The Futurist Moment* (U Chicago, 1986) 35–36, who notes that Boccioni was a Marxist and that Futurism had left-wing import as well.

74. Mirella Bentivoglio and Franca Zoccoli, *The Women Artists of Italian Futurism: Almost Lost to History* (NY: Midmarch, 1997) 9–14, 18–21, 88; Clara Orban, “Women, Futurism, and fascism,” in *Mothers of Invention: Women, Italian Fascism, and Culture*, ed. Robin Pickering-Iazzi (U Minnesota, 1995) 52–75; Robin Pickering-Iazzi, *Politics of the Visible: Writing Women, Culture, and Fascism* (U Minnesota, 1997) 189–246, esp. 211–14 on Angelini; Günter Berghaus, “Dance and the Futurist woman: the work of Valentine de Saint-Point (1875–1953),” *Dance Research* 11 (Autumn 1993) 27–42; F. T. Marinetti, “La Declamazione: dinamica e sinottica (1916),” *Dinamo: Rivista Mensile di Arte Futurista* 1,1, (1919) 5–7; Valentine de Saint-Point, “Futurist Manifesto of Lust 1913,” in *Futurist Manifestos*, ed. Apollonio, 70–74. Cf. front-page debate on the nature and role of women in *L’Italia Futurista* 2 (Oct. 7, 1917), co-edited by Maria Ginanni. In the context of the cultural power and political figuration of women’s voices: Adèle O. Gladwell, *Catamania: The Dissonance of Female Pleasure and Dissent* (L: Creation, 1955).

75. Marinetti in Apollonio, ed., *Futurist Manifestos* (→ n.25) 19–24; Lawrence Rainey, “Shock effects: Marinetti, pathology, and Italian avant-garde poetics,” in *The Mind of Modernism: Modernism, Psychology, and the Cultural Arts in Europe and America, 1880–1940*, ed. Mark S. Micale (Stanford U, 2004) 197–215, q. 205, q. 209 (from Marinetti’s “Multiplied Man and the Reign of the Machine”).

76. W. H. R. Rivers, “On the repression of war experience,” *Lancet* (Feb. 2, 1918) 173–77; *idem*, *Instinct and the Unconscious*, 2nd ed. (Camb U, 1922); *idem*, *Conflict and Dream* (L, 1923) 3–6, q. 17, 66–69, 93–95; Wilfred Owen, “Anthem for Doomed Youth,” in *The Valiant Muse: An Anthology of Poems by Poets Killed in the World War*, ed. Frederic W. Ziv (NY, 1936) 7; Siegfried Sassoon, *Sherston’s Progress* (1936) in *The Complete Memoirs of George Sherston* (L, 1949) 517–57, q. 521, and his *Diaries, 1915–1918*, ed. Rupert Hart-Davis (L: Faber and Faber, 1983), and cf. Pat Barker, *Regeneration* (L: Penguin, 1992) and *The Ghost Road* (NY: Dutton, 1995) esp. 108; Fussell, *The Great War and Modern Memory* (→ n.39) 101–103; Richard Slobodin, *W. H. R. Rivers* (→ n.8) 11–14, 44, 53–63; Stocking, *After Tylor*

(→ n.6) 235-44; Hynes, *A War Imagined* (→ n.42) ch. 8 on Dottyville and Rivers; Edward M. Brown, "Between cowardice and insanity: shell shock and the legitimization of the neuroses in Great Britain," *Science, Technology and the Military*, eds. Everett Mendelsohn et al. (Dordrecht: Kluwer, 1988) II, 323-45. And if you really want to know, it was a case of (*Lancet*, 176) "a young officer who was flung down by the explosion of a shell so that his face struck the distended abdomen of a German several days dead, the impact of his fall rupturing the swollen corpse" and filling his mouth with "the decomposed entrails of an enemy." No sound, no speaking out, could fail to remind the officer of the horror.

77. Bruna Bianchi, "Psychiatrists, soldiers and officers in Italy during the Great War," in *Traumatic Pasts*, eds. Micale and Lerner (→ n.14) 222-52.

78. I draw here from previously cited works by Barham (→ n.36), Binneveld (→ n.37), Bogacz (n.36), Bourgeois and Sourdille (→ n.48), Brown, "Between cowardice and insanity," (→ n.76), Damousi (→ n.27), Leese (→ n.24) esp. ch. 5, Killen (→ n.45), Lerner (→ n.45), Merridale (→ n.38), Southborough et al. (→ n.47), Ritchie (→ n.14), Shephard (→ n.36), Southard (→ n.62), and from the following, listed alphabetically: Chris Feudtner, "Minds the dead have ravished': shell shock, history, and the ecology of disease systems," *H of Sci* 31 (1993) 377-420; Christopher J. Gresens, "The Etiology, Diagnosis and Treatment of Shell Shock During World War I" (UCLA: O'Malley Prize Essay in Medical History, 1991); Doris Kaufmann, "Science as cultural practice: psychiatry in the First World War and Weimar Germany," *J Contemporary H* 34 (1999) 125-44; Ruth Leys, "Traumatic cures: shell shock, Janet, and the question of memory," *Critical Inquiry* 20,4 (1994) 623-42; Harold Merskey, "Shell-Shock," in *One Hundred Fifty Years of British Psychiatry, 1841-1991*, eds. G. E. Berrios and H. Freeman (L: Gaskell, 1991) I, 245-67; George Mosse, "Shell-shock as a social disease," *J Contemporary H* 35,1 (2000) 101-108; Elaine Showalter, "Hysteria, feminism, and gender," in Sander L. Gilman et al., *Hysteria Beyond Freud* (UC, 1993) 286-344, esp. 321-26; Martin Stone, "Shellshock and the psychologists," in *The Anatomy of Madness*, eds. Porter and Shepherd (→ n.48) II, 242-71; Allan Young, *The Harmony of Illusions: Inventing Post-Traumatic Stress Disorder* (Princeton U, 1996). For "sheer funk," [Henry Head], "A discussion on shell shock," *Lancet* (Feb. 5, 1916) 306-307; Ritchie, "One History of 'Shell-Shock,'" 177.

79. Donald Laird, *Applied Psychology for Nurses* (Phila, 1923) 215-16; Major Greenwood and May Smith, "William McDougall, 1871-1938," *Obituary Notices of the Fellows of the Royal Soc* 3 (1940) 39-62, q. 44-45; William McDougall, *The Group Mind* (NY, 1920) x, xii-xvi, 34, 36-37. Restoring a soundlife was more thinly interpreted by physicians who tried to cure hysterical deafness by shouting down the bell end of a stethoscope into the ears of a deaf soldier, then re-educating him "to understand the sound": Lewis R. Yealand, *Hysterical Disorders of Warfare* (L, 1918) 31. I will deal with John Broadus Watson and his 1919 use of noise to condition and decondition a child's fears later in this Round.

80. Quiggin, *Haddon, the Head Hunter* (→ n.6) 139-41; Kathleen Haddon, *Cat's Cradles in Many Lands* (L, 1911); C. G. Seligman, "Dr. A. C. Haddon, F.R.S. [obituary]," *Nature* 145 (June 1, 1940) 848-50.

81. G. Elliott Smith and T. H. Pear, *Shell Shock and Its Lessons*, 2nd ed. (Manchester, 1917) xiii, 2, q. 8 trenches, q. 10 two fronts, and cf. Barham, *Forgotten Lunatics* (→ n.36)

153–54; Rose G. Stern, “Our deafened soldiers: a problem of the near future,” *Survey* 40 (Sept. 7, 1918) 627–30; Stocking, *After Taylor* (→ n.6) 237, 243; Charles S. Myers, *Mind and Work: The Psychological Factors in Industry and Commerce* (NY, 1921) esp. 58, 138, 145–47; idem, his entry in *History of Psychology in Autobiography*, III, 225–27; W. J. H. Sprott, “[Review of] Charles S. Myers, *In the Realm of Mind*,” *Mind* 47 (1938) 247–53, q. 249 from p. 200 of the book, with a critique; F. C. Bartlett, “Charles Samuel Myers, 1873–1946,” *Obituary Notices of Fellows of the Royal Soc* 5 (May 1948) 767–77; K. G. Pollock and F. C. Bartlett, *Psychological Experiments on the Effects of Noise*, published jointly with H. C. Weston and S. Adams, *The Effects of Noise on the Performance of Weavers as Two Studies in the Psychological Effects of Noise* (L, 1932), and McKenzie’s critique (→ n.55); Frederic Charles Bartlett, entry in *History of Psychology in Autobiography*, III, 39–42; idem, *Remembering* (Camb U, 1932) 190–94 on listening as an act of orientation and recognition; idem, *The Problem of Noise* (Camb, 1934), with preface by Charles S. Myers, and cf. Agar, “Bodies, machines, and noise” (→ n.54) 205–206; Saito, ed., *Bartlett, Culture and Cognition* (→ n.6); D. E. Broadbent, “Frederick Charles Bartlett, 1886–1969,” *Biog Memoirs of Fellows of the Royal Soc* 16 (1970) 1–13.

82. [George Slythe Street], “Digression on sound,” *The New Age* 23 (June 13, 1918) 105–106; Wendell V. Harris, “George Slythe Street: avant-garde anachronism,” *English Lit in Transition, 1880–1920* 48,3 (2005) 285–304; Richard Huelsenbeck, tr. Ralph Manheim, “En avant Dada: a history of Dadaism” (1920) in *The Dada Painters and Poets*, ed. Robert Motherwell (NY: G. K. Hall, 1981) 21–48, q. 26, q. 43; Walter Conrad Arensberg, tr. Jerome Rothenberg, “Dada is American,” in *Revolution of the Word: A New Gathering of American Avant Garde Poetry 1914–1945*, ed. Rothenberg (NY: Seabury, 1974) 4; Kahn, *Noise, Water, Meat* (→ n.64) 46–47, q. 47 for Umba. Cf. Roselee Goldberg, *Performance Art: Live Art 1909 to the Present* (L: Thames and Hudson, 1979) 40ff. On jazz, drumming, and their conflation with noise on many sides of the political spectrum from the 1920s on: Michael H. Kater, *Different Drummers: Jazz in the Culture of Nazi Germany* (Oxford U, 1992) esp. 14–18.

83. Kahn, *Noise, Water, Meat* (→ n.64) q. 63 Boccioni; Harold B. Segel, *Turn-Of-The-Century Cabaret: Paris, Barcelona, Berlin, Munich, Vienna* (Columbia U, 1987) 321–65 on Zurich; Hugo Ball, *Flight Out of Time: A Dada Diary*, ed. John Elderfield, tr. Ann Raimés (NY: Viking, 1979) q. 10–11, 37, q. 57; Ernst Teubner, ed., *Hugo Ball (1886–1986) Leben und Werk* (Berlin: Publica, 1986) 134–72, 150 for “Karawane.” The entire extent of Ball’s “verse without words,” somewhat translated, appears in Jerome Rothenberg and Pierre Joris, eds., *Poems for the Millennium* (UC Berkeley, 1995–1998) I, 294–97, and listen to 299–305 for Tristan Tzara’s anti-manifesto of DADA.

84. George W. Crile and William E. Lower, *Surgical Shock*, 2nd rev. ed. (Phila, 1920) 266, and Shradý, “Shock and collapse” (→ n.143), III, 141, both quoted in Armstrong, “Two types of shock” (→ n. 69), and cf. Armstrong’s literary analyses in *Modernism, Technology and the Body: A Cultural Study* (Camb U, 1998). On the political economics of Dadaism: Hanne Bergius, *Das Lachen Dadas: Die Berliner Dadaisten und ihre Aktionen* (Berlin: Ananas, 1989).

85. Janet Abramowicz, *Giorgio Morandi: The Art of Silence* (Yale U, 2004) 48, 51–58, 60

for the light; Massimo Carrà, *Carlo Carrà : dall'avanguardia al mito* (Città di Castello: Delta Grafica, 2000) 38; Giorgio De Chirico, *Memoirs*, tr. Margaret Crosland (L: Owen, 1971) 68, 80–84; Giovanni Lista, *De Chirico et l'avant-garde* (Lausanne: L'Age d'Homme, 1983) 21–27; Khan, *Women's Poetry of the First World War* (→n.37) q. 29, Allen.

86. Franz Kafka, *The Blue Octavo Notebooks*, ed. Max Brod, trs. E. Kaiser and E. Wilkins (Camb: Exact Change, 1991) 19–20, and cf. Bernhard Siegert, *Relays: Literature as an Epoch of the Postal System*, tr. Kevin Rapp (Stanford U, 1999) esp. 247–57; James Joyce, *Ulysses* (NY: Random House, 1961 [1922]) sect. 11, pp. 256–91; Zack R. Bowen, “Bronzegold Sirensong: a musical analysis of the Sirens episode in Joyce's *Ulysses*,” in his *Bloom's Old Sweet Song: Essays on Joyce and Music* (U Presses of Florida, 1995) 25–76; Lawrence Kramer, “‘Longindyingcall’: of music, modernity, and the sirens,” in *Music of the Sirens*, eds. L. P. Austern and I. Naroditskaya (Indiana U, 2006) 194–215; Sara Danius, *Senses of Modernism: Technology, Perception and Aesthetics* (Cornell U, 2002) ch. 4 on *Ulysses* and sound technologies. The inventor of Ohropax plugs, Maximilian Negwer, claimed that he had been inspired by the Homeric episode: www.ohropax.de/17-1-the-beginnings.html.

87. U.S. Army Intelligence Office, Northeastern Dept., “Don't talk... Spies are listening” (1917), in Princeton U Posters Coll, copy in Map Case 2, Drawer 10, in NMAH.

88. Robert L. Sminkey, CDR (SS) USN ret., “History of the SS-108 (The California Boat)” at <http://thesaltsysailor.com/s-boats/ss108.htm>; John Cage, interview with Jeff Goldberg (1976), in *Conversing with Cage*, ed. Richard Kostelanetz (NY: Limelight, 1988) 1.

89. Wilhelm Meinardus, “Die Hörweite des Kanonendonners bei der Belagerung von Antwerpen,” *Meteorologische Z* 50 (1915) 200–206; Josef N. Dörr, “Über die Hörbarkeit von Kanonendonner, Explosionen u. dgl.,” *ibid.*, 207–15; E. van Everdingen, “The propagation of sound in the atmosphere,” *Proc Royal Acad of Sci = Koninklijke Akademie van Wetenschappen te Amsterdam* 18,2 (1916) 933–53; S. Fujiwhara, “On the abnormal propagation of sound waves in the atmosphere,” *Mo Weather R* 44 (Aug. 1916) 436–39; Charles Davison, “Sound-areas of great explosions,” *Sci Amer Suppl* 83 (March 17, 1917) 169; *idem*, “The silent zone in explosion sound areas,” *Sci Progress* 14 (April 1920) 625–34; A. Errera, “La zone de silence,” *Ciel et terre* 36 (1920) 109–11.

90. Lista and Minot, *Le Théâtre futuriste* (→n.42) 1,71 for Cangiullo.

91. Audoin-Rouzeau, *Men at War, 1914–1918* (→n.39) 51–56; Stephen Moss, *A Bird in the Bush: A Social History of Birdwatching* (L: Aurum, 2004) 113, q. 114; Stanley Weintraub, *Silent Night: The Story of the World War I Christmas Truce* (NY: Free Press, 2001) 21, q. 22 from Phillip Maddison, *A Fox Under My Cloak*, 27, 40; Werner Liebert, Jan. 3, 1915, in Lewis, ed., *Mammoth Book of War Diaries and Letters* (→n.15) 256–57; Philip V. Bohlman, “Ontologies of music,” in *Rethinking Music*, eds. N. Cook and M. Everist (Oxford Up, 1999) 31–32; Horace Bruckshaw, *The Diaries of Private Horace Bruckshaw, 1915–1916*, ed. Martin Middlebrook (L: Scholar, 1979) 40.

92. Lena Hitchcock, “The Great Adventure,” unpublished mss., pp. 82–83, in Box 3 of the Estelle Angier and Anna Lena Hitchcock Collection, OHA97, Archives, National Museum of Health and Medicine, DC.

93. Earley V. Wilcox, “To heal the blows of sound,” *Harvard Graduates' Mag* 33 (June 1925) 584–90, the title taken from a line in a poem by Oliver Wendell Holmes bewailing

organ grinders; Henry Hazlitt, "In dispraise of noise," *Century Mag* 120 (Jan. 1930) 4-6, q. 5; Norman Fenton, *Shell Shock and Its Aftermath* (St. Louis, 1926) q. 92, 109, q. 160 on "reintegration," from Harry Hollingworth, *The Psychology of Functional Neuroses* (1920); J. Noir, "La Campagne contre le bruit, la psychologie du 'bruiteur,'" *Le Concours médical* [Paris] 41 (Oct. 11, 1931) q. 3064 from Dr. Henry Lemesle, in *Mercure de France* (Sept. 1, 1931); [Arthur P. Payne], "Shell-shocked New Yorkers," *Lit Digest* 102 (Sept. 21, 1929) 23; Harry R. Ricardo, *The High-Speed Internal Combustion Engine*, rev. ed. (L, 1931 [1923]) 47, q. 247; Walter A. Wells, "The noises of civilization and their evil effects," *Trans Amer Laryngology, Rhinology and Otolary Soc* 37 (1931) 344-53, q. 349; Shirley W. Wynne, "More civilization: this must be the solution to the problem of constant noise in our cities," *Woman's Home Companion* 57 (May 1930) 137; La Salle Archambault, "The effect of noise on the nervous system," *NY State J Med* 32 (Oct. 1, 1932) 1110-15, q. 1111 from Robert Armstrong Jones and citing the English psychologist Maurice Craig, dismissing the idea that people become inured to noise; J. M. Winter, "Shell-shock and the cultural history of the Great War," *J Contemporary H* 35,1 (2000) 7-12 on shellshock's trajectory as a metaphor.

94. John Wolfe, *Great Deaths: Grieving, Religion, and Nationhood in Victorian and Edwardian Britain* (Oxford U, 2000); Maud Howe Elliott, *Roma Beata: Letters from the Eternal City* (B, 1904) 347-50; Charles S. Olcott, *William McKinley* (B, 1916) II, 329 on five minutes' silence as the dead president was carried out of his house in Canton, Ohio; "Nation's dead sleeps in the White House. In impressive silence and with military escort dead President is borne to his late home," *NY Times* (Sept. 17, 1901) 1; Frederic Morton, *Thunder At Twilight, Vienna 1913/1914* (NY: Scribner, 1989); Colin Nicolson, *Longman Companion to the First World War: Europe, 1914-1918* (Harlow: Longman, 2001) 248.

95. Pat Jalland, *Death in the Victorian Family* (Oxford U, 1996) 197-203; Glennys Howarth, "Professionalising the funeral industry in England, 1700-1900," in *The Changing Face of Death*, eds. P. C. Jupp and G. Howarth (NY: St. Martin's, 1997) 125; A. H. Edwards Company, *Patent Burial Casket* (Boston and Lynne, patent of Sept. 1, 1874); Frank E. Campbell, "There is a new burial custom in America," advertisement (May 7, 1922) in "Undertakers, 1919-48" file, Archives, U Illinois at Urbana-Champaign; Bourke, *Dismembering the Male* (→ n.40) 221-22, q. 222 for Spiritualists; Pat Jalland, *Changing Ways of Death in Twentieth-Century Australia: War, Medicine, and the Funeral Business* (U New South Wales, 2006) 41, 63, 77, 80, 84, q. 98; Mary Teresa Parnell, "After the war," *Out of the Mists* (L, 1936), in Khan, *Women's Poetry of the First World War* (→ n.37) epigraph.

96. "Chicago gets out of bed, bedlam reigns in the Loop," *Chicago Trib* (Dec. 12, 1918); Nicolson, *The Great Silence* (→ n.52); Hynes, *A War Imagined* (→ n.42) ch. 13, q. 254 Webb and Woolf, q. 255 Woolf. Hynes claims that the Armistice inspired no great works of art or music, except perhaps (p. 275) for John Fould's two-hour, twenty-movement, microtonal *World Requiem*, composed 1918-1921 and performed on Armistice Days from 1923 through 1926. On the history of thinking about "microevents" and atomic-scale sound particles, as well as the composing of microtonal music: Curtis Roads, *Microsound* (MIT, 2001)

97. Adrian Gregory, *The Silence of Memory: Armistice Day, 1919-1946* (Oxford: Berg, 1994) 8-10, supplemented by Imperial War Museum Collections, "The Two Minute Silence," entry at <http://collections.iwm.org/uk/server/show/ConWebDoc/.3165>;

Nicolson, *The Great Silence* (→ n.52) ch. 9, q. 140 for Honey; Stanley Trapido, “FitzPatrick, Sir (James) Percy (1862–1931),” *Oxford Dict Natl Biography*, eds. H. C. G. Matthews and B. Harrison (Oxford U, 2004) XIX, 912–14; Brian R. Forsyth, “Who was Percy Fitzpatrick” (July 2004) at www.angelfire.com/biz4/bigbrian/fitz.html; The Australian Army, “The Significance of Silence,” at www.defence.gov.au/ARMY/history/Silence.htm; Kanthan Pillay, article on two-minute silence (Nov. 15, 1997) at www.etv.co.za but no longer available online; Todd W. Van Beck, “Theodore Roosevelt, 1858–1919,” *Funerals of the Famous*, III, at www.lifefiles.com/libraryArticle.php?i_messageid=965260200. Another precedent: the minute of silence apparently observed across the United States (and Great Britain?) at noon, April 16, 1912, in memoriam for the victims of the sinking of the *Titanic*.

98. Gregory, *Silence of Memory*, 8–10, q. 13, q. 18, q. 164; Nicolson, *The Great Silence* (→ n.52) q. 144 on the synchronized noise; B. C. Mossman and M. W. Stark, *The Last Salute: Civil and Military Funerals, 1921–1969* (DC: GPO, 1971) 6–13; “Host in Madison Square honors the dead,” *NY Times* (Nov. 12, 1921) 1.

99. Gregory, *Silence of Memory*, q. 57; Ferenczi, “Silence is golden,” *Further Contributions* (→ n.46) II,250–51, as also “On falling asleep during analysis,” II,249–50; Leonard Falkner, “A bathtub showed Maxim how to silence noise,” *Amer Mag* 112 (July 1931) q. 80. On silence as a cultural practice in the wake of war: Efrat Ben-Ze’ev et al., eds., *Shadows of War: A Social History of Silence in the Twentieth Century* (Camb U, 2010).

100. “Music without noise,” *Dwight’s J Music* 20 (Jan. 11, 1862) 325, quoting *Punch*; W. P. Frith, *John Leech: His Life and Work* (L, 1891) II,260–67, as also “The value of quiet,” *The Spectator* (May 21, 1898) 723–24, “One John Leech is worth a wilderness of barrel-organs”; Grant Allen, *For Maimie’s Sake: A Tale of Love and Dynamite* (NY, 1886) q. 23–24, q. 66, q. 111, 123–25, and cf. Alex Houen, “*The Secret Agent*: anarchism and the thermodynamics of law,” *ELH* 65,4 (1998) 995–1016 at 998 on Allen.

101. Hiram Percy Maxim, “The story of the noiseless gun,” *World’s Work* (May 1909) 11573–75, and Capt. Earl D. Church, “The noiseless gun,” *Natl Guard Mag* 3 (Feb. 1909) 108, both in Maxim Silent Firearms Company, Scrapbook of Newspaper Clippings, 1908–1912, Box 1, in Hiram Percy Maxim Coll, Connecticut State Lib, Hartford, CT (hereafter, Maxim Coll), as also Box 1, p. 1, “Maxim’s new weapon” (1908) and “Maxim’s gun device is a silent wonder,” *NY Herald* (Feb. 9, 1909); Bennet Woodcroft, *Chronological Index of Patents Applied for and Patents Granted for the Year 1861* (L, 1862) 140; Donald G. Thomas, comp., *U.S. Silencer Patents, 1888–1972*, eds. R. K. Brown and P. C. Lund (Boulder: Paladin, 1973/1978) 1, 6, 10, 22, 30, 39–40 (Maxim patent no. 880,386), 45 (Maxim patent no. 916,885); Falkner, “A bathtub,” 80–81, 138. On automobile mufflers, Morris White, “The secret of silence,” *Country Life* 23 (Feb. 1913) 96.

102. Ellis, *Social History of the Machine Gun* (→ n.24) 33–39; Anthony Smith, *Machine Gun: The Story of the Men and Weapon That Changed the Face of War* (NY: St. Martin’s, 2003) esp. ch. 6; Hiram P. Maxim, *A Genius in the Family: Sir Hiram Stevens Maxim Through a Small Son’s Eyes* (NY, 1936) q. 66, q. 169; idem, “Automobiles,” *Engineers’ Soc of Western Penn* (1902) 96–130; idem, *Horseless Carriage Days* (NY: Dover, 1962 [1936]) 47, 55, 62; *NY J* (June 12, 1908), citing the *NY American*, in Scrapbook, Maxim Coll, as also “Silent rifle tested,” *Bellingham Herald* (undated) on his muffler. For data on hardness of hearing

among locomotive engineers: Glibert, "Influence of industrial noises" (→ n.55) 265.

103. Scrapbook 1908-1912, Box 1, Maxim Collection: "Maxim robs war of its thunder," *NY Evening Sun* (Feb. 9, 1909); "The gun that makes no sound," *NY Sun* (Feb. 10, 1909), chameleon uniform and end of war; *Brooklyn Daily Eagle* (Feb. 9, 1909) applied to cannon; J. David Truby, *The Quiet Killers* (Boulder: Paladin, 1972) 16-17 on muzzle blast; Ambrose Bierce, "Sway of the silent gun," *NY American* (Feb. 10, 1909); Just a Minute, "The silent gun," *St. Louis Post Dispatch* (Feb. 21, 1909) 2:5, side by side with excerpt on "New Battle Terror," from *Cincinnati Commercial Trib*; Scrapbook 1908-1912, Box 2, "Hastening universal peace," *Minneapolis Bellman* (Oct. 17, 1908) paralysis. For camouflage: Schwartz, *Culture of the Copy* (→ n.60) 186-92, and "Neither Here Nor There: The Schematics of Camouflage" (paper delivered Sept. 24, 2008, New School of Social Research, NY).

104. J. P. Farley, "Silence for military rifles," *Sci Amer Suppl* 70 (Dec. 3, 1910) 354-55; "Report mufflers for firearms," *Sci Amer* 104 (Jan. 28, 1911) 95-96; *Saturday Evening Post* 184 (Dec. 2, 1911) 53, quoted in William B. Waits, *The Modern Christmas in America: A Cultural History of Gift-Giving* (NYU, 1993) 137-39; H. P. Maxim, "Limitations of firearm silencing," *Sci Amer* 107 (Dec. 7, 1912) 496-97; "Reducing noise and recoil: discussion of the rifle silencer," *Outing* 74 (July 1919) 238, 240, 244; Bayard Veiller, *Within the Law* (NY, 1917 [perf. 1912]) 112, q. 139; "The silent gun," *Harper's Weekly* (April 3, 1909) 21. For more on criminals with silencers, Scrapbook, Box 1, Maxim Coll: "Murder made easier," *Brockton [Mass] Enterprise* (Feb. 10, 1909); Clarence L. Cullen, "The noiseless gun will make policemen sit up and take notice," *NY Star* (Feb. 27, 1909); "Burglar's veins ran with raspberry jam," *NY World* (Feb. 21, 1909); Scrapbook, Box 2, II.2, Clips, 1908-1909, Chickering Carter, "A tragedy of the Bowery," *New Nick Carter Weekly* (Sept. 4, 1909) no. 662, p. 18. For the rest, also from Scrapbook, Box 1: Powers cartoon, "More Work for the Silence Maker," *NY Evening J* (Feb. 10, 1909); Stevens cartoon, "With Maxim's Mufflers for Arms and Mufflers for Boats—Why Not?" *B Traveller* (Feb. 19, 1909); *Glens Falls [NY] Star* (Sept. 19, 1908); *Cincinnati Enquirer* (Feb. 12, 1909) VII-12; Eric W. Walford, "Silence," *The Motor Cycle* (June 30, 1909) 480-81; Maurice Ketten cartoon, "A Modern Paradox," *NY Evening World* (Feb. 16, 1909). Finally: "The ideal flat," *Puck's Mo Mag* 65 (April 7, 1909) 5.

105. Maxim Coll, Box 2, Scrapbook 1908-1912, "Maxim appalled by his noiseless gun," *North Amer* (March 1, 1908), as well as Box 2, f. II.3: "Dr. Shush" issue, *Maxim Silencer Mag* (Oct. 1930) 2-7, q. 2; *Maxim Industrial Silencers* (Hartford, 1925) catalog; Maxim advertisement (Dec. 10, 1931), "MAXIM—wizard of silence—BANISHES CITY NOISE from your Home and Office"; "Rotten construction," *QST* (Oct. 1916) 285 on radio. I am also using "Seek to prevent useless noises," *B Herald Trib* (2 Jan. 1928) in Noise clippings, *B Herald Trib* morgue, Mugar Memorial Lib, Boston U; Hiram P. Maxim, "A silencer for street noises," *Amer Architect and Architectural R* 119 (Feb. 2, 1921) 131; "Silencing the big noise," *Power* 70 (Oct. 1, 1929) q. 528; idem, "Noise costs more than fire," *Outlook [NY]* 153 (Dec. 18, 1929) 609-11, 637-38, q. 609 for "hospitals of silence." For the Home Office: William Plowden, *The Motor Car and Politics, 1896-1970* (L: The Bodley Head, 1971) 227-32. On fatigue, citizenship, and business offices: J. S. Hooghiemstra, "The importance of silence," *Industrial Leadership* 4 (1921) 247-51, with discussion following, 266 for William H. Leffingwell, who also compiled an *Office Appliance Manual* (Nat'l Assn Office Appliance

Manufacturers, 1926) listing quiet appliances on 549, 562; J. George Frederick, "Is the noiseless office coming?" *Office Economist* 12,1 (1930) 3-4, 10; Homer Kingsley, "Less noise, more efficiency, better health," *ibid.* 13,6 (1931) 8, 13. For the advertisements: *Good Housekeeping* 76 (1923) 3 Studebaker, 143 Hoffman Valves, 185 Domes; *ibid.* 80 (1925) 132 Westinghouse fan and, same issue, H. Addington Bruce, "What you should and should not do when illness is in the home," 51, 200. For the typewriter in particular, consider *Whispers*, the house organ of the Noiseless Typewriter Company, Middletown, CT, whose initial issue (May 1921) has an essay by the humorist Stephen Leacock on "Noise," and a subsequent issue (Aug. 1922) by Dorothy Parker, asking for "Quiet Please!"

106. Maxim Coll, Box 2, Scrapbook 1908-1912: Wex Jones, "Around the compass: The North," *NY American* (Feb. 29, 1908); Maxim Coll, Box 1: Tad, "There were 'silencers' before Maxim's invention," *NY Evening J* (Feb. 10, 1909) 14; George Steiner, *Language and Silence: Essays on Language, Literature, and the Inhuman* (NY: Atheneum, 1974) 12-35; Segel, *Body Ascendant* (→ n.25) q. 1 on Maeterlinck, and 1-126; Stephen Kern, "Cubism, camouflage, silence, and democracy: a phenomenological approach," in *NowHere: Space, Time, and Modernity*, eds. R. Friedland and D. Boden (UC, 1994) 163-79, esp. 174-78 on silence, Maeterlinck, William James, and "positive negative space"; John Palmer, "J. J. Bernard and the theory of silence," *Fortnightly* 127 (Jan. 1927) 46-58, q. 49, q. 51, q. 55. For an historical assessment of various aesthetics of silence: Winfried Menninghaus, "Lärm und Schweigen," *Merkur* 6 (June 1996) 469-79.

107. Monk, *Ludwig Wittgenstein*, 155-56, and ch. 11, "The Second Coming"; L. H. Bailey, "Ferdinand Kürnberger, Friedrich Schögl, and the feuilleton in *Gründerzeit* Vienna," *Forum for Modern Language Studies* 13,2 (1977) 155-67, epigram also translatable as "he has not merely heard buzzing and blowing around"; Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, tr. D. F. Pears and B. F. McGuinness (L: Routledge and Kegan Paul, 1961 [1922]) §7; David Antin, "Wittgenstein among the poets. [A review of] Marjorie Perloff, *Wittgenstein's Ladder* (1996)," *Modernism/Modernity* 5,1 (1998) 149-66; Françoise Davoine and Jean-Max Gaudillière, *History Beyond Trauma: Whereof One Cannot Speak, Thereof One Cannot Stay Silent*, tr. Susan Fairfield (NY: Other Press, 2004) 48-49, 60-63, 79-80, 235-37 on Wittgenstein, but throughout on war, trauma, repression, silence, and speech; Michael A. Sells, *Mystical Languages of Unsayings* (U Chicago, 1994); Hillel Schwartz, "X marks the spot," *Mythosphere* 1 (Dec. 1997) 45-50. Cf. also Segel, *Body Ascendant* (→ n.25) 32-44 on Hugo von Hofmannsthal's antipathy to words, and esp. 174-84 on Fritz Mauthner; Michael Cowan, "Imagining modernity through the ear," *Arcadia* [Berlin] 41,1 (2006) 124-46 esp. on Rilke and silences.

108. Charles Courtenay, *The Empire of Silence* (L, 1916) q. 5, q. 8 Porphyry and Fox, 68-69, q. 85, q. 251, 331, and ch. 24 on "The Silence of War." Courtenay's Empire was Western; for non-Western silences: S. Ikeda, "Pleasures of silence," *Living Age* 317 (June 9, 1923) 580-82; Philip Peek, "Re-sounding silences," in *Sound*, eds. P. Kruth and H. Stobart (Camb U, 2000) 16-33. An earlier, briefer compendium, W. Maclerie's "Silence," *Tinsley's Mag* 21 (1877) 423-28, emphasized that "Silence is the element in which great things fashion themselves." Courtenay's title had an immediate precedent: "The Empire of Silence," *Spectator* [L] 91 (1903) 1123.

109. Courtenay, *Empire of Silence*, 343; Robin P. Clair, *Organizing Silence: A World of Possibilities* (SUNY Albany, 1998) 24–25; Leslie C. Haylen, *Two Minutes' Silence* (Sydney, 1933) q. act I, sc. 2, and made into an anti-war film produced by Phyllis, Paulette, and Isabel McDonagh in 1933; Roger Chickering, *The Great War and Urban Life in Germany: Freiburg, 1914–1918* (Camb U, 2007) 86–87, 98–102, 105–106, q. 311 Husserl, 315, 424, 428; David Wood, *The Deconstruction of Time* (Northwestern U, 2001) 126 on Husserl, using Derrida, “The voice that keeps silence,” in *La Voix et le phénomène: introduction au problème du signe dans la phénoménologie de Husserl* (P: PUF, 1967); Anthony Steinbock, *Home and Beyond: Generative Phenomenology after Husserl* (Northwestern U, 1995) 73–74; Martin Heidegger, *Being and Time*, tr. Joan Stambaugh (SUNY, 1996 [1927]) 10, 99, 153, q. 154 (§165); idem, *On the Way to Language*, tr. Peter D. Hertz (NY: Harper and Row, 1971) 131; Steven L. Bindeman, *Heidegger and Wittgenstein, The Poetics of Silence* (U Press of Amer, 1981) esp. 98–99; Christopher Fynsk, “Noise at the threshold,” *Language and Relation:—That There Is Language* (Stanford U, 1996) ch. 1; David M. Levin, “Decline and fall: ocularcentrism in Heidegger’s reading of the history of metaphysics,” *Modernity and the Hegemony of Vision*, ed. Levin (UC, 1993) 186–217, on his turn toward listening, further developed in Levin’s *The Listening Self: Personal Growth, Social Change, and the Closure of Metaphysics* (L: Routledge, 1989) and by Frances Dyson, *Sounding New Media: Immersion and Embodiment in the Arts and Culture* (UC, 2009) 85–95, but reconceived by Erlmann, *Reason and Resonance* (n.43) 333–39; Miss A. Dickinson of Bristol, “The Two Minutes Silence,” *L Times* (Nov. 2, 1933) 8:2. Cf. Hans U. Gumbrecht, “Silence vs. Noise,” *In 1926: Living at the Edge of Time* (Harvard U, 1997) 320–28, 454–55 on the cultural contexts of Heidegger’s notion of silence; Robert E. Wood, “Silence, Being, and the Between: Picard, Heidegger and Buber,” *Man and World* 27,2 (1994) 121–34, discerning close relationships between Heideggerian notions of dialogue, Martin Buber’s (Jewish) notion of the I-Thou relation in *Ich und Du* (1923), and Max Picard’s later (Roman Catholic) notion in *The World of Silence*, tr. Stanley Godman (Chicago, 1952 [1948]). Vladimir Jankélévitch, a disciple of Heidegger’s, took silence so much further, with his *Music and the Ineffable*, tr. Carolyn Abbate (Princeton, 2003), that he arrived at noise (p. 139): “Music, which is in itself composed of so many noises, is the silence of all other noises, because as soon as music raises its voice, it demands solitude.” Sterne, *Audible Past*, 16–19, puts the work of Walter J. Ong, S. J., within the context of Catholic theologies of the word, and of the need for silence. For the largest context: Elizabeth McCumsey, “Silence,” *Ency of Religions*, ed.-in-chief Mircea Eliade (NY: Macmillan, 1987) XIII,321–24.

110. Bernard P. Dauenhauer, *Silence: The Phenomenon and Its Ontological Significance* (Indiana U, 1980); “‘Mum’ is the word!” *Ladies’ Home J* (Feb. 1924) 135; Susanna Cocroft, *Self-Sufficiency: Mental Poise*, 2nd ed. (Chicago, 1912) 51, 76; Theron Q. Dumont, *The Power of Concentration* (L, 1916) Lessons IV and XIV. On Coolidge: Lawrence F. Abbott, “Silence and statesmanship,” *Outlook* [NY] 137 (May 21, 1924) 94–95; Edward P. Bell, *Coolidge, a Survey* (from *Chicago Daily News*, 1924); Calvin Coolidge, *Autobiography* (NY, 1929) 12–13 on Indian blood, 29 clear and clean, 127–34 on police strike; “Coolidge is silent on his nomination,” *NY Times* (June 13, 1924) 1; V. Hendrik Booraem, *The Provincial: Calvin Coolidge and His World, 1885–1895* (Bucknell U, 1994) 225 n.26; Claude M. Fuess, *Calvin*

Coolidge: The Man from Vermont (Hamden: Archon, 1965 [1940]) 197, 472–73; Donald R. McCoy, *Calvin Coolidge: The Quiet President* (NY: Macmillan, 1967) 8, 34, 161; Robert Sobel, *Coolidge: An American Enigma* (DC: Regnery, 1998) 11 for length of sentences, 133–48 on police strike; William Allen White, *Calvin Coolidge, The Man Who Is President* (NY, 1925) q. 11, 28, 63. Bud Fisher's cartoon in *The World* (Jan. 21, 1924) is in the Clark Collection of Radioana, Series 169, Box 572, in NMAH (henceforth Clark Radioana). For the defense of industrious noise: "The President talks on art," *Lit Digest* 95 (Nov. 5, 1927) 31, cited in Kathleen D. McCarthy, *Women's Culture: American Philanthropy and Art, 1830–1930* (U Chicago, 1991) 132.

111. White, *Calvin Coolidge*, 28; Charles B. Purdom, *The God-Man: The Life, Journeys and Works of Meher Baba with an Interpretation of His Silence and Spiritual Teaching* (L: Allen and Unwin, 1964) 15–24, q. 24, 244; Jean [Schloss] Adriel, *Avatar: The Life Story of the Perfect Master, Meher Baba* (Berkeley, 1947) 26, 44, 46, 48, 63; Behram Irani, as told to Dr. Hoshang Bharucha, "Early Years With Merwan S. Irani," *Glow Intl* 29 (Aug. 1995) at www.avatarmeherbaba.org/glowtc8.html; Kenneth Lux, "A search in secret New Hampshire: journeying to Meher Baba's first American spiritual center," *ibid.* 30 (Feb. 1996) at www.avatarmeherbaba.org/luxham.html; Ramjoo Abdulla, *Ramjoo's Diaries, 1922–1929: A Personal Account of Meher Baba's Early Work*, ed. Ira G. Deitrick (Walnut Creek: Sufism Reoriented, 1979) 90, floorboards; Allen Y. Cohen, comp. and ed., *Meher Baba: The Master of Consciousness* (NY: Harper and Row, 1977) 9 on Meherabad. Among Baba's constant companions was "Kaka, whose flow of inconsequential chatter, expressed in a confusion of languages invented by himself, provided a daily entertainment and distraction": Tom Hopkinson and Dorothy Hopkinson, *Much Silence: Meher Baba, His Life and Work* (L: Gollancz, 1974) q. 18, 28, 33, 110. Cf. Kevin R. D. Shepherd, *Meher Baba, an Iranian Liberal* (Camb: Anthropographia, 1988) on his theology and politics; Abdul Ghani Munsiff, *Twenty Years with Meher Baba* (Poona: Meher Era, 1984) on Sufism among Baba's mandali, or disciples.

112. Purdom, *The God-Man*, 51–52, 95 on Gandhi, 96 London, 97 Sing Sing, 102 egoism and Garbo, 200 Matchabelli; Abdulla, *Ramjoo's Diaries*, q. 112 voice, 159 laughter; Francis Brabazon, *The Silent Word* (Balmain: Meher Baba Fndtn, 1978) 285 on female disciples; Bhau Kalchuri, *Meher Prabhu/Lord Meher: The Biography of Avatar Meher Baba*, tr. Feram Workingboxwala (North Myrtle Beach: Manifestation, 1986) I, 120, 147, 190, 232, 256–57, 307, 356 for Shivaji, 729–31 reasons for silence; Eruch, Mehera, Mani, and Meheru, *Tales from the New Life with Meher Baba*, eds. D. E. Stevens et al. (Berkeley: Beguine, 1976) 96, 131 snoring, 169; Adriel, *Avatar*, 10–16 on Watson and Matchabelli, 132, 145; Segel, *Body Ascendant* (→ n.106) 15–18 on "The Miracle" and Matchabelli; "Silent seer comes to arouse Americans," *NY Times* (April 24, 1932) IX,7; "God on the Hudson," *Time* (May 2, 1932); "God man still silent," *Time* (May 25, 1932); Jane B. Haynes, ed., *Treasures from the Meher Baba Journals, 1938–1942* (North Myrtle Beach: Sheriar, 1980) q. 56 alarm clock, 185–86 seven planes; Kitty Davy, *Love Alone Prevails: A Story of Life with Meher Baba* (North Myrtle Beach: Sheriar, 1981) 37, 72, 91, 101 *et pass.* on Hollywood.

113. Purdom, *The God-Man*, q. 105 California, 200; Adriel, *Avatar*, 132, 145; Davy, *Love Alone Prevails*, 91–94; Kalchuri, *Lord Meher*, at www.lordmeher.org, V, 1664, "ruse."

114. "Silent Hindu defers radio talk," *NY Times* (July 14, 1932) 21; "Pope sees divine

help for world,” *LA Times* (July 13, 1932) 1, sharing the front page with “California Bonus Army lays siege to capitol”; Kalchuri, *Lord Meher*, at www.lordmeher.org, V, 1668–69; Shepherd, *Meher Baba*, 27 for dresses, 199–200 on “persistent demands from American devotees” causing Baba to set a date for breaking his silence; “Lausanne peace on earth,” *Time* (July 18, 1932) 13–14, and 33 for Tesla. Two other forms of quietly stolen thunder, spiritual and acoustic, were the Vedanta movement and Paramahansa Yogananda’s Self-Realization Fellowship, both well in place in America before Baba arrived, and the latter with an international headquarters in LA by 1925: Carl T. Jackson, *Vedanta for the West: The Ramakrishna Movement in the United States* (Indiana U, 1994); John Dudley Ball, *Ananda—Where Yoga Lives* (Bowling Green U, 1982) ch. 2 and, for a larger if more critical context, Srinivas Aravamudan, “Guru English,” *Social Text* 19,1 (2001) 19–44.

115. Purdom, *The God-Man*, 127, q. 133 Munich, q. 137 masts, q. 146 to decide, 150, q. 151, 160, 216; Adriel, *Avatar*, 154, 219, q. 269 for 1954; Davy, *Love Alone Prevails*, 247, q. 315–16, 428, q. 568; “Baba’s quotations on silence,” at www.eaisai.com/baba/docs/silence.html.

116. Brabazon, *The Silent Word*, 285; idem, *Three Talks on Meher Baba* (Poona: Meher Era, 1971) 23; J. Gordon Melton, “Meher Baba, Lovers of,” *Ency Amer Religions* (Detroit: Gale, 1989) III, 842–43; James A. Hijaya, “The Gita of J. Robert Oppenheimer,” *Proc Amer Phil Soc* 144,2 (June 2000) 123–67, q. 165; Purdom, *The God-Man*, 271–72. Cf. Irene Conybeare, *Civilisation or Chaos?* 2nd ed. (Bombay: Chetana, 1959) xv, 105–106, on the connection of some Baba Lovers to Oswald Spengler’s cultural pessimism of the 1920s.

117. Ruby Cohn, *A Beckett Canon* (U Michigan, 2001) 5–6 for *Assumption*, written while Beckett was studying the silence-driven poetry of Pierre-Jean Jouve; Davy, *Love Alone Prevails*, 166; J.A. Ward, *American Silences: The Realism of James Agee, Walker Evans and Edward Hopper* (Louisiana State U, 1985) q. xiii and throughout.

118. Villiers de l’Isle Adam, *Cruel Tales*, tr. Robert Baldick (Oxford U, 1963) 48–63, and cf. Michael D. Garval, “A Dream of Stone”: *Fame, Vision, and Monumentality in Nineteenth-Century French Literary Culture* (U Delaware, 2004) 55–56.

119. “Host in Madison Sq. honors the dead,” *NY Times* (Nov. 12, 1921) 1, and cf. Anne McKay, “Speaking up: voice amplification and women’s struggle for public expression,” in *Technology and Women’s Voices: Keeping in Touch*, ed. Cheri Kramarae (NY: Routledge & Kegan Paul, 1988) 187–206, esp., 194–96 on the 102 loudspeaking telephones mounted along Park Avenue for 1919 Victory Loan drive; H. G. Wells, *When the Sleeper Wakes* (NY, 1899) 251, and ch. 7, “In the Silent Rooms”; Electrical Research Products, Inc. (Western Electric), Acoustic Consulting Service, *Acoustic Control and Noise Abatement* (NY, 1931) 5; Gerhard Richter, *Walter Benjamin and the Corpus of Autobiography* (Wayne State U, 2000) 195, Nazi “speaker-pillars,” and cf. Carolyn Birdsall, “‘Affirmative resonances’ in the city? Sound, imagination and urban space in early 1930s Germany,” in *Sonic Interventions*, eds. Sylvia Meszkowski et al. (Amsterdam: Rodopi, 2007) 57–86, as well as Inge Marszolek, “Lautsprecher und leise Töne: Radio im Nationalsozialismus,” in Hörsturze, ed. Gess (→ n.39) 53–68. On loudspeakers and sound engineering in cinemas: Scott Eyman, *The Speed of Sound: Hollywood and the Talkie Revolution, 1926–1930* (NY: Simon and Schuster, 1997) 359n. for number of movie theaters wired for sound by 1932; Emily Thompson,

“Wiring the world: acoustical engineers and the empire of sound in the motion picture industry,” in *Hearing Cultures* (→ n.66) 191–209, deriving from her *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (MIT, 2002) 235–48.

120. Crosley Radio Corp. advertisement, “Through this man’s invention the Musicone revolutionizes the loudspeaker field,” *Saturday Evening Post* (March 12, 1927) 180; W. David Lewis, “Peter L. Jensen and the amplification of sound” in *Technology in America*, ed. Carroll W. Pursell, Jr., 2nd ed. (MIT, 1990) 190–210, q. 200; Gerald A. Shepherd, “When the President spoke at Balboa Stadium,” *J San Diego H* 32 (Spring 1986) 92–101; Norman Hurd Ricker, “The Birth of the Paper Cone Loudspeaker,” q. 2–3, in Box 1, f. 9 of his Papers, at CHP, as also f. 1 on “Subterranean sounding,” f. 2 on sound-ranging equipment and loudspeakers, f. 5 for 1914 diary and noisy students; Roswell H. Johnson, “Vacuum tube amplifier in scientific work,” *Sci*, n.s. 56 (Oct. 20, 1922) 449–50; W.R. Whitney, “The vacuum—there’s something in it,” *General Electric R* 27 (July 1924) 430–39; C.L. Farrand, “Cone loud speakers,” *Radio Broadcast* 9 (Oct. 1926) 514–16—Farrand in 1921 had patented the Phonotron, the first coil-driven, direct-radiator loudspeaker to be sold in America; M. Tevis, “Millions on the wire,” *St. Nicholas* 49 (Feb. 1922) 431–33. On Farrand and for images and bibliography: Steven E. Schoenherr, <http://history.sandiego.edu/GEN/recording/loudspeaker.html> (2001). For technical aspects: C.R. Hanna, “Loud speakers of high efficiency and load capacity,” *J Amer Inst Electrical Engineers* 47 (April 1928) 253–57; Hunt, *Electroacoustics* (→ n.63) 67–89; Thompson, *Soundscape of Modernity*, 235–47. For an intriguing dispute over patents: *Klaxon Co. v. Stentor Electric Mfg Co.*, 313 US 487 (1941).

121. Radio Page, “Loudspeakers of today and tomorrow,” *Sci Amer* 131 (Dec. 1924) 390 on radio audience; Jewett Superspeaker advertisements, *Saturday Evening Post* (Jan. 10, 1925) 180 and (April 4, 1925) 183; Master Radio Corp. advertisements, *ibid.* (Oct. 7, 1922) 102, also in *Lit Digest* (Sept. 30, 1922); Sonora Radio Speaker advertisement, *ibid.* (Jan. 17, 1925) 106; Dictogrand advertisement, *ibid.* (Oct. 18, 1924) 158; Herald advertisement, *ibid.* (Oct. 13, 1923) 174, but contrast Brandes advertisement, “You need a headset,” *ibid.* (March 7, 1925) “to listen-in without disturbing others; to shut out the noise in the room—and get all the radio fun; to get the truest and clearest reception—always.” For Siegfried Kracauer: “Boredom (1924),” *The Mass Ornament*, tr. Thomas Y. Levin (Harvard U, 1995 [1927]) 333. Schoenherr, just above, summarizes Chester W. Rice and Edward W. Kellogg, “Notes on the development of a new type of hornless loudspeaker,” *Trans Amer Inst Electrical Engineers* 44 (1925) 461–47. For the physicist: R. Bruce Lindsay Papers, Correspondence with George Walter Stewart, f. 2, letter from Stewart, Jan. 10, 1928, at Archives, John Hay Lib, Brown U. For a technical history: Leo L. Beranek, “Loudspeakers and microphones,” *JASA* 26 (1954) 618–29. On phonography: Jorge Luis Borges so associated authenticity with the scratchiness of fifty years of sound recording that he dated the “degeneration of the tango” to 1926, when Carlos Gardel began recording his tangos through a microphone, not a phonograph horn: Gumbrecht, *In 1926* (→ n.109), 110, and cf. 111, a Columbia Phonograph Company advertisement in 1926 for Viva-tonal Recordings, “absolutely the *same* as the voices and instruments that make them... no sound of the needle, no scratching noise.”

122. George W. C. Kaye, “The measurement of noise,” *Smithsonian Inst Annual Report* (1932) 159–92 at 161; “Entire city can hear world’s biggest loudspeaker,” *Pop Sci Mo* 118 (June 1931) 68; “Giant loud-speaker for London exhibition,” *NY Times* (Sept. 23, 1929) 24; G. Y. Allen, “The case of the loud speaker,” *Lit Digest* (Feb. 10, 1923) 60–62; I. W. Green and J. P. Maxfield, “Public address systems,” *Bell System Technical J* 2,2 (1923) 113–42; Thomas S. Stribling, *The Sound Wagon* (Garden City, 1935) 1; “The spellbinding kilowatt,” *Sci Amer* 131 (Sept. 1924) 154, 220; Myron L. Harmon, “Building a six-foot loud speaker,” *Pop Mechanics* 48 (Oct. 1927) 649–53, q. 653. For the carillons: William Gorham Rice, letter of April 18, 1914 to Mr. Smith, Editorial Dept. *The Century*, in Century Company Records, General Correspondence, Box 83, Manuscripts and Archives Division, NY Public Library.

123. “The spellbinding kilowatt,” 154, and cf. the crowd noises of political conventions as reported in “Three sessions of the convention held,” *NY Times* (July 5, 1900) 1–2 and “Convention ends: platform voted,” *ibid.* (June 17, 1916) 2; Cecilia Winkler, “The loud-speaker nuisance,” *ibid.* (Sept. 19, 1929) 30; *People v. Rubinfeld*, 172 N.E. 485 (NY, 1930) at 486 and 487, citing *Rex v. Smith*, 2 Sess. Ca. p. 6, No. 10, S.c., E.R. (K.B.), bk. 22, 2 Strange 703 (1726); “Flying loud-speaker chased by air police,” *ibid.* (April 6, 1931) 1; “Public nuisance aloft,” *ibid.* (April 7, 1931); Ainslie Darby and C. C. Hamilton, *England, Ugliness and Noise* (L, 1930) 44, deploring the broadcast of music and advertisements from 260-watt loudspeakers attached to airplanes; Ernest Marshall, “Noise stirs British as health menace,” *NY Times* (Sept. 23, 1928) III,6; Sir Duncan Grey, “The age of noise,” *Chambers’s J*, 7th ser., 21 (1931) 233; “New discoveries,” *Amer Weekly* insert, *Washington [DC] Herald* (Feb. 23, 1936).

124. Darby and Hamilton, *England, Ugliness and Noise*, 41–42, and see a loudspeaker disguised as a parrot in J. A. Glassman’s U.S. Patent No. 1,662,742 (March 13, 1928); Y. Y., “Less noise, please!” *New Statesman and Nation* (Aug. 31, 1935) 274–75; Gail Cooper, *Air-Conditioning America: Engineers and the Controlled Environment, 1900–1960* (Johns Hopkins U, 1998); R. H. Marriott, “How loud shall the loud speaker speak?” *Radio Broadcast* 4 (Feb. 1924) 323–24; L. G. Bostwick, “An efficient loud speaker at the higher audible frequencies,” *JASA* 2 (1930) 242–50, q. 250; Vern O. Knudsen, “An ear to the future,” *JASA* 11 (July 1939) 29–36, esp. 29–31 on hearing aids; David E. Hughes, “On the physical action of the microphone,” *L, Edinburgh and Dublin Phil Mag and J Sci* 6 (1878) 48. The American Earphone Company in 1931 made much of its tortoise-shell Super-Ear precisely because it had “No Cord—No Battery—No Noise”: Box 345, f. 3, AMA Archives, courtesy of the American Medical Association, Chicago, and cf. 1931 testimonial from Jacob Furrer, same file.

125. Richter, *Walter Benjamin and the Corpus of Autobiography* (→ n.119) 163–97, q. 163; Gershom Scholem, *Walter Benjamin: The Story of a Friendship*, tr. Harry Zohn (NY: NY R of Books, 2003) q. 32, 137; Howard Caygill, *Walter Benjamin: The Colour of Experience* (L: Routledge, 1998) 69, 97; Walter Benjamin, *The Arcades Project*, trs. H. Eiland and K. McLaughlin (Camb, Mass: Belknap Press, 1999 [1926+]) 388–94, q. 389, q. 544; *idem*, “A Berlin chronicle,” in *Reflections*, ed. Peter Demetz, tr. Edmund Jephcott (NY: Schocken, 1978) 3–60, q. 37; *idem*, *Drei Hörmodelle* (Frankfurt am Main: Suhrkamp, 1971) 87–118; Esther Leslie, *Walter Benjamin: Overpowering Conformism* (L: Pluto, 2000) 68, 127 pass.;

Reinhard Döhl, “Theorie und Praxis des Hörspiels,” *Z für Literaturwissenschaft und Linguistik* 26 (1996) 70–85. For a useful contrast: Brandon LaBelle, “Phantom music—radio, memory, and narratives from auditory life,” in *Radio Territories*, eds. E. G. Jensen and B. LaBelle (LA: Errant Bodies, 2007) 90–111.

126. Walter Benjamin, “The work of art in the age of mechanical reproduction,” in *Illuminations*, ed. Hannah Arendt, tr. Harry Zohn (NY: Schocken, 1969 [1935–1939]) 217–52; Jameson, *Fables of Aggression* (→ n.58) 82, summing up Jean-Paul Sartre, *Critique of Dialectical Reason*, tr. Alan Sheridan-Smith (L: Verso, 1990) 161–96—consider esp. 196, where Sartre’s culminating example of the practico-inert is the noise of the steam whistle, an irreducible signal of industrial power. Contrast a weaker postulate, noise as parasitical, in Michel Serres, *The Parasite*, tr. Lawrence R. Schehr (Johns Hopkins U, 1982). On the history and theory of sound-effects: MacGregor, “Sympathetic Vibrations: Effecting Sound Histories” (→ n.1) 9–18. For a superb essay on exactly the opposite, silences on cinema soundtracks: Stan Link, “Going gently: contemplating silences and cinematic death,” in *Silence, Music, Silent Music*, eds. N. Losseff and J. Doctor (Burlington, VT: Ashgate, 2007) 69–86.

127. Harry D. Clough, “A ‘New Deal’ in sound,” *Hospitals* 12 (Dec. 1938) 90–91; G. Harvey Agnew, “Noise in the hospital,” *ibid.*, 39–40, and cf. Charles F. Neergaard, “What can the hospital do about noise?” *JASA* 13 (Jan. 1942) 217–19; Bob Brozman et al., *History and Artistry of National Resonator Instruments* (Anaheim Hills: Centerstream, 1998); Rudolph Arnheim, *Radio*, tr. M. Ludwig and H. Read (NY: Arno, 1971 [1936]) q. 13, 78 whispers, 83 opera, 100 sound space, 168 “overloaded,” 236–37; Vincent Lynch and Bill Henkin, *The American Jukebox: The Golden Age* (NY: Putnam, 1981) esp. 8–9; William Bunch, *Jukebox America* (NY: St. Martin’s, 1994) 8–9, 95; Rockola Manufacturing Corporation, *The Best There Is In Music* (Chicago, n.d.) in Gambling Equipment and Supplies brochures, Chicago Historical Society; Fontaine Fox, cartoonist, The Terrible Tempered Mr. Bang, “Every now and then Mr. Bang comes home to find that some one has forgotten to turn the radio off,” *Radio Retailing* (May 1928) 65; Constant Lambert, *Music Ho! A Study of Music in Decline* (L: Hogarth, 1985 [1934]) q. 200, 204, q. 205. Cf. Richard Katz, *Die drei Gesichter Luzifers: Lärm, Maschine, Geschäft* (Erlenbach–Zurich–Leipzig, 1934) 125–82 for the integration of the *lautsprecher* into the traditional anti-noise litany of devilish devices, from the first page (p. 125) of a section on “Der Schrei der Materie.”

128. “Working to music,” *Cassier’s Mag* 17 (1899) 86; Richard S. Uhrbrock, “Music on the job: its influence on worker morale and production,” *Personnel Psych* 14,1 (1961) 9–38, q. 13 for laundry, q. 11 for Green from Kenneth S. Clark, *Music in Industry* (NY, 1929); John J. B. Morgan, “The overcoming of distractions and other resistances,” *Archives of Psych* 35 (Feb. 1916) esp. 8, 18–19, 26–27; *idem*, “The effects of sound distraction upon memory,” *Amer J Psych* 28 (1917) 191–208; *idem*, “Noise increases work speed, lab tests show,” *Popular Mechanics* 47 (May 1927) 707—noise as a positive stimulus for mechanical tasks but not for tasks demanding thought, and cf. Richard Gillespie, *Manufacturing Knowledge: A History of the Hawthorne Experiments* (Camb U, 1991); Jerri A. Husch, “Music of the Workplace: A Study of MUZAK Culture,” Ph.D. thesis, U Mass, 1984, esp. 51–57; George Owen Squier described in www.arlingtoncemetery.net/gosquier.htm (Dec. 6, 2004); Stanley

Wyatt and J. M. Langdon, *Fatigue and Boredom in Repetitive Work* (L, 1937) esp. 34, 39–42 for preferred intervals and music; Dan D. Halpin, “Industrial music and morale,” *JASA* 15,2 (1943) 116–18, as also W. A. Kerr, “Attitudes toward types of industrial music,” *ibid.*, 125–29, and Ben Selvin, “Programming music for industry,” *ibid.*, 131–32; R. L. Cardinell, “Music in industry,” *Music and Medicine*, eds. D. M. Schullian and M. Schoen (NY, 1948) 352–63, q. 363 on dynamic range; Theodor W. Adorno, “Musik im Hintergrund” (1934) in his *Musikalische Schriften V* (Frankfurt am Main: Suhrkamp, 1978) 819–24; David Owen, “The soundtrack of your life,” *The New Yorker* (April 10, 2006). The avant-garde para-Dadaist Erik Satie had been the first to propose, and compose, “sound decor” (1891) or “furniture” music (1920) for restaurants and “boring intervals in concerts.” For more: Joseph Lanza, *Elevator Music: A Surreal History of Muzak, Easy Listening and Other Moodsong* (NY: St. Martin’s, 1994); Nick Groom, “The condition of Muzak,” *Pop Music and Soc* 20, 3 (1996) 1–17. Jeffrey Hopkins, “Orchestrating an indoor city: ambient noise inside a megamall,” *Environment and Behavior* 26,6 (1994) 785–812; Brandon LaBelle, *Acoustic Territories: Sound Culture and Everyday Life* (Continuum, 2010) ch. 5.

129. Edmund P. Fowler, “Effect of noise upon the normal and abnormal ear,” *Hearing News* 4 (Sept. 1936) q. 2; Steve Waksman, *Instruments of Desire: The Electrical Guitar and the Shaping of Musical Experience* (Harvard U, 1999) 14–27 for guitars of the 1930s; Frederick V. Hunt, interviewed by Leo Beranek and Charles Weiner, Dec. 18, 1964 and Jan. 8, 1965, pp. 32–33, transcript on file at CHP; Philip M. Morse, “[Auto]Biographical Data, 19 Dec 1962,” in his Papers, CHP; *idem*, *Vibration and Sound* (NY, 1936); *idem*, with Richard H. Bolt, “Sound waves in rooms,” *R Modern Physics* 16 (April 1944) 70–150, resuming decades of research; “Forty years of Soviet acoustics,” *Soviet Physics–Acoustics* 3,4 (1957) 321–39 at 323, 325; Henry Koch and Friedrich H. N. Wohlers, “Loud Speaker for Vehicles,” U.S. Patent No. 1,577,911 (March 23, 1926, filed 1922); Robert L. Davison, “Soundproofing apartments,” *Architectural Record* 65 (March 1929) 289–302; Harry F. Olson, “Sound reinforcing systems,” *RCA R* 1,1 (1936) 49–59; V. O. Knudsen, “Acoustics in the design of auditoriums,” *Architectural Forum* 47 (Sept. 1927) 205–23, q. 205; Vern O. Knudsen Papers, Correspondence, Box 1, f. 5, letter of March 17, 1931 to Carleton Winslow, concerning Fullerton, in Dept. of Special Collections, Charles E. Young Research Lib, UCLA; Stanley S. Stevens and Hallowell Davis, *Hearing, Its Psychology and Physiology* (NY, 1938); Stanley S. Stevens, Papers, 2.12, Correspondence 1945–59, Box 2, f. “Crank Letters,” letter of March 20, 1939 from Enrique Muñoz, Cali, Colombia, in Archives, Pusey Lib, Harvard U, and another letter in same file, Oct. 5, 1956, from Florence M. Luten, who had been “kept in radio, television and telephone,” such that “People from the jungles of some country . . . all seem to have the ability to talk into my consciousness,” using “thinking waves as well as audio frequency waves and also the optic waves.”

130. R. Teghtsoonian, “Stevens, Stanley Smith,” *Intl Ency Soc and Behavioral Sci*, eds. N. J. Smelser and P. B. Baltes (NY: Elsevier, 2001) 15105–15108; Allan Beveridge, “Voices of the mad: patients’ letters from the Royal Edinburgh Asylum, 1873–1908,” *Psych Med* 27 (July 1997) 899–908, at 901; Paul Schilder, *The Image and Appearance of the Human Body* (NY, 1950 [1935]) 215, 218; Stevens and Davis, *Hearing*, 1, 436; Harry F. Olson, “A new cone loud speaker for high fidelity sound reproduction,” *Proc Inst Radio Engineers* 22 (Jan.

1934) 33–46, on the deficits of conventional loudspeakers; Geraldine Stevens, “A small oral history,” in *Ratio Scaling of Psychological Magnitude*, eds. Stanley J. Bolanowski et al. (Hillsdale: Lawrence Erlbaum, 1991) ix–xi on the Psychophysics Lab, as also Leo Beranek, *Riding the Waves: A Life in Sound, Science and Industry* (MIT, 2008) 50 ff., esp. 54 on studies of airplane cockpit noise and noise-cancellation headsets. Beranek, who had played trap drums in a college dance band, “Polly and His Parrots,” would in his professional life figure prominently in national acoustical research for more than half a century.

131. Alfred H. Davis, *Noise* (L, 1937) q. 1, q. 10, 17, q. 18; idem, “An objective noise meter,” *J Inst Electrical Engineers* 83 (1938) 249–60, and cf. G. W. C. Kaye, “The acoustical work of the National Physical Laboratory,” *JASA* 7 (Jan. 1936) 167–73, which also worked to improve loudspeakers, and cf. Agar, “Bodies, machines, and noise” (→ n.54) 206–209; Paul E. Sabine, *Acoustics and Architecture* (NY, 1932) v, on mechanization; Sir Duncan Grey, “The age of noise,” *Chambers’s J*, 7th ser., 21 (March 14, 1934) 233; Floyd R. Watson, *Acoustics of Buildings* (NY, 1923) 19 on wires; S. N. Davis et al., *Effects of Environment and Atmospheric Conditions on Workers* (NY: Amer Management Assn, 1940) 5; Morris Knowles, *Industrial Housing* (NY, 1920) 311, 320; Frederick V. Hunt, Papers, HUG 4458.6, General Correspondence, 1932–59, Box 1, “Consultation—Univ. P.A. System,” Letter to William Bingham, March 15, 1938, at Archives, Pusey Lib, Harvard U, as also HUG4458.6.5, General Correspondence, “Loudspeaker” file, including advertisements and installation reports. I thank Thomas V. Hunt for permission to quote from the Hunt Papers.

132. Davis, “An objective noise meter,” 253; I. Wolff and A. Ringel, “Loud speaker testing methods,” *Inst Radio Engineers* (May 4, 1927) 1, offprint in Earl I. Sponable Papers, Box 13, f. “Loudspeaker data,” as also, same file, Office Memorandum from Mr. D. F. Whiting, Dec. 6, 1928, on the buzzing, rattling, and “very decided snapping sound” of “an electrostatic loudspeaker demonstrated by Mr. Voelk,” and Box 2, Johns Mansville, “The acoustical problem of radio broadcasting studios” (Oct. 1931) at the Rare Book and Manuscripts Library, Columbia University Libraries, Columbia U; Shepherd I. Franz, “Noiseless room for sound experiments,” *Sci* n.s. 26 (Dec. 20, 1907) 878–81 for Prof. H. Zwaardemaker, Physiological Inst, U Utrecht; Austin C. Lescarboursa, “A small private laboratory,” *Sci Amer* 129 (Sept. 1923) 154–55, 201, q. 154 on mystic atmosphere; John W. Kopec, *The Sabinas at Riverbank: Their Role in the Science of Architectural Acoustics* (Woodbury: Acoustical Soc of Amer, 1997) 4–6 and throughout, and contrast Floyd A. Firestone’s review of Paul E. Sabine, *Atoms, Men and God* (1953) in *JASA* 25 (Sept. 1953) 1019–20 with F. V. Hunt’s review in *JASA* 26 (1954) 113–14; V. L. Chrisler, “Acoustical work of the National Bureau of Standards,” *JASA* 7,2 (Oct. 1935) 79–87, reverberation chamber and sound absorption; *Quiet Mag* 2 (April 1938) 32 for Compagnie; Norman W. McLachlan, *Noise: A Comprehensive Survey from Every Point of View* (L, 1935) 115, on an acoustically “dead” room for testing electric motors in England; “Works on sound absorbing devices,” *B Herald* (Dec. 18, 1932) 25 on U. S. Bureau of Standards; CNAM, *La Lutte contre le bruit* (Rouen, 1934; P, 1936) esp. 16; Pauline A. Davis, “Effects of acoustic stimuli on the waking brain,” *J Neurophysiology* 2 (1939) 494–99, q. 497. Cf. Carl F. Eyring, “Reverberation time in ‘dead’ rooms,” *JASA* 1 (1930) 217–21, citing German work, as also Gunther Hartmann, “Aus der Frühgeschichte der Raumakustik,” *Acustica* 72 (Dec. 1990) 247–57. Carl Seashore in 1897–98 may have

been the first to construct a soundproof room for scientific research, for his Psychological Laboratory at the University of Iowa: "History of Stuttering Research and Therapy at the University of Iowa," www.shc.uiowa.edu/wjsch/research/stuttering/history.html.

133. Davis, "Effects of acoustic stimuli," 497; Harry E. Weese, "Noiseless room that speeds production," *System* 46 (Nov. 9, 1924) 654-55; J. P. Quincy, "Free libraries," and William I. Fletcher, "Public libraries in manufacturing communities," in U.S. Bureau of Education, *Public Libraries in the United States of America: Their History, Condition, and Management* (DC, 1876) 1,389-411, q. 389-90, q. 406-407; Louis Shores, *Quiet World: A Librarian's Crusade for Destiny* (Hamden: Linnet, 1975) 23; Dee Garrison, *Apostles of Culture: The Public Librarian and American Society, 1876-1920* (NY: Free Press, 1979) esp. ch. 14, and 213 for the "swell" fiction; Lutie Eugenia Stearns, "The question of discipline," *Lib J* (1901) 735 and Clara Whitehill Hunt, "Maintaining order in the Children's Room," *ibid.* (1903) 164, both reprinted in *Library Work with Children*, ed. Alice I. Hazeltine (NY, 1917) 225-30, 231-38; Sam W. Foss, "The Children's Librarian," *The Song of the Library Staff* (NY, 1906) 8. On the newly "noisy" Pentecostal churches: Grant Wacker, *Heaven Below: Early Pentecostals and American Culture* (Harvard U, 2001) q. 35-36, q. 39, 40-46; Cheryl J. Sanders, *Saints in Exile: The Holiness-Pentecostal Experience in African-American Religion and Culture* (Oxford U, 1996) esp. 31, citing an editorial of 1907 tasking African-Americans in the Holiness movement with embracing a religion that "is sound instead of sense," while ministers interpreted quietness as absence of the spirit, and also 64-66 on the Shout Step; Ray Pratt, *Rhythm and Resistance* (NY: Praeger, 1990) esp. ch. 3 on the history and political influence of "Spirituals," as also Mark L. Taylor, "Bringing noise, conjuring spirit: rap as spiritual practice," in *Noise and Spirit: The Religious and Spiritual Sensibilities of Rap Music*, ed. Anthony B. Pinn (NYU, 2003) 107-30.

134. Mohawk Pyramonic Speaker advertisement in *Dry Goods Economist*, undated clipping in J. Walter Thompson Collection, Competition Ads, Box 74, Radios, at John W. Hartman Center; John Mills (dir.), "Magic of Communication" (35mm, AT&T-Western Electric, 1928, for the U.S. Signal Corps), at RG 111, M234, NARA, II, College Park, MD; Nina Lübbren, *Rural Artists' Colonies in Europe, 1870-1910* (Rutgers U, 2001) esp. 22, 51-53, 86-88; H. Rolls Smith, "Letter," *Med and Surgical Reporter* 18 (1868) 20, in re. W. Stump Forwood, "A visit to the Mammoth Cave: important scientific observations—effect of darkness and silence on the optic and auditory nerve," *Chicago Trib* (Aug. 18, 1867); "A building with sound-proof rooms for the study of music," *Sci Amer* 114 (April 29, 1916) 454, regarding Northwestern U; Jeff Hughes, "Plasticine and valves: industry, instrumentation and the emergence of nuclear physics," in *The Invisible Industrialists*, eds. J. P. Gaudillière and I. Löwy (NY: St Martin's, 1997) 58-101, esp. 83ff; Tom Griffiths, *Slicing the Silence: Voyaging to Antarctica* (Harvard U, 2007) 168 for Borchgrevink, and throughout, and cf. Douglas Quin, "Antarctica: austral soundscapes," *Soundscape: The J of Acoustic Ecology* 3/4 (Winter 2002/Spring 2003) 30-34; Johannes G. Granö, *Pure Geography*, eds. O. Granö and A. Paasi, tr. Malcolm Hicks (Johns Hopkins U, 1997 [1929]) xxii.

135. Lawrence M. Cockaday, "Noise may impair health though individuals become immune to continual din," *NY Herald* (March 16, 1930) IV,3; Raymond Willoughby, "The high cost of noise," *Nation's Business* (oct. 1929) 93-96 for Dockeray, Mohawk, and other

examples; "Quietness on the airway," *Quiet Mag* 1,3 (Autumn 1936) 19.

136. Sherman P. Lawton, *Radio Speech* (B, 1932) q. 12, 146; Anthony Rudel, *Hello, Everybody!* (NY: Harcourt, 2008) 45-55, 71, 77 and 105 on McNamee's voice; Charles W. Taussig, *The Book of Radio* (NY, 1922) 203-204; Frank Biocca, "Media and perceptual shifts: early radio and the clash of musical cultures," *J Popular Culture* 24 (1990) 1-16; Neutrodyne Perfected Radio advertisement, *Saturday Evening Post* (Feb. 7, 1925) 187, in J. Walter Thompson Collection, Box 74, Radios, John W. Hartman Center; Brian Belanger, "And now a word from our sponsor . . . : early radio announcers," *Radio and Television Museum News* 10,4 (2004) 1-7 online at www.radiohistory.org/newsdocs/newsletter/announcers.pdf; Steve J. Wurtzler, *Electric Sounds: Technological Change and the Rise of Corporate Mass Media* (Columbia U, 2007), 108-10 on McNamee and the conventions, throughout on radio regulation during the 1920s; Susan J. Douglas, *Listening In: Radio and the American Imagination* (NY: Times, 1999) 70-71; Dan Lander, "Radiocastings: musings on radio and art," in *Radio Rethink: Art, Sound and Transmission*, eds. D. Augaitis and D. Lander (Banff: Walter Philipps Gallery, 1994) 22 on "dead air" and its relationship (p. 21) to the cleansed voice of radio; Orrin E. Dunlap, Jr., *Talking on the Radio* (NY, 1936) 16 on the need to cut to the chase for radio audiences, for "Always there is a constant bleating of sounds only a hair-breadth away on every dial seeking to enchant the minds of a multitude."

137. General Electric refrigerator advertisement in *Saturday Evening Post* 202 (Dec. 14, 1929) 38, cited in Waits, *Modern Christmas* (→ n.104) 66; H. W. Jones, "Trials of the telegraph," *Amherst Collegiate Mag* 4 (1856-1857) 325, one of the fullest accounts of noises on the line; National Safety Council, "Static electricity," *Natl Safety News* 6 (Dec. 1922) 47ff., no. 52 of Safe Practices Pamphlets, as also Paul G. Guest, *Static Electricity in Nature and Industry* (DC: Dept. of Commerce, for the Bureau of Mines, 1933); Mrs. B. M. Bower, *The Phantom Herd* (B, 1916) 233, static on film negatives, as also *Stanley Co. of America v. General Talking Pictures Corp. et al.*, 47 F.2d 817 (1931) at 819 concerning "ground noise" and scratches; Lillian Hoddeson, "The emergence of basic research in the Bell Telephone System, 1875-1915," *Technology and Culture* 22 (1981) 512-44, much of which research was devoted to eliminating static and cross-talk; *Brown v. North Dakota Workmen's Compensation Board*, 55 N. Dak. 491 (1927); M. Levy, "Static disturbances: means to eliminate them," *Radio Engineering* (July 5, 1919); "France fights man-made statics," *Electronics* (May 1935) 164, for progress; James A. Connor, "Radio Free Joyce," in *Sound States: Innovative Poetics and Acoustical Technologies*, ed. Adalaide Morris (U North Carolina, 1997) 19-31, q. 21 from *Finnegan's Wake*, bk. II, ch.3, and discussion of radionic metaphors.

138. Charles Fensky, *Radium-Ear* (1924?), and "Special Data, 1925-1943" on Fensky, in Box 345, f. 5, AMA Archives, courtesy of the American Medical Association, Chicago; E. F. W. Alexanderson, "How some problems in radio have been solved," *General Electric R* 17 (June 1924) 373-79, q. 374, q. 376, and cf. James E. Brittain, *Alexanderson: Pioneer in American Electrical Engineering* (Johns Hopkins U, 1992); Zenith Radio ad, "— and now — a Radio that will 'measure up' years from today," *Saturday Evening Post* (Dec. 13, 1924) 135.

139. Martin Banner, cartoonist, Winnie Winkle, *The Breadwinner*: "Well, That's Something, Isn't It," *Chicago Daily Trib* (Dec. 27, 1924) in Clark Radioana (→ n.110) Ser.

169, Box 572, as also Box 573A, "Broadcasting Close to Nature," *B Post* (May 13, 1924) on Fantasie and heartbeats; Hilda Morris, *The Tuckers Tune In* (NY, 1943) 19-20, 22, 49; Hedges Collection, Women in Broadcasting, Box 5, file 17 on Ida Bailey Allen, radio and TV pioneer, on sound-effects (from *NY Times* and *MacLean's Mag*), at Lib of American Broadcasting, Hornbake Library, U Maryland; Frank A. Biocca, "The pursuit of sound: radio, perception, and utopia in the early twentieth century," *Media, Culture and Society* 10 (1988) 61-80; Rupert Hughes, *Static* (NY, 1932) 79-80; H. Allen Smith, "Walla walla talk," *Life in a Putty Knife Factory* (Garden City, 1944) 209-11; Stewart-Warner Speedometer Corp., "Stewart-Warner Announces a Sensational New Reproducer," *Saturday Evening Post* (Nov. 27, 1926) 58; G. H. Eckardt, "The Farnsworth multipactor tube," *Television and Short-Wave World* (Jan. 1936) 7-8; Wurtzler, *Electric Sounds*, 7 for statistics, and throughout for radio developments. Cf. Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Duke U, 2003) ch. 5, "The Social Genesis of Sound Fidelity," 273 for another take on the Winnie Winkle cartoon.

140. [Hermann Königer], "Contagion by speaking or coughing," *Lit Digest* (Dec. 29, 1900) 376, from French abstract (of German article) in *R scientifique* (Aug. 14, 1900); Smith Brothers advertisement, "Drop that Cough," *Lit Digest* (March 29, 1919) in "Cough Remedies 1891-1930" file, Archives, U Illinois at Urbana-Champaign, as also: "A Cough is a Social Blunder," *ibid.* (Nov. 8, 1919) 86; "The Terrible Tempered Mr. Bang [on golf course]," *ibid.* (Oct. 25, 1919) 76; "Hey, George, page the Smith Brothers of Poughkeepsie," *ibid.* (Nov. 29, 1919) 80; "Violin Solo, with Foghorn Accompaniment," *ibid.* (Jan. 31, 1920) 99; "A Cough Has Ruined Many an Occasion," *ibid.* (Jan. 10, 1920) 108; "Count Your Coughs in the First Act," *Saturday Evening Post* (March 29, 1930); "I know three sides of one problem," *ibid.* (Jan. 13, 1929) 110. For Luden's: "Static! Something ought to be done about this," *Saturday Evening Post* (Dec. 1, 1928) 123; "Cough and the Concert Stops," *ibid.* (Feb. 23, 1929) 73; "A Cough will dim the hearing of a thousand ears," *ibid.* (Jan. 5, 1929) 203.

141. Smith Brothers, "Please don't make Talkies into Coughies," *Saturday Evening Post* (Feb. 15, 1930) 121; "Including tax?" *World Telegram* (May 2, 1938) in Clark Radioana (→ n.110), Ser. 169, Box 573, as also Hugo Gernsback, ed., *Radiocracy for Xmas-New Year 1944* (NY, 1944) 15, Box 572. Wurtzler, *Electric Sounds*, 97-98, notes the intrusiveness of coughing in radio studios and on Talkies sets and reproduces an advertisement for Old Gold cigarettes (*Life* [April 12, 1929]) featuring Richard Barthelmes saying "Please pardon my frown... but someone in the studio just coughed... and spoiled our love scene."

142. Frank J. Wilstach, "Motion picture primer," *Sound Waves* 1,9 (Dec. 20, 1928) 11 and 2,4 (March 1, 1929) 6; Clive Brook, cited by Hal Erickson, All Movie Guide, on "Interference" at <http://movies.nytimes.com/movie/96634/Interference/overview>, and see Mordaunt Hall's review, "Interference," *NY Times* (Nov. 17, 1928), critical of the long pauses. On the history and theory of film sound: Rick Altman, *Silent Film Sound* (Columbia U, 2004); Douglas Gomery, *The Coming of Sound* (NY: Routledge, 2005); Richard Abel and Rick Altman, eds., *The Sounds Of Early Cinema* (Indiana U, 2001); Elisabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (Columbia U, 1985); Michel Chion, *Audio-Vision: Sound on Screen*, ed. and tr. Claudia Gorbman (Columbia U, 1994). Obversely,

the phonodeik and other “phonophotographic” devices of the 1920s were promoted as technologies for transcribing “folk music” once thought “unnotatable,” such as the “queer pranks,” quavers, and “twists and turns” of Negro singing, and Native American “slurring” of tones: Milton Metfessel, *Phonophotography in Folk Music* (Chapel Hill, 1928). In effect, this genre of filmed sound transposed what had been considered little more than noise into visual rhythms that could be *seen* to be music.

143. Joseph T. Tykociner Papers, 1900–1969, in University Archives, University of Illinois at Urbana-Champaign: Box 12, Autobiographical Data, offprint of J. Tykocinski-Tykociner, “Photographic recording and photoelectric reproduction of sound,” *Trans Soc Motion Picture Engineers* 16 (1923) 90–119; Box 12, “Personal Recollections,” niece’s notes from Tykociner’s dictation (July 17, 1957) and “Reminiscences 1905–19”; “Inventor describes all details of his sound recording camera,” *NY World* (July 30, 1922) 1, on the Biograph show and on the film demonstration of Tykociner’s wife ringing a bell after speaking through an amplified telephone and asking, “Did you hear the bell ringing?” Also Box 14, transcript of interview by Wayne Kaplin (March 9, 1967), reel 2; Box 20, lab notebook (Jan. 1922) esp. Jan. 11, and “First Lecture, Sound on Film, June 6, 1922”; Donald MacKenzie, “Sound recording with the light valve,” *Bell Labs Record* (Nov. 1928) 26, photoelectric sensitivity; Harry Acton, “Lee de Forest describes his phonofilm,” *Evening Mail Radio R and Home Mechanics* (Sept. 23, 1922) sect. 2, q. 1; S. K. Wolf (Theatre Acoustics Engineer, ERPI), “Should sound be easy to listen to?” typescript in Earl Sponable Papers (→ n.132), Box 2, file on “Acoustic Control Data,” as also file on “Academy of Motion Pictures Arts and Sciences,” typescript of “Method of Nominating and Voting for 1930–1931 Academy Sound Award,” and file on “Acoustic Data 1932,” letter of March 24, 1932 from ERPI to Sponable on the noise of movie lights during filming, and Sponable’s letter to H. Keith Weeks of Fox Movietone Studios, Oct. 17, 1931; Barton Kreuzer, “Noise reduction with variable area recording,” *J Soc Motion Picture Engineers* 16 (1931) 671–77 on intrinsic and extrinsic background noise.

144. “Aviators, note,” *Sound Waves* 1,9 (Dec. 20, 1928) 15; H. P. Moore, “Letter to the editor,” *ibid.*, 1,1 (Aug. 15, 1928) 1 on musicians’ union; Evelyn D. Weinstock, “Movies and legitimate vs. sound,” *ibid.*, p. 2; “Marie Quillan to star in ‘Noisy Neighbors’ for Pathé,” *ibid.*, 1,5 (Oct. 15, 1928) 3; “‘Noise morgue’ is latest in pictures,” *ibid.*, 1,9 (Dec. 20, 1928) 5; Paul H. Allen [column], *ibid.*, 2,2 (Feb. 1, 1929) 4 on Squawkies; Harry W. Jones, “The modern news reel,” *J Soc of Motion Picture Engineers* 14 (Feb. 1930) 204–206 with highly revealing discussion, 207–208. On the displacement, and resituation, of “pit” musicians: James P. Kraft, *Stage to Studio: Musicians and the Sound Revolution, 1890–1950* (Johns Hopkins U, 1996) esp. 33–58, 62.

145. Chen-Pang Yeang, “Characterizing Radio Channels: The Science and Technology of Propagation and Interference, 1900–1935,” Ph.D. thesis, MIT, 2004; A. W. Vance, “A noise suppressing means for communication systems,” *Engineering Memorandum TR-170* (Sept. 27, 1932) in ACC 2069, Box 131 of the records and publications of the RCA Victor Company, Inc., Engineering Dept. Research Section [Camden Labs], in Manuscripts and Archives, Hagley Museum and Lib, Wilmington, Delaware; John F. Rider, *Servicing by Signal Tracing* (NY, 1939) 76–78, 259ff.; Lewis S. Simon, *Radio Service Trade Kinks* (NY, 1939);

John R. Carson, “Selective circuits and static interference,” *Bell System Technical J* 4 (1925) 265–79, q. 266, and cf. idem, “The statistical energy frequency system spectrum of random disturbances,” *ibid.* 10 (1931) 374–76, linking these disturbances with the *Schrotheffekt*.

146. Vance, “A noise suppressing means,” 1, and next note.

147. Charles A. Culver, “Transatlantic radio reception,” *J Franklin Inst* 187 (May 1919) 529–80 on sources of interference; D. K. C. MacDonald, “Brownian movement and spontaneous fluctuations of electricity,” in *Electrical Noise: Fundamentals and Sources*, ed. Madhu S. Gupta (NY: IEEE/Wiley, 1977) 7–16; John B. Johnson, “Electronic noise: the first two decades,” in *ibid.*, 17–22; Albert Einstein (with Marian Smoluchowski), *Investigations in the Theory of Brownian Movement*, tr. A. D. Cowper (NY, 1956 [1905–1911, tr. 1926]); Jean Perrin, *Brownian Movement and Molecular Reality*, tr. F. Soddy (L, 1910); Walter H. Schottky, “Über spontane Stromschwankungen in verschieden Elektrizitätsleitern,” *Annalen der Physik* 362 (1918) 541–67; idem, “Small-shot effect and flicker effect,” *Physical R* 28 (1926) 74–103; Thornton C. Fry, “The theory of the Schrotheffekt,” *J Franklin Inst* 199 (Feb. 1925) 203–20, esp. 203 on the space current of a vacuum tube and what it would take for “the migration of discrete particles which possess regularity only in a statistical sense” to become audible; William R. Bennett, *Electrical Noise* (NY, 1960) 9 on high-gain; Wilbur B. Davenport, Jr., and William I. Root, *An Introduction to the Theory of Random Signals and Noise* (NY: IEEE, 1987) ch. 7 on shot noise; Harry Nyquist, “Certain topics in telegraph transmission theory,” *Trans Amer Inst Electrical Engineers* 47 (1928) 617–44; G. L. Grundman, “‘Hiss’ investigation,” *RCA Victor Company, Camden Labs, Engineering Dept., Report TR-31* (May 12, 1930); E. B. Moullin, *Spontaneous Fluctuations of Voltage Due to Brownian Motions of Electricity, Shot Effect, and Kindred Phenomena* (Oxford, 1938) v, 6, q. 7 the “fact,” 13, q. 40–41 patter and shocks, 157 flicker effect; P. H. Sydenham, *Measuring Instruments: Tools of Knowledge and Control* (Stevenage: Peregrinus, 1979) 416–17.

148. David C. Cassidy, *Uncertainty: The Life and Science of Werner Heisenberg* (NY: W. H. Freeman, 1992) 14, 91, q. 92 on quanta. What follows is essentially a gloss on Cassidy, although he does not, as I do, listen for noise.

149. Cassidy, *Uncertainty*, q. 115–16 *Atombau*, 93 on assassinations and inflation, 174–76, q. 192 Pauli and swindle, q. 194 dualities and contortion, and ch. 11; Jagdish Mehra and Helmut Rechenberg, *The Historical Development of Quantum Theory. Volume 4, Part 2. The Reception of the New Quantum Mechanics, 1925–26* (NY: Springer, 1982) q. 225–26, 229, 232–33, 278–79; idem, *Volume 5, Part 2. Erwin Schrödinger and the Rise of Wave Mechanics* (NY: Springer, 1987) 387, 497–99; Suman Seth, “Zweideutigkeit about ‘Zweideutigkeit’: Sommerfeld, Pauli, and the methodological origins of quantum mechanics,” *Studies in H and Phil of Modern Physics* 40 (2009) 303–15. For a different and intriguingly persuasive genealogy of the embrace of scientific uncertainty and of Schrödinger’s creation of wave mechanics to deal with the probabilistic nature of electrons: Deborah R. Coen, *Vienna in the Age of Uncertainty: Science, Liberalism, and Private Life* (U Chicago, 2007) 14–15, on Sigmund Exner’s neurophysiology, pp. 102–104, his and his son Felix’s study of Brownian motion, pp. 76–78 and 264–66, Felix’s statistical-meteorological analyses of the turbulence produced at discontinuous boundaries, pp. 262–67 and 282–92, Sigmund’s brother Serafin Exner’s attention to fluctuations in the probabilistic physics of radiation, pp.

268–76 and 280–82, and Schrödinger’s work on atmospheric physics and hydrodynamics under the eyes and influence of Serafin Exner, pp. 292–98.

150. Cassidy, *Uncertainty*, ch. 11, esp. 223–25, q. 225 for Born, and ch. 12; Felix Bloch, “Heisenberg and the early days of quantum mechanics,” *Physics Today* (Dec. 1976) q. 27; Werner Heisenberg, *Physics and Beyond: Encounters and Conversations*, tr. A. J. Pomerans (NY: Harper and Row, 1971) 328–29, quoted and discussed by Mehra and Rechenberg, *Historical Development of Quantum Theory. Volume 4, Part 2*, 229–30.

151. Cassidy, *Uncertainty*, 226–40, and cf. Masanao Ozawa, “Universally valid reformulation of the Heisenberg uncertainty principle on noise and disturbance in measurement,” *Physical R [A]* 67 (April 11, 2003). Mara Beller draws the technocultural and philosophical bonds even tighter in “Experimental accuracy, operationalism, and the limits of knowledge, 1925–1935,” *Sci in Context* 2 (1988) 147–62. Below, I discuss information theory and radioastronomy, but I will never make it to the issue of noise in quantum computing, on which read Amit Hagar, *The Complexity of Noise: A Philosophical Outlook on Quantum Error Correction* (San Rafael: Morgan and Claypool, 2010).

152. Cassidy, *Uncertainty*, 241–44, 254; Scott Tanona, “Uncertainty in Bohr’s response to the Heisenberg microscope,” *Studies in H and Phil of Modern Physics* 35 (Sept. 2004) 483–507; Kristian Camilleri, “Heisenberg and the wave–particle duality,” *ibid.* 37 (June 2006) 298–315; *idem*, “Bohr, Heisenberg and the divergent views of complementarity,” *ibid.* 38 (Sept. 2007) 514–28; Paul McEvoy, *Niels Bohr: Reflections on Subject and Object: The Theory of Interacting Systems* (San Francisco: Microanalytix, 2001) esp. I, ch. 7, and q. 164. Mara Beller suggests that the principle of complementarity applied also to the apparently divergent philosophical positions of Bohr and Heisenberg: “The rhetoric of antirealism and the Copenhagen spirit,” *Phil of Sci* 63 (June 1996) 183–204.

153. G. W. Stewart, “Problems suggested by an uncertainty principle in acoustics,” *JASA* 2 (1931) 325–29, and cf. Susan G. Sterrett, “Sounds like light: Einstein’s special theory of relativity and Mach’s work in acoustics and aerodynamics,” *Studies in H and Phil of Modern Physics* 29 (1998) 1–35; Denis Bayart, “How to make chance manageable: statistical thinking and cognitive devices in manufacturing control,” in *Cultures of Control*, ed. Miriam R. Levin (Amsterdam: Harwood, 2000) 157–66; David A. Mindell, “Beasts and systems: taming and stability in the history of control,” *ibid.*, 215–19, amplified in his *Between Humans and Machines* (Johns Hopkins U, 2002); Karl K. Darrow, “Statistical theories of matter, radiation, and electricity,” *Bell System Technical J* 8 (1929) 672–748. A number of papers of the 1920s on the statistical limits to, and probabilistic qualities of, telegraphic and wireless transmission are put in the context of subsequent information theory, and the statistical problem of noise, by Lars Lundheim, “On Shannon and ‘Shannon’s formula,’” *Teletronikk* 98,1 (2002) 20–29 at www.telenor.com/teletronikk.

154. Michel Contat and Michel Rybalka, comps., *The Writings of Jean-Paul Sartre: I. A Bibliographical Life*, tr. Richard C. McCleary (Northwestern U, 1974) 52–53, q. 53; Jean-Paul Sartre, *Nausea*, tr. Lloyd Alexander (NY: New Directions, 1969) 29, 32–34, 171–81, q. 233–37; John Gerassi, *Jean-Paul Sartre: Hated Conscience of His Century* (U Chicago, 1989) 106–13, q. 118 from Sartre’s summary of his novel; Robert Dawidoff, *Making History Matter* (Temple U, 2000) 132–33 on Sophie Tucker, one of whose performances of “Some of These

Days” is at www.youtube.com/watch?v=f16rUkLr29Q, but I quote the lyrics from a 1926 Tucker recording as transcribed at www.jumbojimbo.com/lyrics.php?songid=2825 by Adrian Launcelot; Eugenia N. Zimmerman, ““Some of these days’: Sartre’s *petite phrase*,” *Contemporary Lit* 11,3 (1970) 375–81; Leo Spitzer, “Patterns of thought and etymology. I. Nausea > OF (>Eng.) Noise,” *Word* 1,3 (1945, wr. earlier) 260–76. Michael Chanan observes that the success of jazz came paradoxically through the replaying of recordings, which establish a “kind of continuous present,” when jazz performance itself relied on improvisation, and he compares Roquentin to Hans Castorp in Thomas Mann’s *The Magic Mountain* (1924), both of whom “develop the symptoms of being audiophiles”: *Repeated Takes: A Short History of Recording and Its Effects on Music* (L: Verso, 1995) q. 19, q. 22, 42. On jazz itself as cultural critique: Ajay Heble, *Landing on the Wrong Note: Jazz, Dissonance, and Critical Practice* (NY: Routledge, 2000) esp. ch. 4, “Jazz, Voice and Resistance”; Marcel Cobussou, “Noise and ethics: on Evan Parker and Alain Badiou,” *Culture, Theory and Critique* 46,1 (2005) 29–42.

155. Sparrows drew great concern as noisy, dirty bullies: “A nuisance in feathers; some reflections on the English sparrow,” *NY Times* (Jan. 27, 1886) 2; Gary A. Fine and Lazaros Christoforides, “Dirty birds, filthy immigrants, and the English Sparrow War: metaphorical linkage in constructing social problems,” *Symbolic Interaction* 14,4 (1991) 375–93; Robin W. Doughty, “Sparrows for America: a case of mistaken identity,” *J Pop Culture* 14,2 (2004) 212–28; Peter A. Coates, *American Perceptions of Immigrant and Invasive Species: Strangers on the Land* (UC Berkeley, 2006) 28–70.

156. Celotex Marketing Communications Dept., “Celotex celebrates seventy-five years,” *Image* (Nov. 1995) 1, 12; J. Walter Thompson Account Files, Box 3, f. 3, Celotex 1924–1925, at John W. Hartman Center; Jacobson & Co., *The Quiet Forum* 4,2 (1938) 2 for Griffith Planetarium, 5,5 (1938/1939) 3 on Eastern High; Vern O. Knudsen Papers, Correspondence, Box 1, f. 4, letters of Feb. 12 and 25 1930, from/to M. C. Rosenblatt, Inc. (→n.129). For the history: Hale J. Sabine, “Manufacture and distribution of acoustical materials over the past 25 years,” *JASA* 26 (Sept. 1954) 657–61.

157. Burgess advertisement, in *Quiet Mag* 1,3 (Autumn 1936) iii.

158. Helena M. Chew and William Kellaway, eds., *The London Assize of Nuisance, 1301–1431* (L: London Record Soc, 1973) 160–61; *Bradley v. Gill*, 1 Lutwyche 69, 125 E.R. 36 (1594); *Rex v. Dewsnap and Another*, 16 East 194, 104 E.R. 1063 (1812) on steam engine smoke and noise; Robert E. Zupko and Robert A. Laues, *Straws in the Wind: Medieval Urban Environmental Law—The Case of Northern Italy* (Boulder: Westview, 1996); James Oldham, *The Mansfield Manuscripts and the Growth of English Law in the Eighteenth Century* (U North Carolina, 1992) II,879–82, 886–90, 921; William L. Prosser, “Private action for public nuisance,” *Virginia Law R* 52,6 (1966) 997–1027; Joel F. Brenner, “Nuisance law and the Industrial Revolution,” *J Legal Studies* 3 (June 1974) 403–34. For a decision that what is not a noise nuisance on a weekday can become one on Sundays: *Gilbough and Vredenburgh v. West Side Amusement Co.*, 64 N.J. Eq. (19 Dick) 27 (1902).

159. William Blackstone, *Offenses against the Public Peace* (L, 1765); *State of North Carolina v. Cainan*, 94 N.C. 880 (1886) upholding an ordinance against cursing; *Fish v. Dodge*, 4 Denio (N.Y.) 311 (1847) at 313, and cf. *Ray v. Lynes*, 10 Ala. 53 (1846), refusing to

enjoin the erection of a blacksmith's shop next to a residence, cited in *Rouse and Smith v. Martin and Flowers*, 75 Ala. 510 (1883) regarding a livery stable, whose presumed injuries were not so "vast and overwhelming" as to merit an injunction *in advance*, as also *Whitney v. Bartholomew*, 21 Conn 213 (1851); W.R. Cornish and G. de N. Clark, *Law and Society in England, 1750–1950* (L: Sweet and Maxwell, 1989) 154–59. Cf. *State v. Anonymous*, 6 Conn. Cir. 667, 298 A. 2d 52 (1972) on the history of breach of peace statutes, which Justice Jacobs found to be chaotic, in part because these had attracted scant attention from legal scholars or jurists, since defendants in such cases were usually of the poorer sort and the broad political uses were so handy.

160. *Scott v. Firth*, 4 F & F 349, 176 E.R. 595 (1864) on habitability; Robert Chambers, *A Course of Lectures on the English Law . . . 1767–1773*, ed. Thomas M. Curley (U Wisconsin, 1986) II, pt. III, Lecture 13, esp. 174; *Owen v. Henman*, 1 Watts & Sergeant 548 (Penn, 1941), 37 Am. Dec. 481; *Trustees of the First Baptist Church in the City of Schenectady v. Utica and Schenectady Railroad Co.*, 313 N.Y., Barbour Reports, 6th, May 1848, at 314, 316, 318. A widely cited later case pitted the pewholders of a church against a street rail company and raised issues not only of noise but of Sabbath observance: *Sparhawk v. Union Passenger Railway Co.*, 54 Pa. (4 P.F. Smith) 401 (Pa 1867). Cf. the attempt, in successive editions of Theodore Sedgwick's *A Treatise on the Measure of Damages* (NY, 1847–), to retain the emphasis on physical harm in any award of damages for nuisance.

161. Doris M. Provine, "Balancing pollution and property rights: a comparison of the development of English and American nuisance law," *Anglo-Amer Law R* 7 (1978) 31–56; Robert G. Bone, "Normative theory and legal doctrine in American nuisance law, 1650–1920," *Southern Cal Law R* 59 (Sept. 1986) 1104–1226; *Soltau v. De Held*, 2 Simons (N.S.) 133 (1851), 61 E.R. 291; *Bamford v. Turley*, 122 E.R. 27 (Q.B. 1862) at 28, court no longer accepts doctrine concerning "coming to" a nuisance, and cf. an earlier decision denying the doctrine, *Elliotson v. Feetham*, 2 Bing N.C. 134 (1835), against an ironmonger who had been *in situ* for ten years; *Robinson et al. v. Baugh*, 31 Mich. 290 (1875) at 296 on steam hammers. For stables: *Burditt v. Swenson*, 17 Texas R. (1856) 489 at 490–91, plaintiff arguing successfully for reclassifying stables with slaughterhouses and smelting shops, as also *Templeton v. Williams et al.*, 59 Oregon R. 161 (1911) at 164, Justice Bean writing, "because in olden times man and beast were housed under the same roof is no reason why at the present time a stable should be used in the residence district of a city"; *Boyd v. City of Sierra Madre*, 41 Cal. App. 520 (1919) at 524, and cf. decisions in *City of St. Louis v. Russell*, 116 Missouri R (1893) 248–59 and the English cases of *Ball v. Ray*, 8 L.R. (Ch. App.) 467 (1872) and *Broder v. Saillard*, 2 Ch.D. 692 (1876) at 693. On churchbells: *Haddon and Another v. Lynch and Others*, Victorian Law R. 5 (1910) and 230 (1911) at 9, churchbells in Melbourne, Australia, found merely to be announcing "the time for attendance in a manner uncalled for in these days of cheap clocks and watches"; John C. Williams, "Annotation: bells, carillons, and the like as nuisance," *Amer Law R.* 3d, *Cases and Annotations*, vol. 95 (1979) 1268–72, and my Round Two. Morton J. Horwitz, *The Transformation of American Law, 1870–1960* (Harvard U, 1977) 74–75, argues that the balancing of social utility against nuisance was rare in the early 1800s, when Americans were still wielding nuisance law in defense of pre-industrial values and where the assertion of absolute property rights did not block economic growth

so long as undeveloped land was abundant. Noise, however, was not as inextricably linked to industrialization as were nuisances from smoke or water pollution, and the principles of nuisance law were quickly incorporated into statutes protecting public health: Robert McCracken et al., *Statutory Nuisance* (L: Butterworth, 2001). Cf. Donald Wittman, “First come, first served: an economic analysis of ‘coming to the nuisance,’” *J Legal Studies* 9 (1980) 557–68.

162. George Spater, “Noise and the law,” in *Noise Pollution and the Law*, ed. James L. Hildebrand (Buffalo: Hein, 1970) 22–59; *Gaunt v. Finney*, 8 Ch. App. 8 (1872) at 12 and 13; *Heather v. Pardon*, 37 LT 393, discussed in *Annotated British, Commonwealth, and European Cases 2nd* (L: Butterworth, 1990) XXXVI,70; *Sturges v. Bridgman*, 11 Ch.D. 852 (1879) and summarized in “A nuisance by noise restrained,” *Med News* 37 (Oct. 1879) 159; *Collins v. Wayne Iron Works*, 227 Pa. 326 (1910), and cf. the reasoning in *Froelicher v. Oswald Ironworks, Ltd.*, 111 La. 705 (1903); *Sardo v. Russell Boiler Works Co.*, 241 Mass. 215 (1922); *Austin v. Augusta Terminal Railway Co.*, 108 Ga. 671, 34 S.E. 852 (1899) at 863 for dissent of Justice Lewis regarding the unbearable noise of a switching yard; *Rushmer v. Polsue and Alfieri, Ltd.*, 1 Ch.D. 234 (1906), presses; *Bishop v. Banks*, 33 Conn. 118 (1865) slaughterhouse. For quarries and “plain people”: *Stevens et al. v. Rockport Granite Co.*, 216 Mass. 486, 104 N.E. 371 (1914) at 373, a case used by Kathleen Casey (“Noise Making Subjects,” Ph.D. thesis, UC San Diego, 2005, p. 37) to bring in Hegel’s notion of freedom as “our ability to determine that which enters into our realm of attention . . . That which decides for us our level of concentration has arbitrary power over us, and our freedom is left unrealized.” Cf. Christine Rosen, “Differing perceptions of the value of pollution abatement across time and space: balancing doctrine in pollution nuisance law, 1840–1906,” *Law and H R* 11 (1993) 303–81; Sean Coyle and Karen Morrow, *Philosophical Foundations of Environmental Law* (Oxford: Hart, 2004) esp. 111–17. For examples of courts struggling between doctrines: *Butterfield v. Klaber*, 52 Howard Prac. (NY) 255 (1876); *Campbell et al. v. Seaman*, 63 N.Y. 568 (1876).

163. *Fanshawe and others v. London and Provincial Dairy Co. et al.*, 4 Times Law R. 694 (1887), judgment favoring a longstanding dairy despite the fact that the doctrine of coming to a nuisance “was now exploded,” but then *Tinkler v. Aylesbury Dairy Co.*, 5 Times Law R. 52 (1888), citing and apparently agreeing with Fanshawe yet nonetheless finally enjoining Aylesbury from “carrying on in such a way as to cause a Nuisance,” with particular regard to the rattling of milk cans; Horace G. Wood, *A Practical Treatise on the Law of Nuisances* (Albany, 1875) ch. 16 and q. 476, q. 583, q. 587, 598; *Dennis v. Eckhardt*, 3 Grant (Penn, 1862) 392, damages at law distinguished from abatement as directed by an Equity court, and cf. *St. James’ Church v. Arrington*, 36 Ala. 546 (1860), decision by Justice Wallace with regard to livery stables that “The jurisdiction of courts of equity, to interpose by injunction in cases of private nuisance, is of comparatively recent growth . . . [and] should be used cautiously and sparingly”; *Crump v. Lambert*, 3 Law R. (Eq. Cas.) 409 (1866–1867); *Walker v. Brewster*, 5 Law R. (Eq. Cas.) 25 (1868); *Colgate et al. v. N.Y. Central and Hudson Rail Road Co.*, 51 N.Y. Misc. 503 (1906) at 513 and 515. Cf. *Eller v. Koehler*, 68 Ohio St. 51 (1903), Justice Davis citing Wood in support of a less rigid interpretation “of a very old definition of nuisance.” English equity courts had greater jurisdiction with regard to

enjoining nuisances than did American: *Wallace v. Auer*, 10 Phila. 356 (Penn, 1875) at 357.

164. *Seligman v. Victor Talking Machine Co.*, 71 N.J. Eq. (1 Bush) 697 (1906); *Wade v. Miller*, 188 Mass. 6 (1905) for hens; *Straus et al. v. Barnet et al.*, 140 Pa. 111 (1891) for galvanizers versus file-makers. Cf. *Gilbert v. Showerman*, 23 Mich. 448 (1871), no injunction against a flour mill situated in a “business section” of town; *Hafer et al. v. Gynnam et al.*, 20 Pa. Co. Ct. 321 (1896), no injunction against a boiler factory in a manufacturing area.

165. *Rogers v. Elliott*, 146 Mass. 349, 15 N.E. 768 (1888) at 351; *Lexington and Ohio Rail Road v. Applegate*, 8 Dana 289 (Kentucky, 1839) cited in Horwitz, *Transformation of American Law*, 71; *Bell v. Ohio and Pennsylvania Railroad*, 25 Pa. 161 (1855) at 175; *Mygatt v. Goetchins*, 20 Ga. 350 (1856) at 358 and 359. Cf. Gaston Bachelard, *The Poetics of Space*, tr. Maria Jola (B: Beacon, 1994) esp. 28, convinced that “the image of the city’s roar is in the very ‘nature of things,’ and that it is a true image.”

166. *Dittman and Berger v. Repp*, 50 Md. 577 (1878) at 518 and 522; *Demarest v. Hardham*, 34 N.J. Equity (7 Stew.) 469 (1881) at 474; *Bowden v. Edison Electric Illuminating Co.*, 60 N.Y. Supp. 835 (1899) at 836 and 837, and cf. a digest of precedents prepared later by the Edison counsels, S.B. Eaton and E.H. Lewis, *A Collection of Decided Cases Relating to Injunctions and Damages in Actions for Nuisance* (NY, 1907?); *Bennett v. Long Island Rail Road Co.*, 181 N.Y. 431 (1905) at 436-37; *Knight v. Goodyear’s India Rubber Glove Manufacturing Co.*, 38 Conn. 438 (1871) at 439 and 441; *Davis v. Sawyer*, 133 Mass. 289, 43 Amer. R. 519 (1882) at 519-20; *Chicago, Milwaukee and St. Paul Railway Co. and Chicago, Evanston and Lake Superior Railway Co. v. Mary E. Darke*, 148 Ill. 226, 35 N.E. Reporter 750 (1893), at 751, as also *Pennsylvania Rail Road v. Angel and Wife*, 41 N.J. Equity 316, 7 Atl. 432 (1886), and damages awarded when railroad not otherwise enjoined: *Richards v. Washington Terminal Co.*, 233 US 546 (1914). For a contrary opinion in the older tradition: *Taylor et al. v. Seaboard Air Line Railway*, 145 N.C. 401 (1907) at 403: “It is out of the question, in this advanced age, to apply to railways, our great arteries of commerce, the doctrines of the common law in relation to nuisances.” Cf. Christine M. Rosen, “‘Knowing’ industrial pollution: nuisance law and the power of tradition in a time of rapid economic change, 1840-1864,” *Env H* 8,4 (2003) 565-97; Harold L. Platt, “Invisible gases: smoke, gender, and the redefinition of environmental policy in Chicago, 1900-1920,” *Planning Perspectives* 10 (1995) 67-97.

167. *Everett v. Paschall*, 61 Wash. 47, 111 Pacific 879 (1910) at 880 (going against an earlier legal generation’s decision in *Rhodes et al. v. Dunbar et al.*, 57 Pa. 274 [1868]); *Cluney v. Lee Wai*, 10 Hawaii 319 (1896) at 323; *Kestner v. Homeopathic Medical and Surgical Hospital*, 245 Pa. 326 (1914); *Appeal of Ladies Decorative Art Club of Philadelphia*, 10 Sad. 150, 13 Atl. 537 (Penn, 1888).

168. *Town of Davis v. Davis*, 40 W.Va. 464 (1895) at 472, 476, 479, and cf. *Lambton v. Mellish*, 10 Times Law R 600 (1894), plaintiff winning injunction against the “maddening” noise of two merry-go-round organs playing from 10 a.m. to 6 p.m. Legitimate but noisy entertainments posed a pesky problem in nuisance law: “Amusement park as nuisance,” 33 A.L.R. 725 (1923). Cf. the twists and turns in decisions on a skating rink, *Snyder et al. v. W. C. Cabell and J. B. Cabell*, 29 W.Va. 48, 1 S.E. 241 (1886).

169. *Braender v. Harlem Lighting Co.*, 2 N.Y. Supp. 245 (1888) at 246; *Judson v. Los Angeles Suburban Gas Co.*, 157 Cal. 168 (1910) at 170; *Husey v. Bailey*, 11 Times Law R. 221 (1895);

Yocum v. Hotel St. George Co., 18 Abbot N.C. 340, NY Superior Ct, 2nd District (1887) at 342–43.

170. “Legal noise,” *B Daily Advertiser* (Feb. 27, 1886) 4, and cf. Mark M. Smith, *Listening to Nineteenth-Century America* (U North Carolina, 2001) 249–51; Karin Bijsterveld, *Mechanical Sound: Technology, Culture, and Public Problems of Noise in the Twentieth Century* (MIT, 2008) 55–68; Klaus Saul, “Wider die ‘Lärmpest’: Lärmkritik und Lärmbekämpfung im Deutschen Kaiserreich,” in *Macht Stadt Krank? Vom Umgang mit Gesundheit und Krankheit*, eds. Dittmar Machule et al. (Hamburg: Dölling and Galitz, 1996) 151–92; Francis Caballero, *Essai sur la notion juridique de nuisance* (P: Pichon/Durand-Auzias, 1981) 214ff.; Alain Corbin, *Time, Desire and Horror: Towards a History of the Senses*, tr. Jean Birrell (Camb: Polity, 1995) 152–56; idem, *Village Bells: Sound and Meaning in the 19th-Century French Countryside*, tr. Martin Thom (Columbia U, 1998) 298–308; Joel F. Brenner, “Nuisance law and the Industrial Revolution,” *J Legal Studies* 3 (1974) 403–33; John P. S. McLaren, “Nuisance law and the Industrial Revolution—some lessons from social history,” *Oxford J Legal Studies* 3 (1983) 155–221, q. 207 on public interest; Christopher S. Kerse, *Noise* (L: Oyez, 1975) 16–33; Provine, “Balancing pollution and property rights” (→n.161) and cf. E. W. H., “Noise from operation of industrial plant as nuisance,” 90 A.L.R. 1207 (1934); Raymond W. Smilor, “Personal boundaries in the urban environment: the legal attack on noise, 1865–1930,” *Env R* 3,3 (1979) 24–35, with discussion of *Richards v. Washington Terminal Co.*, 233 U.S. 546 (1914) at 29–30. On the “inverse relationship” between liberalism and social welfare initiatives in Europe: Gregory M. Luebbert, *Liberalism, Fascism, or Social Democracy in Social Classes and the Political Origins of Regimes in Interwar Europe* (Oxford U, 1991) ch. 4. On social welfare in the United States: Walter I. Trattner, *From Poor Law to Welfare State*, 6th ed. (NY: Simon and Schuster, 1999).

171. Demands for quiet in courtrooms stiffened with the verbatim recording of testimony and argument, made possible by new stenographic systems and typewriter-like machines: Edwin C. Surrency, “Law reports in the United States,” *Amer J Legal H* 25 (1981) 48–66; Lisa Gitelman, *Scripts, Grooves, and Writing Machines: Representing Technology in the Edison Era* (Stanford U, 1999) 47–51.

172. Jürgen Habermas, *The Structural Transformation of the Public Sphere*, tr. Thomas Burger and Frederick Lawrence (MIT, 1991) ch. 5; Spater, “Noise and the law,” 29; Louise A. Halper, “Nuisance, courts, and markets in the New York Court of Appeals, 1850–1915,” *Albany Law R* 54 (1990) 301–57; G. Edward White, *Tort Law in America: An Intellectual History* (Oxford U, 1980) q. 13, and cf. Francis T. Piggott, *Principles of the Law of Torts* (L, 1885) 331: “if physical invasion and not also exclusive appropriation were sufficient, then noise does constitute a taking.”

173. George L. Priest, “The invention of enterprise liability: a critical history of the intellectual foundations of modern tort law,” *J Legal Studies* 14 (1985) 461–528; William S. Lawler, *Corporate Bodies and Guilty Minds: The Failure of Corporate Criminal Liability* (U Chicago, 2006) ch. 1; Ithak Englar, “Victor Mataja’s *Liability for Damages* from an economic viewpoint: a centennial to an ignored economic analysis of tort,” *Intl R Law and Economics* 10,2 (1990) 173–91; P. W. J. Bartrip and Sandra B. Burman, *The Wounded Soldiers of Industry: Industrial Compensation Policy, 1833–1897* (Oxford: Clarendon, 1983); Pawlowicz

et al. v. *American Locomotive Co.*, 154 NY Supp 768 (1915).

174. Howard L. McBain, *American City Progress and the Law* (NY, 1918) 76–91; Newman F. Baker, “Municipal aesthetics and the law,” *Illinois Law R* 20 (1926) 546–72, q. 562–63 from *Piper v. Elkern*, 180 Wis. 586, at 603; Albert S. Bard, “Aesthetics and the police power,” *Amer J Economics and Sociology* 15,3 (1956) 265–76. On billboards, Round Two, pp. 439–45 (TK); Herbert S. Swan, “Zone law bans billboards from residence districts,” *Amer City* 20 (March 1919) 259; Andrew W. Crawford, *Important Advances toward Eradicating the Billboard Nuisance*, 2nd rev. ed. (DC, 1920), citing, among others, *Cusack v. City of Chicago*, 242 US 526 (1917). Cf. Raymond R. Colette, “The case for aesthetic nuisance: rethinking traditional judicial attitudes,” *Ohio State Law J* 48 (Winter 1987) 141–75; Stanley K. Schultz, *Constructing Urban Culture* (Temple U, 1989) 41–55, the melding of American nuisance law with police power doctrine. At the start of World War II, Harry L. Binsse would associate the concentration of political power with a concentration of visual noise (of billboards): “Nation’s capital,” *Commonweal* 35 (March 6, 1942) 478.

175. *J Proc City Council of Chicago* (Nov. 13, 1911) 1636 and (Dec. 7, 1914) 2408 as also (1915) 2476–77 on “Zones of Quiet” and (1916) 1021–22, “Zones of Quiet in the Vicinity of Schools”; Lawson Purdy et al., *Zoning as an Element in City Planning* (DC, 1920). On zoning in Europe and its transatlantic translation: Charles H. Cheney, “The necessity for a zone ordinance in Berkeley,” *Berkeley Civic Bull* 3 (May 18, 1915) 168–73; Bijsterveld, *Mechanical Sound*, 68–69, 217–18, 245–53; Daniel T. Rodgers, *Atlantic Crossings: Social Politics in a Progressive Age* (Cambridge, Mass: Belknap, 1998) chs. 4–5, esp. 186: “A device intended to curb property’s speculative advantages, it flourished in the United States as a realtor’s asset.” On zoning in the U.S.: Peter C. Baldwin, *Domesticating the Street: The Reform of Public Space in Hartford, 1850–1930* (Ohio State U, 1999) esp. ch. 8 on traffic grids, 255 on “natural neighborhoods,” and 240–58 on zoning and segregation—noting that Southern cities adopted zoning as a means of enforcing racial segregation, a tactic struck down by the Supreme Court in 1917; but consider David M. P. Freund, *Colored Property: State Policy and White Racial Politics in Suburban America* (U Chicago, 2007) ch. 2; Edward M. Bassett, “Zoning,” in *City Planning*, ed. John Nolen (NY, 1929) 405–14; John H. Hepp, IV, *The Middle-Class City: Transforming Space and Time in Philadelphia, 1876–1926* (U Penn, 2003) 94, 203; Michael Holleran, *Boston’s “Changeful Times”: Origins of Preservation and Planning in America* (Johns Hopkins U, 1998) esp. 211, 257–60; Eric Sandweiss, “Paving St. Louis’s streets: the environmental origins of social fragmentation,” in *Common Fields: An Environmental History of St. Louis*, ed. Andrew Hurley (St. Louis: Missouri H Soc, 1997) 90–106; Stanislaus J. Makielski, Jr., *The Politics of Zoning: The New York Experience* (Columbia U, 1966); Jon A. Peterson, *The Birth of City Planning in the United States, 1840–1917* (Johns Hopkins U, 2003) throughout, q. 124 on righteousness, from J. Horace McFarland of the American League of Civic Improvement, and 308–17 on “The Lure of Zoning”; Keith D. Revell, “Regulating the landscape: real estate values, city planning, and the 1916 zoning ordinance,” *The Landscape of Modernity: Essays on New York, 1900–1940*, eds. D. Ward and O. Zunz (NY: Russell Sage, 1992) 19–45; Jennifer S. Light, *The Nature of Cities: Ecological Visions and the American Urban Professions, 1920–1960* (Johns Hopkins U, 2009) 22–28 on Ernest Burgess’s zonal model of the city, 1925. For the paving: “Demand for noiseless city

streets,” *Modern City* 7 (March 1922) 9.

176. *Euclid v. Ambler Realty Co.*, 272 US 365 (1926) at 394, and note above, as well as Michael A. Wolf, *The Zoning of America: Euclid v. Ambler* (U Press of Kansas, 2008), who stresses the opposition of Progressives to zoning measures that could be used to segregate white collar from blue, “native” from immigrant, white from black. An important precedent was *City of Aurora v. Burns et al.*, 319 Ill 84 (1925). For freedom to operate noisily at night within a declared industrial zone: *Irby v. Panama Ice Co.*, 184 La. 1082, 168 So. 306 (1936). For limits on noise inside industrial zones: William A. Lloyd, “Noise as a nuisance,” *U Penn Law R* 82 (1934) 567–82, at 570–71. For a ruling that determinations of noise nuisance may be affected but not controlled by zoning ordinances: *Tortorella v. H. Traiser and Co.*, 284 Mass. 497, 188 N.E. 254 (1934), concerning cigar-making machines, higher in pitch than street traffic and more monotonous.

177. Stephen E. Slocum, *Noise and Vibration Engineering* (NY, 1931) xv, reporting also the invention of a horn loud enough to communicate with aircraft five miles off. In 1920, Winston Churchill had already “legislated away the right of U.K. citizens to sue for the nuisance created by the noise of aircraft in flight so that the spread of aviation could be encouraged”: Michael J. T. Smith, *Aircraft Noise* (Camb U, 1989) 21.

178. *Christie v. Davey*, 1 Ch 316 (1893). Another party-wall feud was depicted in “The Philosopher’s Revenge,” *Punch* 61 (March 13, 1869) 102, 121, where a deep thinker on one side, offended by the pianistics of a young woman on the other, buys a hurdy-gurdy from a black street musician and installs it opposite the piano in such a fashion that each chord played by the woman activates the hurdy-gurdy.

179. *Ibid.*, at 319, “your clients have no carpet on the floor . . . , consequently there is nothing to deaden the sounds,” wrote Davey, and at 324 on the insubstantial party-wall; League of Nations, Health Organisation, Housing Commission, “The Hygiene of Housing. III. Report on Noise and Housing,” *Bull Health Organisation (League of Nations)* 6 (Aug. 1937) 505–50, at 541; Carleton B. Ryder, “The neglected sense,” *Architecture* 66 (Dec. 1932) 319–24 at 320 for Schlenker; Paul Portier, “Sur les méfaits du bruit,” *Bull Acad de Médecine*, 3rd ser., 103 (1930) 515–18, q. 517 for oases; Joan Woollcombe, “Creating a ‘Quiet Zone’ in the home: the woman’s viewpoint on noise abatement,” in Science Museum (S. Kensington) catalog, *Noise Abatement Exhibition 31st May–30th June 1935* (L, 1935) 30–33, and cf. Alfred H. Davis and Cecil J. Morreau, *The Reduction of Noise in Buildings* (L, 1939) 1, 5, 8 on “noisy sanitary appliances”; Michael L. Berger, *The Devil Wagon in God’s Country: The Automobile and Social Change in Rural America, 1893–1929* (Hamden: Archon, 1979) 140 on the enclosure of cars, as also Charles Adler, letter to *Railway Age* 71 (Sept. 17, 1921) 524, inaudibility of railroad crossing bells from inside a closed automobile; Bijsterveld, *Mechanical Sound*, 62 for “islands of silence”; *Babylonian Talmud. Seder Nezikin*, tr. I. Epstein (L, 1935) Aboth III, Mishnah 13.

180. “‘The hell of noise’ in Japan,” *Lit Digest* 110 (Aug. 15, 1931) 13, from the *Osaka Mainichi Shimbun* [Daily News]; City Club of Chicago, Noise Abatement Committee, *The Problem of Noise Abatement in Chicago* (Chicago, 1937), 11 for Bombay and Havana; James J. Flink, *America Adopts the Automobile, 1895–1910* (MIT, 1970) 58, 75, 96, 195; “\$149,000,000 given to mankind in 1907 . . . Was also a year of disasters,” *NY Times* (Jan. 2, 1908) 10;

Frederick Upton Adams, "Get ready for 5,000,000 automobiles," *Amer Mag* 81 (April 1916) 18-20, 73-74; Richard Overly, "Heralds of modernity: cars and planes from invention to necessity," in *Fin de Siècle and Its Legacy*, eds. Teich and Porter (→n.67) 54-79, data at 65; R. Vance Ward, "Automobile fatalities in 1929," *Canadian Med Assoc J* 22 (Feb. 1930) 255; Xenophon P. Huddy and Arthur F. Curtis, *The Law of Automobiles*, 6th ed., (Albany, 1922) Sects. 524-26, 927; Sidney Coleman, "Chained-in safety zones block Buffalo jay-walkers," *Natl Safety News* 3 (Feb. 28, 1921) 5; poster section, *ibid.* 5 (Jan. 1922).

181. *J Proc City Council of Chicago* (1915) 2476-77 on "Zones of Quiet" and (1916) 1021-22, "Zones of Quiet in the Vicinity of Schools"; Henry P. Maybury et al., *Report of Conference on Road Traffic Noises and Priority of Traffic at Cross Roads* (L, 1929) 3 on "zones of silence" against honking, and also on the technical difficulty of "satisfactorily distinguishing types of horns according to their notes, whether pleasing or otherwise"; Spooner, "The noise question" (→n.53) 306-307, and 309 on airplanes; [Mr. Hore-Belisha, Minister of Transport], "Street noise abatement," *Local Government Chronicle* [London] 3538 (Sept. 1, 1934) 552 on "silence zones"; Paul Portier, "Les méfaits du bruit," *Bull Acad de Médecine*, 3rd ser., 104 (1930) 7-8, and Alberte Leconte, "Du bruit et de ses effets dans la vie urbaine," Thesis, Faculté de Médecine de Paris, 1930; T. R. Cave-Brown-Cave, "Exhaust noise and other noises of motor transport," *J Royal Soc of Arts* 83 (June 28, 1935) 760-78, 770 for "power roar," 773 for "silence zones"; *idem*, "The torment of noise. Inquiry by British Association," *L Times* (Nov. 9, 1933) 13, on the most annoying sources of noise, tabulated from letters solicited by the Association at the request of Henry Fowler, "The torrent of noise. A new society formed," *ibid.* (Sept. 30, 1933) 11:5; "It's not all blowing the whistle with the traffic cop," *Illustrated World* [Chicago] 34 (Sept. 1923) 77-78. Cf. "The noise of motor traffic," *The Engineer* [London] 117 (Feb. 1914) 169-70, 205-206, 230-31; John A. Montgomery, *Eno—The Man and the Foundation* (Westport: ETF, 1988) on development of traffic rules and controls, and 93 on Mussolini; Jerusalem note, in *Quiet Mag* 1 (Autumn 1936) 2; Clive Elmsley, "'Mother, what did policemen do when there weren't any motors?' The law, the police, and the regulation of motor traffic in England, 1900-1939," *Historical J* 36 (1993) 357-81.

182. G. W. C. Kaye, commenting on Cave-Brown-Cave, "Exhaust noise," q. 774; "Noise abatement," *Mo Bull City Club of NY* 22 (April 1930) 4; Thomas Jeeves, First Baron Horder, "Human reactions to noise," *J Royal Sanitary Inst* 58 (June 1938) 713-21, q. 714 mortality, q. 715 East Wind, q. 721 dysgenic, and cf. Agar, "Bodies, machines and noise" (→n.54) 202-204 on Horder's influence and ideology, as also Geoffrey Bourne, "Lord Horder (Obituary)," *British Heart J* 18 (1956) 123-35, and Christopher Lawrence, "A tale of two sciences: bedside and bench in twentieth-century Britain," *Med H* 43 (1999) 421-49; Dr. L. Grant Hector of Buffalo, cited by Sherwood L. Reeder, Exec. Dir., Institute of Municipal Law Officers, preface to the Institute's Report No. 10, "Anti-Noise Ordinances" (1936) in Howard F. Ilgner Papers, f. 85, "Noise File," red notebook, at Milwaukee County Historical Society, Milwaukee, Wis; Donald Laird, "Measurement of effects of noise on industrial efficiency," *J Ind Hygiene* 9 (Oct. 1927) 431-34; Jûichi Obata et al., "The effects of noise upon human efficiency," *JASA* 5 (April 1934) 255-61. Himself a driving enthusiast, Horder's prescription for one of the many shellshocked veterans he saw after the Great

War was to go buy a used motorcycle and drive it to Edinburgh and back: Mervyn Horder, *The Little Genius: A Memoir of the First Lord Horder* (L: Duckworth, 1966) 71, 93.

183. Floyd W. Parsons, “Noises, nerves and business,” *Readers’ Digest* 18 (Jan. 1931) 843, from *Advertising and Selling* (June 25, 1930). Cf. Daniel F. Hoth’s study, for Bell Labs, of “Room noise spectra at subscribers’ telephone locations,” *JASA* 12 (April 1941) 499–504.

184. John Mills, *A Fugue in Cycles and Bels* (NY, 1935) 28–29 on the history of standard international pitch and how this could be affected by the advent of electronic music; A. M. Mayer, “On the experimental determination of the relative intensities of sound,” *Amer J Sci* 105 (1873) 44–46, 123; Joseph Jastrow, “An apparatus for the study of sound intensities,” *Sci n.s.* 3 (1895) 544–46; Myles W. Jackson, *Harmonious Triads: Physicists, Musicians, and Instrument Makers in Nineteenth-Century Germany* (MIT, 2006); Dundas Grant, “A rapid method of making graphic charts of hearing power for various tones,” *Laryngoscope* 4 (1898) 102–106; Charles K. Wead, “On the intensity of sound,” *Amer J Sci* 41 (1890) 232–35, q. 234, and “On the intensity of sound.—II. The energy used by organ pipes,” 42 (1891) 21–34, q. 30; *Catalogue des appareils d’acoustique construits par Karl R. Koenig* (P, 1889); A. Sturmhoefel, “Neues über Schallmessung,” *Deutsche Bauzeitung* (Jan. 13, 1894) 24–27. On variant results for audible sound-range: Turnbull, *Imperfect Hearing* (→ n.138) 9–10; E. W. Johnson, “Tuning forks to audiometers and back again,” *Laryngoscope* 80 (Jan. 1970) 49–68.

185. Thomas A. Edison, Inc., advertisement, “No difference!” *Lit Digest* 63 (Oct. 4, 1919) 43; Thompson, *Soundscape of Modernity* (→ n.119) 235–40; Sterne, *The Audible Past* (n.139) ch. 5. For a measurement of the singing of Enrico Caruso, one of the most widely recorded of operatic stars: V. Karapetoff, “Audible electric signals in industrial plants, and acoustical engineering,” *J Amer Inst Electrical Engineers* 39 (Jan. 1920) 13–19. For the impact of recording technologies on musical style and taste: Robert Philip, *Early Recording and Musical Style: Changing Tastes in Instrumental Performance, 1900–1950*, new ed. (Camb U, 2004); Mark Katz, *Capturing Sound: How Technology Has Changed Music* (UC, 2004); Sudip Bose, “Vibrato wars,” *Amer Scholar* 78 (Spring 2009) 114–17, and cf. Wilmer T. Bartholomew’s review of Carl E. Seashore, *Psychology of the Vibrato in Voice and Instrument* (Iowa City, 1936), in *JASA* 8 (1937) 205.

186. U.S. Bureau of Mines, *Explosives and Miscellaneous Investigations* (DC, 1919) 99–103; C. A. Heiland, *A New Geophone*, Technical Pub. 330, Class L, Geophysical Prospecting, Amer Inst of Mining and Metallurgical Engineers (NY, 1930).

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206. Aldous Huxley, *Brave New World* (L, 1932) 1; idem, *The Perennial Philosophy* (NY, 1945) 216–19, q. 218. Huxley’s sensitivity to sound had been conditioned by eighteen months of near-blindness when he was sixteen: *Letters*, ed. Grover Smith (NY: Harper and Row, 1969) 39, 55. Cf. “Squeak and gibber” (1931) in his *Music at Night* (L, 1949) 99–100.

207. Aldous Huxley, “Water music” (1920) in *On the Margin* (L, 1926) 39–44, q. 40–41; idem, *Time Must Have a Stop* (NY, 1944) 121, conjurors; Free, “How noisy is New York?” 322; Edmund Jacobson, *You Must Relax*, 4th ed. (NY, 1957 [1934]) esp. preface and bibliography; W. B. Cannon, *The Wisdom of the Body* (NY, 1932); Hans Selye, “History and present status of the stress concept,” in *Handbook of Stress*, eds. L. Goldberger and S. Breznitz (NY: The Free Press, 1982) 7–20; R. Jacob and G. Kissling, “History of cardiac physiology in the framework of the German Society for Circulation Research (1927–1980),” *Z Kardiologie* 91, Suppl 4 (2002) 25–33. Some of Laird’s methods, including the gas masks put on typists, can be seen in “Relax” (Prelinger Archives, ca. 1940), a film he made with the Jam Handy outfit for General Motors; here the solution to noise or stress at home is to go for a solo drive in a quiet Chevy: www.archive.org/details/relax.

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and tigers; Frederick G. Fassett, "New York's loud noise about noise," *B Evening Transcript* (Oct. 3, 1930), in "Noise" vertical file, Library, Volta Bureau, DC.

211. "Rest cures for sick ears," *NY Times* (July 3, 1928) 20; "The noise 'emergency,'" *ibid.* (July 7, 1930) 18; Brown et al., *City Noise*, 17 for emergency, 46 for Fletcher, 81 for Budapest and *NY Post*, 119 for the 10,000.

212. R. V. Parson, "Is there a quiet spot in New York" (1929) in Brown et al., *City Noise*, 237, and 267 for "imprisoned street noise"; "Noise expert tells finding. Little noise often noisiest. It depends where you sit," *San Francisco Chronicle* (March 2, 1936); Walter J. Hodge, "Sound control and noise elimination," *Personnel J* 15 (May 1936) 11-18, 15 for vaults and heart; "Noise," *NY Times Mag* (March 31, 1940) VII,2:4; "Startling new audit of nerve-wracking noises," *San Francisco Chronicle* (Oct. 29, 1933) *Mag*, p. 6.

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214. Walter H. Eddy, "The decibels will get you... if you don't watch out!" *Good House-keeping* (Aug. 1938) 80, 136; "La Guardia backs anti-noise drive," *NY Times* (May 17, 1935) 23; "League opens drive to reduce city noise," *ibid.* (June 7, 1935) 23; "Noiseless nights"

decreed here by La Guardia during October," *ibid.* (Aug. 11, 1935) 1; "Night din in the city dwindles as campaign to end noise begins," *ibid.* (Oct. 1, 1935) 1; "1,273 noise makers get warnings, 5 arrested in drive's first night," *ibid.* (Oct. 2, 1935) 27; "Brass band's blare ends anti-noise hearing; trumpets and drums lend point to speeches," *ibid.* (April 12, 1930) 21; "It's still bedlam on the subway," *NY Times Mag* (Sept. 29, 1940) VII,7, reviewing five years of anti-noise campaigning. Each chapter of James Flexner, *City Noise. Vol. II* (NY, 1932) was separately paginated. I use preface 1-3; ch. 1, q. 1 for cricket, 2-3; ch. 2, q. 1, 5; ch.3, 9 for ghost; ch. 5, 1-10 for schools, 10 for "hush day"; ch. 6, q. 7 for the blind.

215. Ryder, "The neglected sense" (→ n.179) 322; "Electric ear devised to aid in war on noise," *NY Times* (Dec. 3, 1930) 52, and cf. "Silencing New York subways a difficult task for science," *ibid.* (Dec. 21, 1930) IX.6; "Banishing noise" (Dec. 6, 1928) as also "Electric ear to reduce noise demonstrated by engineer" (Dec. 3, 1930) in *B Herald Trib* morgue, Boston U; Albert Glinsky, *Theremin: Ether Music and Espionage* (U Illinois, 2000) esp. 23, origins of the theremin in designs for an invisible burglar alarm; Henry A. Christian, *Report of the Boston Noise Commission Appointed by his Honor, Mayor James M. Curley, to Work in Cooperation with the City Planning Board in Considering the Question of the Suppression of Unnecessary Noises in the City of Boston* (B, 1932) 10; "That noise survey," *Milwaukee J* (Nov. 25, 1935) and "Limit on noise finds success in Wauwatosa," *ibid.* (July 29, 1936) for Lindeman, both in "Noise" vertical file, Milwaukee Public Lib; Spooner, "Noise question" (→ n.53) q. 307, as also T.R. Cave-Brown-Cave, "Exhaust and other noises of motor transport," *Noise Abatement Exhibition* (→ n.179) 23; Atlanta Chamber of Commerce, "Anti-Noise Committee," *City Builder* 3 (Aug. 1918) 9-10; T. J. C. Martyn, "City din measured to abate its noise," *NY Times* (May 31, 1931) XX,4, esp. on doormen whistling for taxis at midnight.

216. Harry F. Olson and Frank Massa, *Applied Acoustics* (Phila, 1934) 398-404; "Noise measurement methods," *Electronics* (April 1935) 110-13; William B. White, "Roar of cities has musical undertone," *NY Times* (Jan. 4, 1931) IX.4; C. W. Glover, "London's baritone of terrific intensity," *Quiet Mag* 1,3 (Autumn 1936) 10; news of omnibus strike, *ibid.* 1,6 (Oct. 1937) 7; Edward Podolsky, "Noise," *Illinois Med J* (May 1935) 478-80 for Kennedy and other evidence that shrill sounds could boil an egg, kill bacteria, and coagulate proteins; "Noise found harder on brain than drugs," *NY Times* (July 7, 1930) 1; "Actually loud clothes," *ibid.* (July 8, 1930) 22.

217. "Some fundamentals of sound," *Radio Retailing Today* (Oct. 1943) fold-out chart; W. H. Pielemeier, "Seeing summer sounds," *Sci Mo* (May 1946) 450-62 on grasshoppers, and cf. P. T. Haskell, *Insect Sounds* (Chicago, 1961) 9, 106-108; Louis Milne and Margery Milne, *The Senses of Animals and Men* (NY, 1962) 63 for Darwin; Howard F. Weiss, "Noise and health," *Amer Forests and Forest Life* 37 (July 1931) 410-11; David W. Smith, "Hearing loss protection for agricultural workers," for the Texas Cooperative Extension, at <http://agsafety.tamu.edu/HEARING%20LOSS%20PROTECTION.pdf> on barns, pigs, and tractors; Oskar Spitta, "Über den Lärm," *Gesundheits-Ingenieur* 64,2 (1941) 22-26 on whispers, townhouses, aircraft; Leon A. Frechette, "The great divide," on circular saws, at www.asktooltalk.com/articles/toolhistory/divide.php; Hale Sabine, *Less Noise, Better Hearing*, 6th ed. (Chicago: Celotex, 1950 [1938]) 66 for the Buffalo Zoo's Celotexed Monkey House. Cf. "Villages outdoing big cities. Noises of a metropolis negligible compared to

din in small towns,” *NY Times* (April 12, 1931) III,2, citing the Arctic explorer Vilhjalmur Stefansson on the “frozen silent North” being as “noisy as a Chicago street canyon at 4 p.m.,” with the cracking of ice shelves and shrieks of seabirds.

218. McLachlan, *Noise* (→ n.132) q. 1, 60 for background noise; Kaye, “Measurement of noise” (→ n.122) 160–63, q. 160 on Armistice Day; L. J. Sivian, “Speech power and its measurement,” *Bell System Technical J* 8 (1929) 655, ten flights up; Wilber D. Currier, “Office Noises and Their Effect on Audiometry,” MA Thesis, Dept. of Otolaryngology, Washington U, 1942, p. 7 and Table 2; Walter A. Wells, “Some practical consideration with regard to hearing tests,” *AORL* 49 (1940) 427–37 for the percentages, q. 436, and warning (p. 430) that unless otologists embraced the audiometer, commercial audiologists would threaten their profession; Sabine, *Less Noise, Better Hearing*, 79–82; Shirley W. Wynne, “City noise,” *JASA* 11 (Jan. 1942) q. 214; “Calls noise enemy no. 1,” *B Herald Trib* (March 1, 1935) in newspaper morgue, Boston U.

219. Vern Knudsen, introduction to *Outdoor Noise and the Metropolitan Environment: A Case Study of Los Angeles*, eds. M. C. Branch and R. D. Beland (LA: Dept. of City Planning, 1970) iii, and fig. 1 for decibel levels; Theodore Berland, *The Fight for Quiet* (EC: Prentice-Hall, 1971), 141, 143; William Hamby, “Ultimate Sound Pressure Level Decibel Table” (2004) at www.makeitlouder.com/Decibel Level Chart.txt for estimates on nuclear explosions.

220. Jean Cocteau, *La Voix humaine* (P, 1934 [1930]); Avital Ronell, *Finitude’s Score* (U Nebraska, 1994) 34–40.

221. On timbre and subtones, consider Mark Dresser, “A personal pedagogy,” in *Arcana: Musicians on Music*, ed. John Zorn (NY: Granary, 2000) 250–61, and Bob Ostertag, “All the rage,” 193–202 on the sonic intricacies of anger, screaming, and riot. Contrast Stephen McAdams, “Recognition of sound sources and events,” in McAdams and Bigand, *Thinking in Sound* (→ n.190) 162–74. Erik Christensen, *The Musical Timespace: A Theory of Listening* (Aalborg U, 1996), maps timbre as microtemporal, such that the auditory cortex must process successive cues in short-term memory in order to register it. In this respect, consider Karen Painter, *Symphonic Aspirations: German Music and Politics, 1900–1945* (Harvard U, 2008) 87, who suggests that “For timbre to gain sovereignty, even for a moment, imperiled a bourgeois world in which status depended on the reproducibility of culture.” Knudsen’s curves are printed in Sabine, *Less Noise*, 26, who claims (p. 11) that “A telephone transmits the fundamental voice frequencies very inefficiently as compared with the vowel and consonant frequencies, but this attenuation of the low frequencies affects only the naturalness and not the intelligibility of the transmitted speech.”

222. Kaye, “Measurement of noise” (→ n.122) q. 159. On the efforts of two generations of RCA engineers and others to reduce the noise of phonographic recording and playback in order to expand (or at least restore) sensitivity to and reproduction of timbre, especially with the development of long-play (33 $\frac{1}{3}$ rpm) and stereo systems: Harry F. Olson, “A review of twenty-five years of sound reproduction,” *JASA* 26 (1954) 637–43; Colin Symes, *Setting the Record Straight: A Material History of Classical Recording* (Wesleyan U, 2004); David Morton, *Off the Record: The Technology and Culture of Sound Recording in America* (Rutgers U, 2000); Susan Schmidt-Horning, “Engineering the performance: recording

engineers, tacit knowledge, and the art of controlling sound,” *Social Studies of Sci* 34 (2004) 703–31; Alexander B. Magoun, “Shaping the Sound of Music: The Evolution of the Phonograph Record, 1877–1950,” Ph.D. thesis, U Maryland, 2000, based on materials in the David Sarnoff Lib, Princeton, NJ.

223. JoAnne Yates, *Control through Communication: The Rise of System in American Management* (Johns Hopkins U, 1989) q. 12 from the mechanical engineer Henry Metcalfe (1886), 56 for vertical files, 88 for Gantt Progress Chart (1917), and 95 for memo (1918).

224. David Kahn, *The Codebreakers: The Story of Secret Writing* (NY: Macmillan, 1967) 266–386; R. V. Jones, “Alfred Ewing and ‘Room 40,’” *Notes and Records of the Royal Soc of L* 34,1 (1979) 65–90; Rudolf Kippenhahn, *Code Breaking: A History and Exploration*, tr. Ewald Osers (Woodstock: Overlook, 1990).

225. *OED*, s.v. “Information”; “Information?” *Amer Telephone J* 15 (1907) 297; John Brooks, *Telephone: The First Hundred Years* (NY: Harper & Row, 1976) 100–101, 117, 168; Michèle Martin, “Hello, Central?: Gender, Technology, and Culture in the Formation of Telephone Systems (McGill-Queen’s U, 1991).

226. On polygraphs, which built upon a 19th-century tradition of physiological devices and psychophysical experiments by Étienne-Jules Marey in Paris (studying the pulse rates and respiration of subjects exposed to noise) and continued by Hugo Münsterberg at Harvard: Hoebbel E. Hoff and L. A. Geddes, “An historical perspective on physiological monitoring: Chauveau’s projecting kymograph and the projecting physiograph,” *Cardiovascular Research Center Bull* 14 (1975) 3–35; François Dagognet, *Étienne-Jules Marey: A Passion for the Trace*, tr. Robert Galeta with Jeanine Herman (NY: Zone, 1992) esp. 42–63; John A. Larson, with George W. Haney and Leonarde Keeler, *Lying and Its Detection: A Study of Deception and Deception Tests* (Montclair: Patterson Smith, 1969 [1932]); Eugene B. Block, *Lie Detectors: Their History and Use* (NY: McKay, 1977); Kerry Segrave, *Lie Detectors: A Social History* (Jefferson: McFarland, 2004) 10–47; Ken Alder, *The Lie Detectors: The History of an American Obsession* (NY: Free Press, 2007) q. 32 from *San Francisco Examiner* (June 10, 1922); David T. Lykken, “Trial by polygraph,” *Behavioral Sciences and the Law* 2 (Winter 1984) 75–92, results rarely acceptable in court.

227. E.g., Edna E. Cassel and K. M. Dallenbach, “The effect of auditory distraction upon the sensory reaction,” *Amer J Psych* 29,2 (1918) 129–43; Edwin G. Boring, *Sensation and Perception in the History of Experimental Psychology* (NY, 1942), and Laird on typists, as above (→ n.205).

228. Robert V.L. Hartley, “Transmission of information,” *Bell System Technical J* 7 (1928) 535–63, q. 535; David A. Mindell, *Between Human and Machine: Feedback, Control, and Computing before Cybernetics* (Johns Hopkins U, 2002) esp. 106–12. Cf. Leon Cohen, “The history of noise,” in *Noise in Communication*, eds. L.B. White et al. (Bellingham: SPIE, 2004) 85ff., carried forward in his “The history of noise,” *IEEE Signal Processing Mag* (Nov. 2005) 20–45.

229. James Jeans, *Science and Music* (NY: Dover, 1968 [1937]) 1–16, q. 3, q. 7, caption to Plate I, fig. 2, q. 14–16.

230. Theodor W. Adorno, “Bewusstsein des Konzerthörers (1930),” *Musikalischen Schriften, V* (Frankfurt am Main: Suhrkamp, 1978); idem, “On the fetish-character in

music and the regression of listening (1938)” in *The Essential Frankfurt School Reader*, eds. A. Arato and E. Gebhard (Oxford: Blackwell, 1978) 270–99; idem, “On popular music (1941),” *On Record*, eds. S. Frith and A. Goodwin (NY: Pantheon, 1990) 301–14, q. 302, q. 303; idem, “A social critique of radio music,” *Kenyon R 7* (Spring 1945) 208–17; idem, *Philosophy of Modern Music*, trs. A. G. Mitchell and W. V. Blomster (NY: Seabury, 1980 [1958]) 197–201; idem, *Night Music: Essays on Music, 1928–1962*, ed. Rolf Tiedemann, tr. Wieland Hoban (L: Seagull, 2009), esp. 118–76, “On Jazz.” Cf. Thomas Y. Levin, “For the record: Adorno on music in the age of its technological reproducibility,” *October* 55 (1990) 23–66; idem, with Michael von der Linn, “Elements of a radio theory: Adorno and the Princeton Radio Research Project,” *Musical Q* 78 (Summer 1994) 316–24. Cf. the sly critique by Ellis O. Jones, “Confessions of a professional listener,” *Forum* 98 (Sept. 1937) 119–22. On Adorno’s belief that self-respecting modern art and music must be acts of denial and resistance: Hendrik Birus, “Adorno’s negative aesthetics,” in *Languages of the Unsayable*, eds. S. Budick and W. Iser (Columbia U, 1989) 140–64; for a critique, David Cunningham, “A time for dissonance and noise: on Adorno, music, and the concept of modernism,” *Angelaki* 8 (April 2003) 61–74, and more generally, Andrew Dell’Antonio, ed., *Beyond Structural Listening? Postmodern Modes of Hearing* (UC, 2004).

231. Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (U Illinois, 1949, including a paper by Shannon in the *Bell System Technical J* [July and Oct. 1948] and an article by Weaver in *Sci Amer* [July 1949]) 25–26 for English, 50n. on Shannon’s uncomfortableness with the figurative nature of “white noise,” 109 on freedom of choice, 116 “bizarre”; Claude E. Shannon, “Communication in the presence of noise,” *IEEE Proc* 86,2 (1998) 447–57, reprinted from *Proc IRE* 37,1 (1949) 10–21; J. R. Licklider, “The manner in which and extent to which speech can be distorted and remain intelligible,” in *Cybernetics: Circular Causal and Feedback Mechanisms in Biological and Social Systems*, ed. Heinz von Foerster (NY, 1949–1953) II,61; Steve J. Heims, *The Cybernetics Group (1946–1953)* (MIT, 1991) 26 on Lewin; Norbert Wiener, *Ex-Prodigy: My Childhood and Youth* (MIT, 1953) 266; idem, typescript review of Shannon and Weaver (1949?), Box 28D, f. 618, in his Papers, 1910–1963, Institute Archives and Special Collections, MIT. For the thermodynamic implications of information theory: Leon Brillouin, “Maxwell’s Demon cannot operate: information and entropy, I,” *J Applied Physics* 22 (1951) 334–37, which debates the counterintuitive association of information with entropy, and cf. Katherine N. Hayles, “Information or noise? Economy of explanation in Barthes’s *S/Z* and Shannon’s information theory,” in *One Culture: Essays in Science and Literature*, eds. G. Levine and A. Rauch (U Wisconsin, 1987) 119–42 at 120. Also useful: Hans Christian von Baeyer, *Information: The New King of Science* (Harvard U, 2004) 122–28; Stanley A. Gelfand, “Theory of signal detection,” in his *Hearing: An Introduction to Psychological and Physiological Acoustics*, 2nd ed. (NY: Marcel Dekker, 1990) 313–24.

232. Thomas Willis, *Two Discourses concerning the Soul of Brutes*, tr. Samuel Pordage (Gainesville: Scholars’ Facsimiles, 1971 [1683, original Latin 1672]) 73; Knudsen, “Reminiscences,” 436–37; idem, “The hearing of speech in auditoriums,” *JASA* 1 (Oct. 1929) 56–82, noise always gets in the way of hearing.

233. These mixed metaphors come home to roost in French, where “parasite” is also

the technical term for noise in an electrical channel, a *double entendre* upon which Michel Serres has built an entropic theory of sound and society: Michel Serres, *The Parasite*, tr. Lawrence R. Schehr (Johns Hopkins U, 1982), esp. 121–35, 185–89; idem, *Les cinq sens* (P: Grasset, 1985) 113–20; idem, *Genesis*, trs. G. James and J. Nielson (U Michigan, 1995) throughout; idem, *La Naissance de la physique dans le texte de Lucrèce: fleuves et turbulences* (P: Éditions de Minuit, 1977). For concise accounts of the life-project of Serres with regard to noise: John Lechte, *Fifty Key Contemporary Thinkers* (L: Routledge, 1994) 82–85; Eric C. White, “Negentropy, noise, and emancipatory thought,” in *Chaos and Order: Complex Dynamics in Literature and Science*, ed. N. Katherine Hayles (U Chicago, 1991) 263–70. For an earlier French framing of noise within the context of information theory (where “intelligibility varies inversely as originality”): Abraham Moles, *Information Theory and Esthetic Perception*, tr. Joel E. Cohen (U Illinois, 1968 [1958]) q. 22 and throughout. For a critique of the “badly phrased question, ‘Is noise information?’”: Donald MacKay, *Information, Mechanism and Meaning* (MIT, 1969) 134.

234. Otto Mayr, *The Origins of Feedback Control* (MIT, 1970); idem, *Authority, Liberty, and Automatic Machinery in Early Modern Europe* (Johns Hopkins U, 1986).

235. E. Colin Cherry, “A history of the theory of information,” *IEEE Trans on Information Theory* 1 (1953) 22–43, discussion 167ff.; idem, “The communication of information (an historical review),” *Amer Sci* (1952) 640–64; idem, *The Age of Access: Information Technology and Social Revolution*, comp. and ed. William Edmondson (L: Croom Helm, 1985); Mindell, *Between Human and Machine*, 105–106 pass.; Heims, *The Cybernetics Group*; Norbert Wiener, *Cybernetics: or, Control and Communication in the Animal and the Machine* (NY, 1948); idem, *Ex-Prodigy*, 257–58; idem, with J. Wiesner and L. Levine, “Some problems in sensory prosynthesis,” ca. 1949, in Box 28D, f. 623 of the Wiener Papers, Institute Archives and Special Collections, MIT, and cf. idem, “Speech, language, and learning,” *JASA* 22 (1950) 696–97, which follows on the lobes of R. M. Fano, “The information theory point of view in speech communication,” *ibid.* 691–96.

236. Susan Burch, *Signs of Resistance: America Deaf Cultural History, 1900 to World War II* (NY U, 2002) esp. 72–73; Homer Jacobson, “Information and the human ear,” *JASA* 23 (1951) 463–71; W. H. Huggins, “A theory of hearing,” in *Communication Theory*, ed. Willis Jackson (L, 1953) 364. At this point I leave off the analysis of relationships between deaf communities and noise, which other scholars are pursuing with emphasis on controversies over cochlear implants, on which see Josh Aronson (dir.), *Sound and Fury* (NY: Aronson Film Associates and Public Policy Productions in association with Thirteen/WNET and Channel 4, 2000) and files and videotapes at the House Ear Inst, Los Angeles, as well as the revealing set of “practical applications” in Brian C. J. Moore, *An Introduction to the Psychology of Hearing* (San Diego: Academic, 1997) 306–29. Most recent is Stuart Blume, *The Artificial Ear: Cochlear Implants and the Culture of Deafness* (Rutgers U, 2010).

237. Theodore Reik, *Listening with the Third Ear* (NY, 1948) ch. 12, q. 125–26, and cf. Carl Rogers, “The directive versus the non-directive approach (1942),” in *Carl Rogers Reader*, eds. H. Kirschenbaum and V. L. Henderson (B: Houghton Mifflin, 1989) 77–87; Thomas Merton, *The Waters of Siloe* (NY, 1949); idem, *Entering the Silence: Becoming a Monk and Writer*, ed. Jonathan Montaldo (San Francisco: Harper, 1995 [wr. 1946–1952]);

Daniel Quinn, *Providence: The Story of a Fifty-Year Vision Quest* (NY: Bantam, 1995) 42-43, 49 on Merton; Norris, *Writing War* (→n.38) ch. 7 on Hiroshima, esp. 194; André Neher, *The Exile of the Word, from the Silence of the Bible to the Silence of Auschwitz*, tr. David Maisel (Phila: Jewish Publication Soc, 1981), but contrast David Patterson, *The Shriek of Silence: A Phenomenology of the Holocaust Novel* (U Press of Kentucky, 1992) and Raymond Federman, *Shhh: The Story of a Childhood* (Buffalo: Starcherone, 2010); as well as Michal Glowinsky, *The Black Seasons*, tr. Marci Shore (Northwestern U, 2005) 67-73; Picard, *The World of Silence* (→n.109) 17, 22, 32, 40, 83, 206, 211.

238. David Revill, *The Roaring Silence: John Cage A Life* (L: Bloomsbury, 1992) 20-21, q. 29-30, 47, q. 51, 60, 64; Robert P. Morgan, "Rethinking musical culture: canonic reformulations in a post-tonal age," in *Disciplining Music*, eds. K. Bergeron and P. V. Bohlman (U Chicago, 1992) 44-63; John Cage, *A Year from Monday* (Wesleyan U, 1967) 44-45, reviewing a book of Schoenberg's letters; William Moritz, *Optical Poetry: The Life and Work of Oskar Fischinger* (Indiana U, 2004) 42-43, 58-60, q. 78, 165, 226-27 for his "Komposition in Blau"; John Cage, "The future of music (1937)," in his *Silence* (Wesleyan U, 1961) 3-6, q. 3.

239. Revill, *The Roaring Silence*, 65, 73; Symes, *Setting the Record Straight* (→n.222) 13; Hick, *Henry Cowell* (→n.67); Henry Cowell, *New Musical Resources*, ed. David Nicholls (Camb U, 1997 [1919]); William Bunch, *Jukebox America* (NY: St. Martin's, 1994) 8, 93; Bob Gilmore, *Harry Partch: A Biography* (Yale U, 1998) esp. 26-27, 50, q. 52, q. 72, q. 97, q. 137 on Cage, 148 on Brant, 151; David P. Brown, *Noise Orders: Jazz, Improvisation, and Architecture* (U Minnesota, 2006) xxvi, xxviii, and throughout; Dean Sanomieri, interviewed in *Incredibly Strange Music*, eds. V. Vale and A. Juno (San Francisco: Re/Search, 1994) II, 123-24, and elaborated by Jordan R. Young, *Spike Jones Off the Record: The Man Who Murdered Music* (Albany: Bear Manor, 2005); Anaïs Nin, *Diary: III. 1939-1944*, ed. Gunther Stuhlmann (NY: Swallow/Harcourt Brace Jovanovich, 1969) 61-62, 155-56, 268. William H. Kenney suggests that Mississippi River Boat jazz owed its volume and rhythms to the need to be heard above boat engines: *Jazz on the River* (U Chicago, 2005). Cf. Kahn, *Noise Water Meat* (→n.64), 161-99, critical of Cage's exclusionary practices and disingenuous musico-theoretical politics.

240. George J. Leonard, "D. T. Suzuki and the creation of Japanese American Zen," in *The Asian Pacific American Heritage*, ed. Leonard (NY: Garland, 1999) 381-94; Kahn, *Noise Water Meat* (→n.64), 172-74, 182-83; Cage, *Silence*, 262; D. T. Suzuki, *Introduction to Zen Buddhism*, with foreword by Carl Jung (NY: Grove, 1994 [1914, reissued in 1948]) 59, q. 106; Yoel Hoffman, ed. and tr., *The Sound of the One Hand: 281 Zen Koans with Answers* (NY: Basic, 1975) esp. 10-11, quoting Holmes Welch, *The Practice of Chinese Buddhism* (1967) on the acoustic regulation of Zen monasteries: "In a well-run hall the monk should be able to forget his body and let it be guided like an automaton by the bell and board."

241. D. T. Suzuki, *The Zen Doctrine of No-Mind* (York Beach: Weiser, 1972 [1949]) 93, 153 on boxing the ear; Roberta Wohlstetter, *Pearl Harbor: Warning and Decision* (Stanford U, 1962) chs. 1-2. A contrary interpretation was devised by secret police and Cold War interrogators, who called their practice of boxing a torture-victim's ears with cupped hands so as to cause pain but no visible wound "telefono": Eric T. Stover and Elena O.

Nightingale, eds., *The Breaking of Bodies and Minds: Torture, Psychiatric Abuse, and the Health Professions* (NY: W. H. Freeman, 1985) 62.

242. Lewis Hyde, "Elegy for John Cage," *Kenyon R* 5 (Summer 1993) 55–56; John Cage, *A Year from Monday* (Wesleyan U, 1967) 134, discussed by Kahn, *Noise, Water, Meat* (→ n.64) 189–91, and Dyson, *Sounding New Media* (→ n.109) 60–72; McLachlan, *Noise* (→ n.132) 5; Price, "Baltimore and the battle on noise" (→ n.213); Morris F. Heller and Moe Bergman, "Tinnitus in normally hearing persons," *Annals of Otology* 62 (1953) 73–83, q. 74 from R. L. Wegel, "A study of tinnitus," *Archives of Otolaryngology* 14 (1931) 158. For another moral-metaphorical use: Jean-François Lyotard, *Soundproof Room: Malraux's Anti-Aesthetics*, tr. Robert Harvey (Stanford U, 2001). From the yogic perspective, another tradition with which Cage had a passing acquaintance, disciples are instructed to concentrate upon the "Dhum-Dhum-Kāra Nāda" that can be heard within the head when both ears are plugged up, which gradually turns into the mantric *Om*: Guy L. Beck, *Sonic Theology: Hinduism and Sacred Sound* (U South Carolina, 1993) 100. In 1955, having constructed a soundproof room specifically for better cardiac auscultation, a physician at the Medical College of South Carolina reported that "cardiac murmurs which may be totally inaudible in the ordinary clinic or hospital environment can be heard distinctly in the 'sound room': Dale Groom to S. S. Stevens, April 5, 1955, with reply from Stevens on April 15 in Box 3, 713.9010, Corr. D–N, in the Papers and Records of the Harvard Psycho-Acoustic Laboratory (hereafter, PAL) Archives, Pusey Lib, Harvard U. For my own quarter-hour inside an anechoic chamber, I must thank Robert Piserchio of the Physics Department, San Diego State U. I must also admit that a lifelong history of asthma, and consequently of listening to my own breathing, has doubtless skewed my approach to Cage's experience of his own breathing, and the rest.

243. Peter Szendy, *Écoute: Une histoire de nos oreilles* (P: Éditions de Minuit, 2001) 105; <http://en.wikipedia.org/wiki/4'33>; Revill, *The Roaring Silence*, 166–69; Kahn, as above; Frances Dyson, "The ear that would hear sounds in themselves: John Cage 1935–1965," in *Wireless Imagination*, eds. Kahn and Whitehead (→ n.67) 373–408; John Cage, *Empty Words: Writings, '73–'78* (Wesleyan U, 1979) 181. Rauschenberg's "empty" canvases had precedents in the white-on-white series of paintings (1918) by Kasimir Malevich, whose compositional theories are discussed by Stuart Sim, *Manifesto for Silence: Confronting the Politics and Culture of Noise* (Edinburgh U, 2007) 116–22.

244. Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music*, tr. Carolyn Abbate (Princeton, 1990) 43, and cf. Morgan, "Rethinking musical culture," 52; Cage, *A Year from Monday*, 98; Heller and Bergman, "Tinnitus in normally hearing persons," 82; John Cage, *For the Birds: John Cage in Conversation with Daniel Charles* (B: Marion Boyards, 1981) 39; Jean Baudrillard, *Revenge of the Crystal: A Baudrillard Reader*, eds. and trs. P. Foss and J. Pefanis (L: Pluto, 1990) 83; John Milton Cage, Sr., and Charles J. Bashe, *Theory and Application of Industrial Electronics* (NY, 1951) q. 41, q. 49, 132. The 4'33" may also refer to the roughly 4'30" of recording time on each side of a 78-rpm record, before long-play (33 1/3 rpm) records were introduced, postwar, for the home market.

245. Paul Taylor, *Private Domain: An Autobiography* (San Francisco: North Point, 1988) 79–80; National Council of Dull Men, "January" listing at www.dullmen.com/january.

htm; Harry F. Olson, Electronic Noise Suppressor File, 1954-57, in his Papers/Reports, formerly in the Library of the David Sarnoff Research Center, Princeton, NJ, and currently in the David Sarnoff Collection, Hagley Museum and Library, Wilmington, DE; Harry F. Olson and Everett G. May, "Electronic sound absorber," *JASA* 25 (Nov. 1953) 1130-36; Elaine Dutka, "Settlement reached in 'silence' case," *LA Times* (Sept. 25, 2002) F2, noting that Batt had registered copyrights for silences of 4'32" and 4'34" of silence, so that "If there's ever a Cage performance where they come in a second shorter or longer, then it's mine."

246. Percy A. Scholes, *Music Appreciation: Its History and Techniques* (NY, 1935) esp. 30ff.; Rudy Tomedi, comp., *No Bugles, No Drums: An Oral History of the Korean War* (NY: Wiley, 1993) q. 99 for Zonge, 126; Martin Russ, *The Last Parallel: A Marine's War Journal* (NY: Rinehart, 1957) q. 61-62, 75, 99, 287; "Speech of Joseph McCarthy, Wheeling, West Virginia, February 9, 1950," online at <http://historymatters.gmu.edu/d/6456>; "McCarthy cries again," *Collier's* (Aug. 2, 1952) 70.

247. Cf. Haig A. Bosmajian, *The Freedom Not to Speak* (NYU, 1999); Louis M. Seidman, *Silence and Freedom* (Stanford U, 2007), an intriguing legal analysis. The *via negativa* of Christian theology, or apophatic discourse more generally, in which one speaks of the unspeakably glorious until enlightened enough not to speak at all, is another, older tradition in which to couch Cage's writing/performance after 1950. Consider here Jacques Derrida, "How to avoid speaking: denials," *Languages of the Unsayable* (→ n.230) 3-70.

248. Thomas S. Hines, "Then not yet 'Cage': the Los Angeles years, 1912-1938," *John Cage: Composed in America*, eds. M. Perloff and C. Junkerman (U Chicago, 1994) 89-90; Saunders, *Survey of Physics* (→ n.64) 250. Cf. Paul Carter, "Desire of dialogue: radio writing and environmental sound," in *Uncertain Ground: Essays Between Art + Nature*, ed. Martin Thomas (Sydney: Art Gallery of New South Wales, 1999) 143-59 at 153 on "swimming in sound" and Michel Redolfi's *Underwater Music* (1984).

249. Robert Galambos, "The avoidance of obstacles by flying bats: Spallanzani's ideas (1794) and later theories," *Isis* 34 (1942) 132-40; David M. Damkaer, *Copepodologist's Cabinet* (Phila: Amer Phil Soc, 2002) 175-85 on Jurine; George W. Pierce, *The Songs of Insects* (Harvard U, 1948); Frederick A. Saunders and F. V. Hunt, "George Washington Pierce, January 11, 1872 - August 25, 1956," *Bioog Memoirs Natl Acad of Sci* 33 (1959) 351-80 at 356-57; Charles C. Gross, "Donald R. Griffin, August 3, 1915-November 7, 2003," in *ibid.* 86 (2005); Donald R. Griffin, "The early history of echolocation," *Animal Sonar Systems*, eds. R. G. Busnel and J. F. Fish (NY: Plenum, 1980) 1-10; G. W. Pierce and Donald R. Griffin, "Experimental determination of supersonic notes emitted by bats," *J Mammalogy* 19 (Nov. 14, 1938) 454-55; Donald R. Griffin and Robert Galambos, "The sensory basis of obstacle avoidance by flying bats," *J Experimental Zoology* 86 (1941) 484-506; Robert Galambos and Donald R. Griffin, "Obstacle avoidance by flying bats: the cries of bats," *ibid.* 89 (1942) 475-90; Donald R. Griffin, "Echolocation by blindmen, bats, and radar," *Sci* 100 (1944) 589-90; *idem*, *Listening in the Dark: The Acoustic Orientation of Bats and Men* (Yale U, 1958) 64-76; *idem*, "Return to the magic well: echolocation behavior of bats and responses of insect prey," *BioSci* 51 (2001) 555-56; Mary E. Bates et al., "Jamming avoidance response of big brown bats in target detection," *J Experimental Biology* 211

(2008) 106–13. Cf. Howard C. Hughes, *Sensory Exotica: A World Beyond Human Experience* (MIT, 1999) 10–55.

250. Thomas Nagel, “What is it like to be a bat?” *Phil R* 83 (Oct. 1974) 435–50; Justin Leiber, “‘Cartesian’ Linguistics?” in *The Chomskyan Turn*, ed. Asa Kashe (Oxford: Blackwell, 1991) 150–81. Recently, Mirjam Knörnschild et al. have shown that bats are also capable of imitating sounds, a rare accomplishment thought to be a prerequisite for developing spoken language: “Complex vocal imitation during ontogeny in a bat,” *Biology Letters* 6 (April 23, 2010) 156–59.

251. Philip H. Gosse, *The Wonders of the Great Deep* (Phila, 1874) 125, glaciers; J. W. Van Dervoort, *The Water-World* (NY, 1886) 434, 437 for monsoons and hurricanes; Engelbert Kaempfer, *Kaempfer’s Japan: Tokagawa Culture Observed*, ed. Beatrice M. Bodart-Bailey (U Hawaii, 1999 [wr. 1690–1692]) 55; Harriet Beecher Stowe, “The secret,” *Collected Poems*, ed. John M. Moran, Jr. (Hartford: Transcendental, 1967) 31; William J. Broad, *The Universe Below: Discovering the Secrets of the Deep Sea* (NY: Simon & Schuster, 1997) 27–42, q. 28 from Sir John Ross; Matthew Maury, *Physical Geography of the Sea* (NY, 1858), quoted by William Wertebaker, *The Floor of the Sea: Maurice Ewing and the Search to Understand the Earth* (B: Little, Brown, 1994) 62–63.

252. A. Hyatt Verrill, *The Ocean and Its Mysteries* (NY, 1917) 15, a “world of ooze, darkness and cold” but no longer thought to be uninhabited; Susan Schlee, *A History of Oceanography: The Edge of an Unfamiliar World* (L: Robert Hale, 1975) 82–123; Margaret Deacon, *Scientists and the Sea, 1650–1900*, 2nd ed. (Burlington: Ashgate, 1997) 279–85; Hugh Robert Mill, “The bed of the ocean,” *Good Words* 31 (1890) 686–92, q. 691; Agnes Giberne, *The Romance of the Mighty Deep* (L, 1910) 40–41, 267; John C. Van Dyke, *The Opal Sea* (NY, 1917) 51; Kipling, *Verses* (→ n.16) 174; Callum Roberts, *The Unnatural History of the Sea* (DC: Island, 2007) ch. 10 on trawlers, 143 for trawl as plow; Broad, *The Universe Below*, 30–38, q. 42 for “pyrotechnic network.”

On the coelacanth, which has a rostral organ through which it senses electrical changes in its environment (and in its prey) and which responds to sound with pressure-sensitive basillar papilla otherwise found only in animals that live in air: Samantha Weinberg, *A Fish Caught in Time: The Search for the Coelacanth* (NY: Harper Collins, 2000); H. Fricke, “Coelacanths: a human responsibility,” *J Fish Biology* 59A (Dec. 2001) 332–38; Bernd Fritzsche, “Hearing in two worlds: theoretical and actual adaptive changes of the aquatic and terrestrial ear for sound reception,” in *Comparative Hearing: Fish and Amphibians*, eds. R. N. Fay and A. N. Popper (NY: Springer, 1998) 15–42 at 27, pass. Possibly the immediate predecessor of the first fish to crawl out of the water onto land, the relatively silent coelacanth has now been given a staticky oceanic voice, “spotted with compact grains of noise,” by Loren Chasse and Jim Haynes, a.k.a. Coelacanth, *The Glass Sponge* (23five, 2003), as reviewed by Bruce Adams and others at www.23five.org/reviews/coelacanthglassponge.htm. On long-term shifts in attitudes: Antonis Balasopoulos, “‘Suffer a sea change’: spatial crisis, maritime modernity, and the politics of utopia,” *Cultural Critique* 63 (2006) 123–56.

253. Alain Corbin, *The Lure of the Sea: The Discovery of the Seaside in the Western World, 1750–1840*, tr. Jocelyn Phelps (UC, 1994); Abbot S. Smith, “On sea-bathing,” *The Sanitarian* 1 (1873) 268–76, q. 274; Wallace Stevens, “The Idea of Order at Key West” (1934) and

“Somnambulisma” (1943) in *The Collected Poems* (NY, 1954) 127-28, 304, both discussed by Helen Vendler, “Wallace Stevens: hypotheses and contradictions,” *Representations* 81 (Winter 2003) 99-117, but in “The Woman That Had More Babies Than That” (1932) the sea has a “central humming” more in line with the rhapsody of Michel Serres, “Noise,” tr. Laurence R. Schehr, *SubStance* 12,3 (1983) 48-60, for whom the ocean, and Proteus, are coterminously the essence and metaphysical upheaval of noise, chaotic yet collected, shapeshifting yet incontestable. On Rachel Carson, “Undersea,” *Atlantic Mo* 160 (July-Dec. 1937) 322-35, q. 322 (and → n.275). For our bodies as water: Josef Brozek, “Body composition: the relative amounts of fat, tissue, and water vary with age, sex, exercise, and nutritional state,” *Sci* 134 (Sept. 29, 1961) 920-30.

254. Fay, *Sub Sig Log* (→ n.63); Charles C. Bates and Richard H. Fleming, “Oceanography in the Hydrographic Office,” *Military Engineer* 39 (Aug. 1947) 338-44; Sabine Höhler, “Depth records and ocean volumes: ocean profiling by sounding technology, 1850-1930,” *H and Technology* 18,2 (2002) 119-54; Bell to his wife Mabel, April 5, 1879, pp. 3-4, in the Alexander Graham Bell Family Papers, Division of Manuscripts, Lib of Congress, DC; [William Dubilier], “Submarines betrayed by sound waves,” *Sci Amer* 113 (Oct. 16, 1915) 333; C. V. Drysdale, “Listening under water,” *Engineering and Ind Management* 6 (Dec. 1921) 45-53; Harvey C. Hayes, “Measuring ocean depths by acoustical methods,” *J Franklin Inst* 197 (March 1924) 323-54; idem, “The application of acoustics to submarine surveying,” *Geographical R* 14, suppl. (Oct. 1924) 681-94; T. Wayland Vaughan, chair, “Report of the Committee on Ocean Sounding and Oceanographic Thermographs” (April 26, 1924), in Box 18, John Dove Isaacs, III, Papers, ca. 1943-1980, Archives, SIO; Karl F. Graff, “A history of ultrasonics,” *Physical Acoustics*, eds. W. P. Mason and R. N. Thurston (NY: Academic, 1981) XVI,1-97; R. Bruce Lindsay, “Intellectual biography,” 82-84, in Box 1-UF, f. 1, Papers, in Archives, Brown U; Herbert G. Dorsey, “Transmission of sound through seawater,” *JASA* 3 (1932) 428-42 on the wrinkles (which would take more than thirty years to resolve: Fred Fisher, interview Feb. 9, 1994, SIO); Gary E. Weir, “Fashioning naval oceanography: Columbus O’Donnell Iselin and American preparation for war, 1940-1941,” in *The Machine in Neptune’s Garden: Historical Perspectives on Technology and the Marine Environment*, eds. H. M. Rozwadowski and D. K. Van Keuren (Nantucket: Science H, 2004) 65-91; D. J. Creasey, “Underwater acoustics,” *Physics Education* 16 (1981) 244-45 on the British side. For debates over the naming of “sonar”: Laurence Batchelder, letter to Thaddeus G. Bell, Sept. 27, 1962, in Box AR-104b (74) of the Records of the Submarine Signal Division, Technical Information Center, Raytheon Company, Portsmouth, Rhode Island. Felix Exner’s study of temperature fluctuations at various depths in a lake led him as early as 1900 to propose the existence of water “layers”: Coen, *Vienna in the Age of Uncertainty* (→ n.149) 261-62.

255. Weir, “Fashioning naval oceanography,” 77-79, 88 n.6; Dorsey, “Transmission of sound,” 434; John O. Herrick, *Subsurface Warfare: The History of Division 6, NDRC* (DC, 1951) q. 22 for “ping-happy” and ocean acoustics. On sonar rooms and training, I rely upon the following Reports of the University of California Division of War Research in the Archives, SIO (hereafter, UCDWR): Henry E. Hartig and George A. Brettell, Jr., “Primary Listening Teacher” (U57, April 30, 1943), a device (with electronic noise-generator)

for the New London Submarine School and West Coast Fleet Sound School, San Diego, in Box 1; C.F. Bradley, “Shipboard Anti-Submarine Attack Teacher” (U93, Aug. 30, 1943) in Box 2, f. 91; William J. Giese, “Test-retest reliability of the [Western Electric] 6B Audiometer under military conditions” (U16, Aug. 30, 1943) in Box 2, f. 92 on rooms with double doors, double floors, Celotexed ceilings and walls, yet susceptible to outside noises such as scrub buckets and footsteps; “Submarine sounds recorded for Mare Island, Navy Yard” (M277, Nov. 18, 1944) in Box 3, f. 244; *Instructor’s Manual: Echo Recognition Group Training* (M341, Oct. 15, 1944) in Box 3; also the Chief Signal Officer materials, directly ahead (→ n.258). On difficulties with auditory processing related to sonar work: William A. Yost and Sandra J. Guzman, “Auditory processing of sound sources: is there an echo in here?” *Current Directions in Psych Sci* 5 (Aug. 1996) 125–31.

256. William Bragg, *The World of Sound: Six Lectures Delivered before a Juvenile Auditory at the Royal Institution, Christmas, 1919* (L, 1927) 136, fish cannot hear but may react to changes in pressure from explosions underwater; William Wright, *Fishes and Fishing* (L, 1858) 80–95; John C. Galton, “The song of fishes,” *Pop Sci R* 13 (1874) 337–49, q. 347, as also C.P.O., “Do fishes utter sounds?” *Hardwicke’s Science-Gossip* 10 (1874) 261, and “Noises from the sea: different species of finny vocalists that utter sounds,” *Brooklyn Daily Eagle* (Jan. 23, 1887) 11; Otto Körner, *Können die Fische Hören* (Berlin, 1905); idem, with Rolff Wagner, *Lehrbuch der Ohrenheilkunde und ihrer Grenzgebiete* (Wiesbaden, 1906) 5. As an otologist, Körner was fascinated with absences and abscesses; his study of fish had as much to do with auditory cavities as with ichthyology: cf. Otto J. Stein, “Middle ear disease in relation to cranial cavity,” *Trans Mississippi Valley Medical Assn* 26,2 (1900) 185–210 at 197. Widely cited much later, a two-part monograph by a Marseille physician on the soundmaking and hearing of fish had escaped Körner’s notice: Adolphe Dufossé, “Recherches sur les bruits et les sons expressifs que font entendre les poissons d’Europe et sur les organes producteurs de ces phénomènes acoustiques ainsi que sur les appareils de l’audition de plusieurs de ces animaux,” *Annales des sci naturelles*, ser. 5, 19,5 (1874) and 20,3 (1874/1875). Cf. Elissa Briggs and Gary M. Wessel, “In the beginning . . . animal fertilization and sea urchin development,” *Developmental Biology* 300 (Dec. 1, 2006) 15–26 and notes 16–17 therein on Dufossé.

257. Jon E. Roedelstein, *The Concept of Time in Psychology* (Westport: Greenwood, 2000) 65–66 on Exner; Coen, *Vienna in the Age of Uncertainty* (→ n.149) on all of the Exners, 100n. on Freud attending the lectures of both Sigmund and Serafin Exner, 264–68 on Brownian motion, and 320–31 on von Frisch’s color studies; Karl von Frisch, *A Biologist Remembers*, tr. Lisbeth Gomblich (Oxford: Pergamon, 1967) 82–87; idem, “The sense of hearing in fish,” *Nature* 141 (Jan. 1, 1938) 8–11, q. 11. For a contemporary response to von Frisch: Robert H. Gault, “An interpretation of vibro-tactile phenomena,” *JASA* 5 (April 1934) 252–54, applied to the teaching of the deaf. On how fish hear: Peter L. Tyack, “Acoustic communication under the sea,” in *Animal Acoustic Communication*, eds. Steven L. Hopp et al. (Berlin: Springer, 1998) 184–86; Fay and Popper, eds., *Comparative Hearing: Fish and Amphibians* (→ n.251). On the importance of the sacculus, the chief auditory organ of the catfish inner ear and part of the vestibular system in human inner ears: Neil P. McAngus Todd et al., “A saccular origin of frequency tuning in myogenic vestibular

evoked potentials? Implications for human responses to loud sounds,” *Hearing Research* 141 (March 2000) 180-88.

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259. T. H. Waterman, “Communication. (I) Electrical Interference” (May 18, 1942) in PAL (→ n.242) 713.9023, Box 1, with accompanying Memo (Jan. 26, 1942) from J. P. Egan and T. H. Waterman to S. S. Stevens; K. C. Black to S. S. Stevens, Memo on jamming radio (June 19, 1943), in PAL, 713.9023, Box 2, and reply from Stevens (“Secret,” June 26, 1943), as also S. S. Stevens to J. H. Moore of Div 15, NDRC (June 26, 1943) on bagpipes, and K. C. Black to Lt. Col. Norman L. Winter, Chief, Electronics Branch, Office of Chief Signal Officer (Sept. 10, 1943), and conference notes (Nov. 10, 1943) on paper by E. B. Newman and S. S. Stevens, with memo from Newman about the conference (Nov. 1943). Also J. W. Horton, “Excursions in the Domain of Physics,” typescript autobiography (New London, 1965) q. 8, in CHP. From the Army side, I have summarized materials and discussion in the following files from the Office of the Chief Signal Officer, Record Group 111, NARA II, College Park, MD: General R & D Files, Box 24, Signal Corps Labs, “Monthly Progress Report for Oct 1941”; Unclassified Control Decimal Files, 1941-1957, Box 1412, f. 413.44, “Communication in Noise folders (Noise Elimination) 1942-43”; “The Performance of Communication Equipment in Noise” (OSRD no. 901, Oct. 1, 1942); Classified Central Decimal File, Box 1452, “Anti-Jamming #2,” Army Air Forces School of Applied Tactics, “Tentative S.O.P. for Determining the Source of Jamming for Wing Radar Stations” (Aug. 6, 1943) and Memo from D. W. Hunt, Radio Transmitting Section (Nov. 10, 1943) on training procedures for code operators and use of battle noise records; Box 1452, “Anti-Jamming #3” (March 1-May 31, 1944), and “Addenda on Radar Jamming” (Nov. 28, 1942[?]); Box 1453, “Anti-Jamming #2, folder 2 of 2” (Aug. 1943-Feb. 1944), esp. HQ (Nov. 18, 1943) to Commandant, Anti-Aircraft Artillery School, Camp Davis, NC, “one of the greatest difficulties in anti-jamming training is to prevent the operators from tearing down their sets when jamming occurs”; Box 1454, Anti-Jamming folders, Aug. 1942-July 1943, “Notes on Anti-Jamming Techniques for Service Officers” (Nov. 1943) p. 18 on Types of Accidental Interference, and Memo “The Intentional Jamming of Radio Circuits” (Jan. 14, 1943); Box 1455, “Anti-Jamming,” Minutes of Conference at Camp Coles Signal Lab, Fort Monmouth, NJ—Radio Operator Training (May 5, 1943), an invaluable document, with a suggestion from Major Hessel (p. 12), “Perhaps what we need to do, instead of just using random receiving noises as they happen to be picked up, is to

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260. James Hamilton-Paterson, *The Great Deep* (NY: Random House, 1992) 109–10, toadfish grunts setting off acoustic mines; Michael V. Namorato, “A concise history of acoustics in warfare,” *Applied Acoustics* 59 (Feb. 2000) 101–35, esp. on acoustic torpedoes; Fay, “Underwater-sound reminiscences” (→n.63) 42; T. G. Muir, “Shallow water acoustics,” *Naval Research R* 35,4 (1983) 35–46, q. 35; D. A. Proudfoot, “Underwater Sound Survey, New York Harbor Approaches” (Aug. 28, 1943, based on March–April tests) folder no. 316, and W. B. Snow, Memo, p. 2 (April 12, 1943) on the Conference on Underwater Biological Noise, April 1, 1943, both in Columbia U Division of War Research, Record Group 227, NARA, Northeast Region, Waltham, Mass; UC Public Information–Radio Service Broadcast, “Sounds in the sea,” Broadcast no. 2683 (Jan. 26, 1947), in the Martin Wiggo Johnson Papers, ca. 1930–1970, Box 1, Correspondence, 1946–1950, Archives, SIO, as also Box 2, Sound, newsclips, A.P. story, “Jap shrimp provided sound screen for U.S. Subs,” citing geologist Milton B. Dobrin on postwar information about acoustic mines that had been set off by drumfish in Tokyo Bay, and on noises in Chesapeake Bay; “Dr. Charles Fish, 79; biologist established oceanography school,” *NY Times* (Dec. 24, 1978) 14; Marie Poland Fish, *Sonic Fishes of the Pacific*, ed. Charles J. Fish (Woods Hole Oceanographic Inst, 1948).

261. Johnson Papers, Box 2, Oceanographic Medley no. 1, “Memoirs of Martin W. Johnson (ca. 1980, from a rough draft prepared in 1952) q. 17, q. 33, 61, q. 63, 85–86 pass.; Deborah Day, “Martin Johnson and the Martin Johnson House T-29” (Feb. 1, 2002) at <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1198&context=sio/arch>; John A. McGowan et al., “Martin W. Johnson, Marine Biology: San Diego,” UC: In Memoriam, 1987, at <http://content.cdlib.org/xtf/view?docId=hb6zo9p0jh&brand=calisphere>.

262. Johnson Papers, “Life in the Sea” (n.d.) in Box 1, Correspondence, 1924–1940, and letter from J. A. Furer, Rear Admiral, USN, to Commandant, Sixth Naval District, March 31, 1943, on Johnson’s work at Navy Lab, as well as Box 2, “Memoirs,” 91–93, 100; Thomas E. Bowman et al., “Martin Wiggo Johnson (1893–1984): an appreciation and bibliography,” *Monoculus: Copepod Newsletter* 11 (1985) 7–15. On the copepod tango: J. R. Strickler, “Swimming of planktonic Cyclops species (Copepoda, Crustacea): pattern, movements and their control,” in *Swimming and Flying in Nature*, eds. T. Y.-T. Wu et al. (NY: Plenum, 1975) 599–613; Jennifer Yauck, “The secret lives of copepods,” *Bay View Compass* 5 (July 2008) at www.glwi.uwm.edu/features/news/documents/o8o7o1_Copepod.pdf; David M.

Fields and Mark J. Weissburg, “Evolutionary and ecological significance of mechanosensor morphology: copepods as a model system,” *Marine Ecology Progress Series* 287 (2005) 269–70.

263. J. E. Duffy et al., “Multiple origins of eusociality among sponge-dwelling shrimps (*Synalpheus*),” *Evolution* 54,2 (2000) 503–16; H. Coutière, “The American species of snapping shrimps of the genus *Synalpheus*,” *Proc U.S. Natl Museum* 36 (1909) 1–93; Whitlow W. L. Au and Kiara Banks, “The acoustics of the snapping shrimp *Synalpheus paraneomeris* in Kaneohe Bay,” *JASA* 103 (1998) 41–47; Axel Michelsen et al., “Sound and vibrational signals in the dance language of the honeybee, *Apis mellifera*,” *Behavioral Ecology and Sociobiology* 18 (Jan. 1986) 207–12; Michael Hrnčir et al., “Vibratory and airborne-sound signals in bee communication (Hymenoptera),” *Insect Sounds and Communication: Physiology, Behaviour, Ecology, and Evolution*, eds. S. Drosopoulos and M. Claridge (Noca Rato: Taylor & Francis, 2006) 421–36; Martin W. Johnson et al., “The role of snapping shrimp (*Crangon* and *Synalpheus*) in the production of underwater noise in the sea,” *Biological Bull* 93,2 (1947) 122–38; Johnson Papers, Box 2, Sound, 1942–1947, “Synopsis of the Study of Shrimp Crackle (For Discussion with Instructors [of Sound Operators at Sea]).” On how snapping shrimp “dominate a vast bandwidth (from a few kHz to over 300 kHz) of ambient noise in warm shallow waters”: John R. Potter and Teong Beng Koay, “Do snapping shrimp chorus in time or cluster in space?” *Proc Fifth European Conference on Underwater Acoustics, ECUA 2000*, eds. P. Chevret and M. E. Zakharia (Lyon, 2000); Josie Glausiusz, “Joining hands: the mathematics of applause,” *Discover* 21 (July 2000) 32–36, on synchrony. For their sounds, listen at “Discovery of sound in the sea,” <http://www.dosits.org/gallery/marinemm>, a site maintained by the Office of Marine Programs, U Rhode Island, and offering soundclips for all of the marine mammals discussed below. For excellent charts correlating wind speed, wind force, sea state, and wave heights, and the ambient noise spectra in the open sea: W. John Richardson et al., *Marine Mammals and Noise* (San Diego: Academic, 1995) Table 5.1 and Figure 5.3.

264. Johnson et al., “The role of snapping shrimp,” 125, 127; Johnson Papers, Box 1: Correspondence, 1942–1945, Memorandum to Dr. G. P. Harnwell, July 19, 1943; Correspondence, 1946–1950, “Natural History Notes on Some Unusual Marine Phenomena in the San Diego Area,” paper for the San Diego Soc of Natural H (Sept. 12, 1949); UCDWR Report U337 (April 1, 1946 draft). Also Box 2, OM no. 1, “Those Were the Days: These Are the People” (1980), 19–20, q. 20, on his underwater noise research methods and reasoning; “Underwater sounds of biological origin,” UCDWR Report U28 (Feb. 1943, wr. Dec. 1942). For Bikini results, Box 2, “Oceanographic Medley #1,” p. 103. For recent data on lobsters: Sheila N. Patek and R. L. Caldwell, “The stomatopod rumble: sound production in *Hemisquilla californiensis*,” *Marine and Freshwater Behaviour and Physiology* 39,2 (2006) 99–111; Erica R. Staaterman et al., “Disentangling defense: the function of spiny lobster sounds,” *Behaviour* 147,2 (2010) 235–58. A technical note: underwater decibel levels are figured according to a micropascal pressure reference level 20x lower than in air and a characteristic impedance value 3600x greater (at a standard depth and temperature), so one must subtract ~62 db from decibel readings underwater to find the equivalent in air. For example, the 189 db of a snapping shrimp colony would be ~127 db in air, akin to

the roar of a heavy metal band; a seabed volcanic eruption can reach 255 db underwater, seismic exploration devices 230 db, an offshore oil rig 185 db. On all of this: Federation of American Scientists, Military Analysis Network, "Underwater acoustics," at www.fas.org/man/dod-101/sys/ship/acoustics.htm#conversion.

265. Johnson et al., "The role of snapping shrimp," 122, some of the thunder stolen by Donald P. Loye and Don A. Proudfoot, "Underwater noise due to marine life," *JASA* 18 (1946) 446-49, and heralded much before by Martin D. Burkenroad, "Notes on the sound-producing marine fishes of Louisiana," *Copeia* (March 1931) 20-28; Marie P. Fish et al., "Studies on the production of underwater sound by North Atlantic coastal fishes," *J Marine Research* 11 (1952) 180-93; Marie P. Fish, *Character and Significance of Sound Production among Fishes of the Western North Atlantic* (New Haven, 1954); eadem, with William H. Mowbray, *Sounds Of Western North Atlantic Fishes; A Reference File Of Biological Underwater Sounds* (Johns Hopkins U, 1970); William N. Tavolga, "Fish bioacoustics: a personal history," *Bioacoustics* 12 (2002) 101-104 and Per S. Enger, "Ultrasound perception - an old question," *ibid.*, 104-106; Michael Salmon, "Sexual discrimination and sound production in *Uca pugilator* Bosc," *Zoologica* 47 (1962) 15-21; idem, "Sound production by priacanthid [Bigeye] fishes," *Copeia* 4 (Dec. 23, 1966) 869-72; idem, "Sound production and associated behavior in triggerfishes," *Pacific Sci* 22 (Jan. 1968) 11-20; James F. Fish and George C. Offutt, "Hearing thresholds for toadfish, *Opsanus tau*," *JASA* 51,4 (1972) 1318-21; René-Guy Busnel and James F. Fish, eds., *Animal Sonar Systems* (NY: Plenum, 1980); Arthur A. Myrberg, Jr., "Sound communication and interception in fishes," in *Hearing and Sound Communication in Fishes*, eds. William N. Tavolga et al. (Berlin: Springer, 1981) 385-415 on trying to establish the purpose of fish sounds. I want to thank Bob Kenney for guiding me through the Narragansett Marine Laboratory (U Rhode Island, Bay Campus) Reference File of Biological Underwater Sounds (1946-), which served as the basis for a Folkways Science Series Record (ca. 1960). Dr. Kenney was also kind enough to play for me (on Oct. 19, 1995) a 1966 tape of sperm whale clicks (which to an untrained ear sound like static), of blackfish (drumsticks slapped against each other, tuning a radio across high frequencies), porpoises (birdlike squeals, whistles), humpbacks (braying, trumpeting), and Belugas (rasping, trilling, yelping, clicking, squawking), all recorded at sea and awash with water noise and boat noise.

266. Carl F. Eyring et al., "Reverberation in the sea," *JASA* 20 (July 1948) 462-75; Philip M. Morse, *In at the Beginnings* (MIT, 1977) 132, 139-40 on studies of sound scattering; Russell Watson Raitt Papers, 1939-1977, Box 1, Attenuation of Sound, First Lecture (Sept. 27, 1946 [Eckart, Lieberman]) on inadequacy of classical theory and limits of sonar, and lecture by Raitt (Oct. 7, 1946), as well as Box 1, UCDWR Reverberation Group papers, in Archives, SIO; "Moving Shoals," *Time* (Aug. 3, 1962). The rest is from the Johnson Papers, Box 1, folders as follows: Deep Scattering Layer, 1945-1948, Early Notes, Memo to Ralph J. Christensen (Jan. 29, 1945), and UCDWR Report M397, "Stratification of Sound Scatterers in the Ocean" (Feb. 16, 1946); Deep Scattering Layer, 1949, 1954, 1961-1982, "Introductory Remarks to Symposium on the DSL" (Intl Congress on Zoology, DC, 20-27 Aug. 1963), and Robert S. Dietz, U.S. Navy Electronics Laboratory, San Diego, "The Deep Scattering Layer in the Pacific and Antarctic Oceans" (1961?); Lectures,

1940–1954, “Advancements in Marine Sciences: Marine Invertebrates, SIO Colloquium” (March 31, 1954); Correspondence 1946–1950, Johnson to Rachel Carson, March 22, 1950. By 1955, the DSL had not only been heard but seen: J. Brackett Hersey, “Applications of acoustical tools to problems of deep sea research,” in *Proc Symposium on Aspects of Deep Sea Research*, ed. William S. von Arx (DC, 1957) 90–97. I write “a” DSL because it was soon determined that there could be several DSLs, but most of the information on them was either classified or inaccessible (in mimeographed papers rather than published journals): Carl Eckart, letter to L. A. Walford (Aug. 20, 1951), in Box 2, f. 94, of the Carl Leavitt Hubbs Papers, 1920–1979, Archives, SIO, as also Brian P. Boden, NSF Proposal, 1962, for work on “identity of scatterers in the deeper [DSL] layer,” in Box 17, f. 28, “Deep Scattering Layer, 1948–1962.”

267. Vern O. Knudsen, letter from J. T. Tate to Knudsen, July 22, 1947, with response Aug. 12, 1947, in his Correspondence and Manuscripts, Box 5, f. 11, as also f. 7 on ear plugs work (→ n.129); U.S. Navy, “Submarine Noise Reduction” (Frederick K. Rockett Co., 1955), in Record Group 428–MN–8140A, NARA II, College Park, MD; James H. Leighton, transcript of interview by Betty J. Quayles concerning his work in the Second World War with the Navy Radio and Sound Laboratory, Point Loma (April 22, 1991) at p. 6, “very, very noisy” ocean, in the Oral History Archives, San Diego Historical Soc; Carl Eckart and Richard P. Carhart, “Fluctuations of sound in the sea,” in Panel on Underwater Acoustics, *A Survey Report on Basic Problems of Underwater Acoustics Research* (DC: National Research Council, 1950) 63, as also Carl Eckart, “Theory of noise in continuous media,” *JASA* 25 (1953) 195–99, and idem, “Scattering of sound from sea surface,” *ibid.*, 566–70. For paranoid politics and the technicalities of noise: Paul N. Edwards, *The Closed World of Computers and the Politics of Discourse in Cold War America* (MIT, 1996) esp. 209–37; Jessica Wang, *American Science in an Age of Anxiety: Scientists, Anticommunism, and the Cold War* (U North Carolina, 1999) esp. 206–11 on the Scientists’ Committee on Loyalty Problems, founded in 1948 and chaired by Lyman Spitzer, a Princeton physicist much involved with undersea warfare issues after the Second World War and editor of the Research Analysis Group’s *Physics of Sound in the Sea* (DC, 1949); Lyman Spitzer, Jr., Papers 1936–1986, Box 39, f. 6, Underwater Warfare Committee, letter from Clyde K. Boyer to Spitzer, June 18, 1951, in Division of Manuscripts, Dept. of Rare Books and Special Collections, Princeton University Library. Cf. Morse, *In at the Beginnings*, 280–83. As late as 1984, Robert J. Urick noted that many underwater acoustics studies were still classified: *Ambient Noise in the Sea* (DC: Undersea Warfare Technical Office, Department of the Navy, 1984) i, and listing only nineteen publicly available sources, 1945–1960, on ambient ocean noise. Cf. Naval Underwater Systems Center, *Annotated Bibliography of Underwater Acoustic Research, 1942–1945: Performed by Columbia and Harvard Universities at Fort Trumbull, CT* (Newport: NUSC, 1983).

268. UC Public Information–Radio Service Broadcast, “Sounds in the sea,” Broadcast no. 2683 in Johnson Papers (→ n.258), as also Box 2, Sound, no date, Script for Recording No. 5-X–Underwater Sounds, cut 12, “mewing sound” and cut 13, “awesome moaning,” recording June–Dec. 1942; George Woods Shepard, “Arctic Ocean Ambient Noise,” Ph.D. thesis, MIT, 1979; “Noise in ocean hindering work on war secrets, scientist says,”

Washington Post (July 13, 1947); Harvard Underwater Sound Lab, "Sonar Doppler Applications Completion Report" (Nov. 15, 1945) Sect. III, Electronic Aural Responder, pp. 79-92, in Record Group 227, H486, no. 1369, NARA, Northeast Region, Waltham, Mass, as also R. C. Maninger, "Maximum Listening Ranges of Underwater Sound Equipment" (memo, March 13, 1944), Record Group 227, Columbia U Division of War Research, no. 616; Elmer P. Wheaton, "John Dove Isaacs III, 1913-1980," *Memorial Tributes: Natl Acad Engineering* 2 (1984) 130-35; John Dove Isaacs III, file on the Brobdingnagophone, 1948-1950, in Box 16 of his Papers (→ n.254). Before and during the Second World War, Japanese scientists had contemplated long-distance listening for low-frequency sounds from as far off as Hawaii, but underwater noise around Japan itself was a serious obstacle: Yoshihito Takesada, "Consideration of the underwater sound waves with geophysical prospect," *Bull Kyoto Gakugei U Ser. B* 3 (1953) 55-59, copy in the R. Bruce Lindsay Papers, Corresp-Active File-T-reprints, University Archives, John Hay Lib, Brown U.

269. Herbert Aldrich, "New Bedford," *New England Mag* 4 (May 1886) 423-44; idem, *Arctic Alaska and Siberia, or, Eight Months with the Arctic Whalers* (Chicago, 1889) 32-35; Charles M. Scammon, *The Marine Mammals of the Northwestern Coast of North America* (NY: Dover, 1968 [1874]) 63, 266; idem, "Two Journals of Whaling Voyages, 1853-1863," in MSS P-K 200-207, Charles Melville Scammon Papers, Bancroft Library, UC Berkeley, second volume of which has been published as *Journal aboard the bark Ocean Bird on a whaling voyage to Scammon's Lagoon, winter of 1858-1859*, ed. David A. Henderson (LA: Dawson's Book Shop, 1970); John Griffin Nelson diary (March 1876) in "*Euterpe: Diaries, Letters and Logs of the 'Star of India' as a British Emigrant Ship*," ed. Craig Arnold (San Diego: Maritime Assoc, 1988) 75. Cf. Margaret S. Creighton, *Rites and Passages: The Experience of American Whaling, 1830-1870* (Camb U, 1995) esp. 170 on the loneliness of the men on whaling ships, another encouragement to listening for songs; Roberts, *Unnatural History of the Sea* (→ n.251) ch. 13 on "The Legacy of Whaling."

270. John Y. Beaty, *The Baby Whale, Sharp Ears* (NY, 1938) q. 8, 21; Urick, *Ambient Noise in the Sea*, ch. 2, pp. 2-8; Randall Jarrell and Irene Reti, *Kenneth S. Norris: Naturalist, Cetologists, and Conservationist, 1924-1998* (UC Santa Cruz, 1999); Kenneth Norris, *Dolphin Days* (NY: Norton, 1991), which emphasizes (pp. 193, 200) the noisiness of dolphins—"the damndest cacophony you ever heard." On whale hearing: Darlene R. Ketten, "Structure and function in whale ears," *Intl J Animal Sound and Its Recording* 8 (1997) 103-35, still debating whether Mysticete whales echolocate, as do Odontocetes and dolphins; Douglas Wartzok and Darlene R. Ketten, "Marine mammal sensory systems," in *Biology of Marine Mammals*, eds. J. E. Reynolds, II, and S. A. Rommel (DC: Smithsonian Inst, 1999) 117-48; Douglas H. Chadwick, "Evolution of whales," *Natl Geographic* 200 (Nov. 2001) 64-77, esp. 75, the importance of a skull architecture that enables the production, focusing, and reception of sound vibrations.

271. Maurice Ewing and J. Lamar Worzel, "Long-range sound transmission," *Bull Geological Soc Amer* (Oct. 15, 1948); Maurice Ewing et al., "Propagation of sound in the ocean," *Memoirs Geol Soc Amer* 27 (1948); Stanley M. Flatté et al., "Preface," *Sound Transmission through a Fluctuating Ocean* (Camb U, 1979) 65, and cf. Joseph W. Blum and Donald S. Cohen, "Acoustic wave propagation in an underwater sound channel," *IMA J*

Applied Mathematics 8,2 (1971) 199–220 for later refinements; Wertenbaker, *The Floor of the Sea* (→ n.251) 40, 46, and throughout; Jacob D. Hamblin, “The Navy’s ‘sophisticated’ pursuit of science: undersea warfare, the limits of internationalism, and the utility of basic research, 1945–1956,” *Isis* 93 (March 2002) 1–27 at 9 and 16; Jacques-Yves Cousteau, with Frédéric Dumas and James Dugan, *Silent World* (NY, 1953 [1950]) 216–18, and cf. James M. Long, “‘Absolute’ calm two miles down,” *San Diego Evening Trib* (Oct. 1, 1953), reports of “the quiet of death” in the deeps as explored by Auguste and Jacques Piccard in their bathyscaph, on whom also Broad, *Universe Below*, 49ff.; Vladimir B. Grinioff, *Tale of a Whistling Shrimp* (NY, 1957) epigraph from Khrushchev, and p. 240, Sinochka asking “And have you heard the shrimp whistle?” and Fedya replying, “They whistle all the time—but only for each other.” (For more on Soviet noise-control measures, Vladimir I. Chudnov, *Noise Abatement*, tr. Hilary Hardin [Jerusalem: Keter, 1974] esp. 30, 57 contrasting a quiet Lenin with a noisy Khrushchev.) Leonid Brekhovskikh of the USSR had also come upon the sound channels, knowledge of which the Russian military too kept quiet: Walter Munk, “Ocean acoustic tomography: from a stormy start to an uncertain future,” in *Physical Oceanography: Developments since 1950*, eds. M. Jochum and R. Murtugudde (NY: Springer, 2006) 119–38 at 120–21; “In memory of L.M. Brekhovskikh (May 6, 1917–January 15, 2005),” *Acoustical Physics* 51 (Aug. 2005) 480–81. Elvis needs no citation, but there are intriguing parallels between SOFAR and the expectant sonicities of a Great Admiralty Island cargo cult as described and analogized to the new sounds of popular music by Robert Duncan, *The Noise: Notes from a Rock ‘n Roll Era* (NY: Ticknor and Fields, 1984) 1–16. The frogmen come from a memo in the papers of Edward J. Fahy (→ n.63), director of the U.S. Navy’s Underwater Sound Laboratory, Box 1, f. 8, Memo (Dec. 9, 1953) on how to publicize the Laboratory, and the platform from a notecard ca. 1953 taped to the back of a 1951 card from R.E. Peterson on “Radar Sea Platforms for Sonar,” same folder. As for publicity and ignorance: not until 2009/2010 did the U.S. Navy release generations of sonar mapping data, revealing that little is still known about the contours of the Earth’s 47,000+ sea-mounts, which can be disruptive to sound channels in the deep sea and become a kind of sonotopographical noise: Rex Dalton, “Sonar mapping ventures into uncharted waters,” *Nature* 458 (April 1, 2009) 557.

272. G. J. M. Copeland, “Low frequency ambient noise—generalised spectra,” in *Natural Physical Sources of Underwater Sound: Sea Surface Sound*, ed. B.R. Kernan (Dordrecht: Kluwer, 1993) 17–30; Eric Pace, “W.E. Schevill dies; authority on sounds of whales was 88,” *NY Times* (July 27, 1994) D21; William E. Schevill, memorial notice for “Glover Morrill Allen, 1879–1942,” *J Mammology* 24,3 (Aug. 17, 1943) 300–301, on Australia; A. S. Romer and D. Lewis, “A mounted skeleton of the giant plesiosaur *Kronosaurus*,” *Breviora* 112 (1959) 1–15; Carl Hubbs, letter to Robert W. Hiatt (Sept. 13, 1948), on Navy Electronics Lab recordings, in Box 54, f. 49, Hubbs Papers, as also a status report by Schevill and Lawrence on “Keotophonics... April 1, 1952–September 30, 1952” (Oct. 1952) in Box 54, f. 58; William E. Schevill and Barbara Lawrence, “Underwater listening to the white porpoise, or ‘sea canary,’” *Sci* 109 (Feb. 11, 1949) 143–44; idem, “Auditory responses of a bottlenosed porpoise, *tursiops truncatus*, to frequencies above 100 KC,” *J Experimental Zoology* 124 (Oct. 1953) 147–65; Sid Fleischman, “Sea sleuths, underwater wire tap fail

in efforts to make whales talk," *San Diego Daily J* (Feb. 17, 1950) 15; Carl Leavitt Hubbs, "Initial Studies [on Gray Whales], 1945-66, and Conservation Efforts, 1956-73," (talk, Nov. 8, 1973) in his Box 2, f. 28, Hubbs Papers, as also letter from Martin W. Johnson to Hubbs and James M. Snodgrass (Dec. 20, 1949) in Box 544, f. 58, and letter from Thomas C. Poulter to Hubbs (Nov. 8, 1967) on hearing the gray whales in Scammon's Lagoon once he had filtered out the noise of snapping shrimp, Box 56, f. 40, and cf. Paul V. Asa-Dorian and Paul J. Perkins, "The controversial production of sound by the California gray whale, *Eschrichtius gibbosus*," *Narragansett Marine Laboratory Technical Report* 19 (Kingston, 1968); L. Valentine Worthington and William E. Schevill, "Underwater sounds heard from sperm whales," *Nature* 180 (Aug. 10, 1957) 291; Richard H. Backus and William E. Schevill, "Physeter clicks," in *Whales, Dolphins, and Porpoises*, ed. Kenneth A. Norris (UC Berkeley, 1966) 514; William E. Schevill and William A. Watkins, *Whale and Porpoise Voices* (Woods Hole Oceanographic Inst, 1962); William E. Schevill et al., "The 20-cycle signals and *Balaenoptera* (fin whales)," 147-52, and William E. Schevill, "Underwater sounds of Cetaceans," 307-11, in Tavolga, ed., *Marine Bio-Acoustics*, with follow-ups, Thomas J. Thompson et al., "Mysticete sounds," *Behavior of Marine Animals*, eds. H. E. Winn and B. L. Olla (NY: Plenum, 1979) III,403-31, and Gordon W. E. Hafner et al., "Signature information in the song of the humpback whale," *JASA* 66 (July 1979) 1-6. The American public learned quickly about cetacean noise: "Record sounds of right whales," *B Traveler* (April 19, 1956); "The chattering whale," *Time* (Aug. 19, 1957) 59-60; "Scientists receive signals from whales," *LA Times* (Feb. 21, 1958) I-20; R. Bruce Lindsay, "Whale and Porpoise Voices [A twelve-inch LP phonograph record]," *Sound* 2,3 (1963) 42. On Watkins and his technical contributions, particularly with regard to eliminating noisy interference from the flutter and wow of idlers inside shipboard machines and the use of harmonic analysis to fine-tune sound spectrography: William A. Watkins, "Listening to cetaceans," in *Whales, Dolphins and Porpoises* (above, this note) 472; idem, "The harmonic interval: fact or artifact in spectral analysis of pulse trains," *Marine Bio-Acoustics*, vol. 2: *Proceedings of the Second Symposium on Marine Bio-Acoustics* (Oxford: Pergamon, 1967) esp. 15; Douglas Wartzok et al., "In Memoriam: William A. Watkins, 1926-2004," *Marine Mammal Sci* 21,4 (Oct. 2005) 784-88.

273. Schevill et al., "The 20-cycle signals and *Balaenoptera* (fin whales)," 147-52, and William E. Schevill, "Underwater sounds of cetaceans," 307-11, in Tavolga, ed., *Marine Bio-Acoustics*, as also G. M. Wenz, "Curious noises and the sonic environment in the ocean," 111 for "the boing," 114 for "the carpenter"; Tim Shepard, "Fish grind their teeth, hiss, hum, purr, and strum," *San Diego Union* (March 9, 1958) A-15, quoting Andy Richnitzer; William E. Schevill, "Whale music," *Oceanus* 9 (Dec. 1962) 2-13; David H. Brown, "Behavior of a captive Pacific pilot whale," *J Mammalogy* 41,3 (1970) 342-49; William C. Cummings and Paul O. Thompson, "Underwater sounds from the blue whale, *Balaenoptera musculus*," *JASA* 50 (1971) 1193-98; William C. Cummings, James F. Fish, and Paul O. Thompson, "Sound production and other behavior of southern right whales, *Eubalaena glacialis*," *Trans San Diego Soc Natural H* 17,1 (1972) 1-14. The "boing," actually more like the sound of an electric shaver, was later traced to a call from minke whales: "Mysterious underwater noise is likely a whale mating call," *San Diego Union-Trib* (Dec. 27, 2002) B4.

274. World Wildlife Fund, “The history of whaling and the International Whaling Commission” at http://assets.panda.org/downloads/history_whaling_2007.pdf (May 2007) p. 2; Roger Payne and Steven McVay, “Songs of humpback whales,” *Sci* 173 (1971) 585–97, updated in Adam S. Frankel, “Sound production,” *Encyclopedia of Marine Mammals*, 2nd ed., eds. William F. Perrin et al. (Burlington: Academic, 2009) 1062–67; Roger Payne, *Among Whales* (NY: Scribner, 1995) 141–211, q. 144–45, and cf. Lisa Walker, “Listening underwater,” *Soundscape: The J of Acoustic Ecology* 3/4 (Winter 2002/Spring 2003) 35–36.

275. Kaja Silverman, *World Spectators* (Stanford U, 2000), revisiting the optics of Plato’s Cave; Ted Steinberg, *Down to Earth: Nature’s Role in American History* (Oxford U, 2002) 246–47, 251–53; Mel Horwitch, *Clipped Wings: The American SST Conflict* (MIT, 1982), updated by Erik M. Conway, *High-Speed Dreams: NASA and the Technopolitics of Supersonic Transportation, 1945–1999* (Johns Hopkins U, 2005); Stephen Shepard, “The supersonic boom,” *Atlantic Mo* 222 (Aug. 1968) 10–14; Linda Lear, “Rachel Louise Carson,” www.rachelcarson.org/Biography.aspx on “biography of the ocean”; Mark H. Lytle, *The Gentle Subversive: Rachel Carson, Silent Spring, and the Rise of the Environmental Movement* (Oxford U, 2007), with follow-up by Elizabeth Kolbert, “The darkening sea,” *The New Yorker* (Nov. 20, 2006) 67–75, and a correlative cautionary tale, Bridget J. Stutchbury, *Silence of the Songbirds* (NY: Walker, 2007); Joan MacIntyre, “Project Jonah” brochure (Friends of the Earth, 1973) 2–3, in Box 16, f. 61 of the Hubbs Papers, SIO, as also Audubon Society radio spot scripts. For the spectrum: Stephen Martin, *The Whales’ Journey* (Crows Nest NSW: Allen & Unwin, 2001) 28 on Hovhanness, pass.; David Rothenberg, *Thousand Mile Song: Whale Music in a Sea of Sound* (NY: Basic, 2008) and listen also to Paul Halley’s “Concerto for Whale and Organ,” in his and Paul Winter’s, *Whales Alive* (Earth Music, 1987) cut 5; Don V. Lax and Melissa Proulx, *Ancient Ocean Harmonies* (Gentle Beauty, 2005); Rauno Lauhakangas, “Cetacean children’s bibliography” (July 1, 2005) at www.helsinki.fi/~lauhakan/whale/literature, where also find a “Cetacean fiction bibliography” (July 1, 2005). For assessments of whale intelligence: Lori Marino, “Cetacean brain evolution: multiplication generates complexity,” *Intl J Comparative Psych* 17 (2004) 1–16.

276. Katharine Payne, Peter Tyack, and Roger Payne, “Progressive changes in the songs of humpback whales,” in *Communication and Behavior of Whales*, ed. Roger Payne (Boulder: Westview, 1983) 9–58, as also Linda N. Guinee et al., “Changes over time in the songs of known individual humpback whales,” 59–80; Michael J. Noad et al., “Cultural revolution in whale songs,” *Nature* 408 (Nov. 30, 2000) 537; Hal Whitehead, *Sperm Whales* (U Chicago, 2003) on society, culture, and evolutionary history; Beverly Beyette, “San Diegans find whales that talk,” *San Diego Union* (July 14, 1970) B-8, concerning recordings of blue whales by William Cummings, who describes them as having a “guttural sound, a long-drawn out note in three stanzas, repeated regularly, almost to the second”; “Navy scientists hear voice of a whale,” *ibid.* (Sept. 15, 1970), Cummings having found five years before that white whales repeat “a complicated twelve-minute stanza of signals.” On lower songs as a healthy response: Bing Venkataraman, “Blue whales’ lower song heartening,” *San Diego Union-Trib* (July 31, 2008) E3. D. P. Costa and J. Gedamke, “Minke Whale (*Balaenoptera Acutorostrata*) Response to a Sound Playback Experiment,” NTIS Final

Report, ADA416796 (2003), suggest that whale song is “likely used to maintain spacing between singing individuals,” so questions of aggregation were important. Cf. Virginia Madsen, “The call of the wild,” in *Uncertain Ground*, ed. Thomas (→ n.248) 33–37, esp. 33, “the voice of the whale has become a huge ‘desiring-machine’—it is multiplied, amplified, mixed and processed, and through such aesthetic and scientific operations the divine message of the earth is heard to pass.” Cf. also Scott Norris, “Creatures of culture? Making the case for cultural systems in whales and dolphins,” *Soundscape: The J of Acoustic Ecology* 3/4 (Winter 2002/Spring 2003) 37–40. As for Gaia, an astute review is provided by Evan Eisenberg, *The Ecology of Eden* (NY: Vintage, 1998) ch. 21.

277. Rennie Taylor, “Ocean mystery noises most baffling,” *San Diego Union* (June 19, 1952) A31; “Recordings seen as lure for tuna,” *San Diego Evening Trib* (Nov. 12, 1951) A11; Ursula K. LeGuin, “The New Atlantis” (1975) in *The Compass Rose* (NY: Harper and Row, 1982) 12–40, q. 27. An immediate (and eloquent) antecedent here was naturalist George F. Mason’s *Animal Sounds* (NY, 1948).

278. Christine Erbe and David M. Farmer, “Zone of impact around icebreakers affecting Beluga whales in the Beaufort Sea,” *JASA* 108,3 (2000) 1332–40, and cf. Barry Lopez, *Arctic Dreams: Imagination and Desire in a Northern Landscape* (NY: Scribner’s, 1986) esp. 138–39; Paul J. Perkins et al., “Underwater communication sounds of the sperm whale, *Physeter catodon*,” *Norsk Hvalfangst-Tidende* 12 (1966) 225–28 for the sounds; Gordon W. Hafner, “Signature information in the song of the humpback whale,” *JASA* 66 (July 1979) 1–6; H. E. Winn et al., “Song of the humpback whale—population comparisons,” *Behavioral Ecology and Sociobiology* 8 (1981) 41–46 for dialects, as also Bob Kenney, interview, Bay Campus, U Rhode Island, Oct. 19, 1995; Christopher W. Clark and Jane M. Clark, “Sound playback experiments with southern right whales,” *Sci* 207 (Feb. 8, 1980) 663–65; J. G. N. Thewissen et al., “Whales originated from aquatic artiodactyls in the Eocene epoch of India,” *Nature* 450 (Dec. 20, 2007) 1190–94, with the most significant connection between cetaceans and the Indian raoellids being the “thickened medial lip of the auditory bulla”; PBS-TV segment on whales, part of “The New Explorers” series (April 5, 1995), submarine as “the next best thing to a whale”; “Sony studies the sea,” *Application Bull of the SONY-Industrial Division* (ca. 1960); U.N. Food and Agriculture Organization, *Report on a Meeting for Consultations on Underwater Noise* (Rome: FAO, 1970) on the use of sound to attract fish or drive shoals into the net, as well as the problems that fisheries, fishermen, and fish have with noise; Michael Jasny, *Sounding the Depths: Supertankers, Sonar and the Rise of Undersea Noise* (NY: Natl Resources Defense Council, 1999) 48–49. For a fine summary of ocean noises of human and non-human origin identified as of 1972: E. M. Arase and T. Arase, “Underwater ambient noise,” in *Acoustics and Vibration Progress*, eds. R. W. B. Stephens and H. G. Leventhal (L: Chapman and Hall, 1974) 195–230. Cf. George A. Young, *The Physical Effects of Conventional Explosives on the Ocean Environment* (White Oak: Naval Ordnance Lab, 1971).

279. Hillel Schwartz, *Century’s End: A Cultural History of the Fin de Siècle from the 990s through the 1990s* (NY: Doubleday, 1990); Chandra Mukerji, *A Fragile Power: Scientists and the State* (Princeton U, 1989); W. H. Munk and A. M. G. Forbes, “Global ocean warming: an acoustic measure,” *J Physical Oceanography* 19 (1989) 1765–77; Naomi Oreskes, “Science

and public policy: what's proof got to do with it?" *Env Sci and Policy* 7 (Oct. 2004) 369-83, sect. 6.; John R. Potter, "ATOC: sound policy or enviro-vandalism? Aspects of a modern media-fueled policy issue," *J Env and Policy* 3,2 (1994) 47-62, and L. M. Herman, "Hawaiian humpback whales and ATOC: a conflict of interests," *ibid.*, 63-76.

280. Potter, "ATOC"; Oreskes, "Science and public policy"; Acoustic Thermometry of Ocean Climate, clippings files, Archives, SIO, including Rod Thompson, "Warming: are oceans undergoing changes?" *Honolulu Star Bull* (June 2, 1992) A-3, and SIO News Release, Feb. 19, 1993, on award of \$35,000,000 ATOC research contract from the Defense Advanced Research Projects Agency (DARPA). In addition to temperature, internal ocean waves significantly affect sound transmission speeds, but Walter Munk and colleagues at Scripps had developed a statistical theory by which to compensate for this "noise" in the interpretation of ATOC results: Munk, "Ocean acoustic tomography" (→ n.271) 123. For the postwar fascination with, and military concern about, silent submarines: Ira Wolfert, "The silent, invisible war under the sea," *Readers' Digest* (Nov. 1945) 116-28; James F. Baxter, "The seesaw of submarine warfare," *Atlantic Mo* 178 (Aug. 1946) 81-87; Hackmann, *Seek and Strike* (→ n.63) 354-56; Thomas B. Allen, "Run silent, run deep," *Smithsonian Mag* 31 (March 2001) 50-61. For an echo from Isaac Rice: "Navy lets contract for 'quiet' U.S. subs," *NY Times* (Nov. 22, 1968) 23, to be manufactured by the Electric Boat Division of General Dynamics, and cf. the earlier film commissioned by U.S. Navy, "Submarine Noise Reduction" (Frederick K. Rockett Co., 1955) MN 8140A in Record Group 428, at NARA II, College Park, MD.

281. Potter, "ATOC"; Sam H. Ridgway, "Who are the whales?" *Bioacoustics* 8 (1997) 3-20; Darlene R. Ketten, "Structure and function in whale ears," *ibid.* 103-35; David Graham, "Scripps to alter sound-blast plans," *San Diego Union* (June 18, 1994) B4, and Kathy Payne, "Could the whales' song be silenced?" *LA Times* (April 13, 1994) B7, both in ATOC clippings files, Archives, SIO.

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Infants (Budapest: Akadémiai Kiadó, 1982), and cf. Barry M. Lester and C.F. Zachariah Boukydis, *Infant Crying: Theoretical and Research Perspectives* (NY: Plenum, 1985), esp. Lester's introductory, "There's more to crying than meets the ear," 1-27.

303. J.I. Rodale and Edward J. Fluck, *The Phrase Finder* (Emmaus, 1953) 433, "Curetes"; Bärbel Mahler, "Beiträge zur Geschichte des Schnullers," Thesis, Universität Düsseldorf, 1966; Theodore G.H. Drake, "Pap and panada," *Annals Med H* 3 (1931) 289-95, and cf. Danièle Alexandre-Bidon and Didier Lett, *Children in the Middle Ages*, ed. Judy Gladding (U Notre Dame, 1999) 90 on nearly identical debates about how to quiet a noisy child in the 15th century. Letters and advice are all from the Records of the Children's Bureau, RG 102, Natl Archives II, College Park, MD: letter 4-9-1-2-1 of April 26, 1917 from Mr. T. W. Orten of Chicago, in Box 29, CF 1914-20; letter 4-5-6-3 received Aug. 23, 1924 from Mrs. W. W. Whipple, Jr., of Amityville, in Box 188, CF 1921-24, as also American Child Health Association and Child Health Organization of America, draft of *Rearing the Runabouts (Children from Two to Six) in the House of Health* (1923) 23; letter 4-12-6-3-8 of Nov. 9, 1929 from Mrs. Raymond F. Cook of Horton, Kansas, and Sept. 5, 1931 from Mrs. Wilson M. Long of Brooklyn, in Box 388, CF 1929-32.

304. Hulbert, *Raising America*, 238 on Spock; Spock, *Common Sense*, q. 19-20, 101, q. 102, 112, q. 113-14, q. 115, 117, q. 118, and sect. 125 on thumb-sucking; Children's Bureau records, letter 4-12-6-3-8 of July 14, 1941 from Mrs. William Calhoun in Box 135, CF 1941-44; letter 4-12-6-3-8 of Oct. 10, 1944 from Mrs. K. Sears in Box 135, CF 1941-44, asking about a "noise absorbing material that I can make a screen out of to put around the crib to muffle the crying"; file 4-12-6-3-8 on crying, in Box 123, CF 1945-48. Cf. Arnold Gesell and Frances L. Ilg, *The Child from Four to Ten* (NY, 1946) 291-92 for a "Crying Gradient." Unknown to Dr. Spock, dyslexia may be a temporal processing deficit affecting both vision and hearing, which in turn can affect the nature of "fussiness": Mary E. Farmer and Raymond M. Klein, "The evidence for a temporal processing deficit linked to dyslexia," *Psychonomic Bull and R* 2,4 (1995) 460-93; Michael Studdert-Kennedy and Maria Mody, "Auditory temporal perception deficits in the reading-impaired: a critical review of the evidence," *ibid.*, 508-14.

305. Donald A. Laird and Eleanor C. Laird, *The Strategy of Handling Children: Questions-and-Answers on Parents' Problems* (NY, 1949) 78-79; Richard Wright, "Long Black Song," in *Uncle Tom's Children* (NY: Harper and Row, 1965 [1938]) 125-56, q. 126-27; Lee Salk, *Ask Dr. Salk: Questions and Answers about Your Family in the 60s* (Indianapolis: Bobbs-Merrill, 1981) 82-85, q. 84-85. As for boredom, the literature on the need for stimulation in utero went back at least to J. C. Grimwade et al., "Sensory stimulation of the human fetus," *Australian J of Mental Retardation* 2 (1970) 63-64. Daniel Beekman, *The Mechanical Baby: A Popular History of the Theory and Practice of Child Raising* (Westport: Lawrence Hill, 1977) xv, reminds us that Galen had much earlier observed that even quiet could be a burden to infants, whose crying was always meaningful. Currently, parents are being cautioned that crying is not always meaningful and must be tolerated in the acronymic form of PURPLE or Peak pattern, Unpredictable, soothing-Resistant, Pained expression, Long bouts of crying, usually in the Evening. The designation of PURPLE crying may be a confession of pediatricians at their own wits' ends, but it is also an attempt to forestall

Peter G. Hepper and Sara Shahidullah, "Development of fetal hearing," *Fetal and Maternal Med R* 6 (1994) 167-79, the range of frequencies to which a fetus responds as it ages expands first downward from 500 Hz to 100 Hz, then upward to 1000 Hz and 3000 Hz.

308. J. C. Grimwade et al., "Human fetal heart rate change and movement in response to sound and vibration," *Amer J Obstetrics and Gynecology* (Jan. 1, 1971) 86-90, and David Walker et al., "Intrauterine noise: a component of the fetal environment," *ibid.*, 91-95; William S. Condon and Lewis W. Sander, "Synchrony demonstrated between movements of the neonate and adult speech," *Child Development* 45 (1974) 458-62; Raul Artal et al., "Fetal response to sound," *Contemporary Ob/Gyn* 5 (May 1975) 13-16, citing thirty-six studies; Working Group 85, Committee on Hearing, Bioacoustics, and Biomechanics, National Research Council, *Prenatal Effects of Exposure to High-Level Noise* (DC: Natl Acad, 1982), citing forty-one sources and finding only small, non-injurious fetal changes in response to extruterine noise; Margaret A. Vince et al., "The sound environment of the fetal sheep," *Behaviour* 81, 2/4 (1982) 296-315; Sherri L. Smith et al., "Intelligibility of sentences recorded from the uterus of a pregnant ewe and from the fetal inner ear," *Audiology and Neuro-Otology* 8 (2003) 347-53, with good bibliography; B. Chayen et al., "Fetal heart rate changes and uterine activity during coitus," *Acta Obstetrica Gynecologica Scandinavica* 65 (1986) 853-55; William P. Fifer and Christine Moon, "Auditory experience in the fetus," eds. Smotherman and Robinson, 175-88; Committee on Environmental Health, "Noise: a hazard for the fetus and newborn," *Pediatrics* 100 (Oct. 1997) 724-27; Annette Karmiloff-Smith and Kyra Karmiloff, "Your baby's secret world," *Parents Expecting* (Summer 1999) 26-27, excerpted from the authors' *Everything Your Baby Would Ask... If Only He Or She Could Talk* (L: Ward Lock, 1998); Lawrence M. Schell, "Pollution and human growth: lead, noise, polychlorobiphenyl compounds and toxic wastes," in *Applications of Biological Anthropology to Human Affairs*, eds. C. G. N. Mascie-Taylor and G. W. Lasker (Camb U, 1991) 83-116, at 103-106; N. P. Luz, "Auditory evoked response of the human fetus: a simplified methodology," *J Perinatal Med* 19,3 (1991) 177-83; B. Sara Shahidullah and Peter G. Hepper, "Hearing in the fetus: prenatal detection of deafness," *Intl J Prenatal and Perinatal Studies* 4, 3/4 (1992) 235-40; R. M. Abrams et al., "Fetal music perception: the role of sound transmission," *Music Perception* 15 (1998) 307-17.

309. Thomas Verny with John Kelly, *The Secret Life of the Unborn Child* (NY: Summit, 1981) q. 11, 19, q. 20, 21, 23n., q. 38.

310. Robert Emde and Jean Robinson, "The first two months: recent research in developmental psychology and the changing view of the newborn," in *Basic Handbook of Child Psychiatry, I*, ed. Joseph Noshpitz (NY: Basic, 1979) 72-105; Kenneth J. Gerhardt et al., "Fetal response to intense sounds," in *Scientific Basis of Noise-Induced Hearing Loss* (NY: Thieme, 1996) 229-40; K. J. Gerhardt and R. M. Abrams, "Fetal exposures to sound and vibroacoustical stimulation," *J Perinatology* 20 (Dec. 2000) 521-30, and also their "The acoustic environment and the physiological responses of the fetus," *ibid.*, 531-36; Peter W. Nathanielsz with Christopher Vaughan, *The Prenatal Prescription* (NY: HarperCollins, 2001) 4-5, q. 38; E. J. H. Mulder et al., "Prenatal maternal stress: effects on pregnancy and the (unborn) child," *Early Human Development* 70 (2002) 3-14; Colleen F. Moore, *Silent Scourge: Children, Pollution, and Why Scientists Disagree* (Oxford U, 2003) 174-78 on the

cortisol; G. S. G. Géléoc and J. R. Holt, “Developmental acquisition of sensory transduction in hair cells of the mouse inner ear,” *Nature Neurosci* 6,10 (2003) 1019–20; Janet L. Hopson, “Fetal psychology,” *Psych Today* 31 (Sept.–Oct. 1998) 44; Leslie Feher, *Psychology of Birth: Roots of Human Personality* (NY: Continuum, 1981); Frédéric Leboyer, *Birth Without Violence* (NY: Knopf, 1975) and cf. Alice E. Adams, *Reproducing the Womb: Images of Childbirth in Science, Feminist Theology and Literature* (Cornell U, 1994) 160–63; Karil Daniels, “Water birth: the newest form of safe, gentle, joyous birth,” *J of Nurse-Midwifery* 34,4 (1989) 198–205 and two preceding articles in same issue; David B. Chamberlain, *Babies Remember Birth* (NY: St. Martin’s, 1988) 87; Elizabeth Noble, *Primal Connections: How our Experiences from Conception to Birth Influence our Emotions, Behavior and Health* (NY: Simon and Schuster, 1993) 69n. on “dream,” 98ff. on breathing, q. 123 from Grof, ch. 13 on “prenatal bonding.” For a reassessment of fetal breathing: Giacomo Meschia, “Evolution of thinking in fetal respiratory physiology,” *Amer J Obstetrics and Gynecology* 132 (1978) 806–10. As for remembering acoustic insults, consider Robert G. Crowder, “Auditory memory,” in McAdams and Bigand, eds., *Thinking in Sound* (→ n.190) 113–45.

311. Ruth Halliwell, *The Mozart Family* (Oxford U, 1998) 27–28, 30; Don G. Campbell, *Master Teacher: Nadia Boulanger* (DC: Pastoral, 1984); idem, *Introduction to the Musical Brain* (St. Louis: Magnamusic-Baton, 1983); idem, *The Mozart Effect: Tapping the Power of Music to Heal the Body, Strengthen the Mind, and Unlock the Creative Spirit* (NY: Avon, 1997) 14–16; Frances H. Rauscher et al., “Music and spatial task performance,” *Nature* 365 (Oct. 14, 1993) 611; eadem, “Listening to Mozart enhances spatial-temporal reasoning: towards a neurophysiological basis,” *Neurosci Letters* 185 (1995) 44–47; eadem, “Key components of the ‘Mozart Effect,’” *Perceptual and Motor Skills*, 86 (1998) 835–41; eadem, “Reply: Prelude or requiem for the ‘Mozart effect’?” *Nature* 400 (1999) 827–28, and most recently, Wilfried Gruhn and Frances H. Rauscher, *Neurosciences in Music Pedagogy* (NY: Nova Science, 2007); Thomas Blum, ed., *Prenatal Perception, Learning, and Bonding* (Berlin: Leonardo, 1993), esp. essays by David B. Chamberlain, Chairat Panthuraamphorn, Ruth Fridman, and Brad Logan, who had written a dissertation in developmental psychology on “Neurogenetic Effects of Sonic Imprinting” and later founded the International Society for Prenatal and Perinatal Psychology; Sharlene Habermeyer, *Good Music, Brighter Children* (Rocklin: Prima, 1999) 33–38, also citing Donald J. Shetler, “The inquiry into prenatal musical experience: a report of the Eastman Project, 1980–87,” in *Music and Child Development*, eds. F. R. Wilson and F. L. Roehmann (St. Louis: MMB Music, 1990), and cf. Marc D. Hauser and Josh McDermott, “The evolution of the music faculty: a comparative perspective,” *Focus on Music* 6,7 (2003) 663–68. For more: Giselle E. Whitwell, Center for Prenatal and Perinatal Music, at www.prenatalmusic.com. For a critique: John T. Bruer, *The Myth of the First Three Years: A New Understanding of Early Brain Development and Lifelong Learning* (NY: Free Press, 1999). For claims that the infant sensorium is synaesthetic and its hearing inseparable from the other senses until five or six months: Campen, *Hidden Sense* (→ n.67) 30–33. For claims that infants do not listen selectively: Jill Y. Bargones and Lynne A. Werner, “Adults listen selectively; infants do not,” *Psych Sci* 5 (May 1994) 170–74. For socio-musico-logical context about the “intrauterine symphony”: Tia DeNora, *Music in Everyday Life* (Camb. U, 2000) 77–79.

312. On the history of campaigns against hospital noise: Ronald F. Dixon, "Psychology studies noise: suggestions for its elimination," *Trained Nurse and Hospital R* 78 (1927) 253-55; Charles F. Neergaard, "Controlling hospital noise," *Architectural Forum* 57 (Nov. 1932) 448-50; idem, "What can the hospital do about noise?" *JASA* 13 (1942) 217-19; Stephen A. Falk and Nancy F. Woods, "Hospital noise levels and potential health hazards," *New England J Med* 289 (Oct. 1973) 774-81; Colloque sur la lutte contre le bruit dans l'hôpital, *La Lutte contre le bruit* (P: Masson, 1968). On incubators: Jeffrey P. Baker, *The Machine in the Nursery: Incubator Technology and the Origins of Newborn Intensive Care* (Johns Hopkins U, 1996) throughout, q. 97; W.A. Silverman, "Incubator-Baby side shows," *Pediatrics* 64 (1979) 127-41, with postscript in *Pediatrics* 66 (1980) 464-75 and follow-up in 100 (1997) 159-60; Richard F. Snow, "Martin Couney," *Amer Heritage Mag* 32 (June/July 1981); Gesell and Ilg, *Child from Five to Ten* (→ n.304) 278; Frank L. Seleny and Michael Streczyn, "Noise characteristics in the baby compartment of incubators," *Amer J Diseases of Childhood* 117 (1969) 445-50; Fred H. Bess et al., "Further observations on noise levels in infant incubators," *Pediatrics* 63 (1979) 100-106; A.P. Carvalho and L.F. Pereira, "Noise in infant incubators and in neonatal intensive care units," *Inter-noise 98: Proceedings, 1998 International Congress on Noise Control Engineering: Sound and Silence, Setting the Balance*, eds. Vern C. Goodwin and Cliff D. Stevenson (Christchurch, 1998) at <http://paginas.fe.up.pt/~carvalho/in98.pdf>, esp. 4, comparison chart, 1968-97; Consensus Committee to Establish Recommended Standards for Newborn ICU Design (1992-1999), clippings in the "Critical Care" file, Library, American Hospital Association, Chicago; M. Michaëlsson et al., "High noise levels in infant incubators can be reduced," *Acta Paediatrica* 81 (Oct. 1992) 843-44; Diana S. Pope, "Music, noise, and the human voice in the nurse-patient relationship," *IMAGE: J of Nursing Scholarship* 27,4 (1995) 291-96, q. 293 "female vocals," as also Melanie J. Spence and Anthony J. DeCasper, "Prenatal experience with low-frequency maternal-voice sounds," *Infant Behavior and Development* 10,2 (1987) 133-42; Pamela Bremmer et al., "Noise and the premature infant: physiological effects and practice implications," *J of Obstetric, Gynecological, and Neonatal Nursing* 32 (July-Aug. 2003) 447-54. Ototoxic drugs were also often used in the treatment of at-risk newborns, further increasing the chances of permanent hearing loss: Stephen A. Falk, "Noise pollution: neonatal aspects," *Pediatrics* 54 (1974) 46-79. Cf. M.K. Philbin et al., "Recommended permissible noise criteria for occupied, newly constructed or renovated hospital nurseries," *J Perinatology* 19 (Dec. 1999) 559-63.

313. Otto Rank, *The Trauma of Birth*, ed. E. James Lieberman (NY: Dover, 1993 [1923]) 11-12, 102; Florence Dupont, *Daily Life in Ancient Rome*, tr. Christopher Woodall (Oxford: Blackwell, 1992) 223-25 on Vaticanus; Lloyd deMause, "The fetal origins of history," in his *Foundations of Psychohistory* (NY: Creative Roots, 1982) ch. 7; Karen Newman, *Fetal Positions: Individualism, Science, Visuality* (Stanford U, 1996) esp. 66, 100-103; Greenacre, "Biological economy of birth" (→ n.298); Feher, *Psychology of Birth*, 13-15; Rita B. Eisenberg, *Auditory Competence in Early Life* (Baltimore: University Park Press, 1976) esp. 139, the fetus emerging "rather neatly equipped to organize his auditory world"; Milton Waldman, "Life before birth: the impact of prenatal experiences," *J Regression Therapy* 4,2 (1990) 46-53; Benedikte Scheiby, "Death and rebirth experiences in music and music

therapy,” in *Listening, Playing, Creating*, ed. Carolyn B. Kenny (SUNY Albany, 1995) 199–216; Arthur Janov, *The Primal Scream: Primal Therapy: The Cure of Neurosis* (NY: Dell, 1970) 11–13. Cf. William G. Niederland, “Early auditory experiences, beating fantasies, and primal scene,” *Psychoanalytic Study of the Child* 13 (1958) 471–504, a riff on Freud’s “A child is being beaten” (1919) with emphasis (p. 473) on “terrifying and disruptive impact of primitive, crude sounds on the ego” that can be “observed not only with regard to the infantile psyche, but also under special circumstances in adult life.” And listen to Chris Alonzo’s “Ditter’s Primal Scream,” in *Monologues for Men by Men*, eds. G. Garrison and M. Wright (Portsmouth: Heinemann, 2002) 67–68, a short story that must be read aloud.

314. Levin, *The Listening Self* (→ n.109) 71, q. 86 from Carl Rogers; Eugenio Barba and Nicola Savarese, “The silent scream,” *A Dictionary of Theatre Anthropology: The Secret Art of the Performer*, tr. Richard Fowler (L: Center for Performance Research/Routledge, 1991) 234–35, quoting George Steiner; Robin Maconie, *The Second Sense: Language, Music and Hearing* (Lanham: Scarecrow, 2002) 9–15; Bernard Nathanson, with Richard N. Ostling, *Aborting America* (Garden City: Doubleday, 1979) 47, 247, and throughout; “The Silent Scream” (American Portrait, 1984), available on YouTube.com; Newman, *Fetal Positions*, 111ff.; Steinbock, *Life Before Birth*, 58; Editorial, “A false scream,” *NY Times* (March 11, 1985) A18; Sally Faith Dorfman et al., *The Facts Speak Louder Than “The Silent Scream”* (NY: Planned Parenthood, 1985) at www.plannedparenthood.org/issues-action/abortion/anti-choice-activity/reports/facts-speak-louder-than-silent-scream-6136.htm; Stephen T. Erlewine, “Primal Scream,” in *All Music Guide to Rock*, 3rd ed., eds. Vladimir Bogdanov et al. (Ann Arbor: All Music, 2002) 887–88. Stefan Helmreich reminds me that on “Mother,” the first track of his first solo album, *John Lennon/Plastic Ono Band* (Apple, 1970), Lennon’s finely escalated screaming was inspired by Janov, who had worked personally with him and with Yoko Ono for several months; for the story and Janov’s commentary: <http://homepage.ntlworld.com/carousel/pob11.html>. Mark Dery would collate this with Munch’s “Scream” as part of a “scream meme”: *The Pyrotechnic Insanitarium: American Culture on the Brink* (NY: Grove, 1999) 45–60. Lauren Berlant heard the fetal screaming as an appropriation by anti-abortion groups of feminist tactics that had fought to give voice to other silenced, invisible parties: “America, ‘fat,’ the fetus,” in *Gendered Agents: Women and Institutional Knowledge*, eds. S. Mariniello and P. A. Bové (Duke U, 1998) 192–244 at 199.

315. Stephen T. Erlewine, “Screaming Trees,” *All Music Guide to Rock*, 984–85; Peter Tompkins and Christopher Bird, *The Secret Life of Plants* (NY: Harper and Row, 1973); Walon Green (dir.), *The Secret Life of Plants* (Infinite Enterprise, 1979) available online at <http://video.google.com/videoplay?docid=4753736638977368381>, which features clips of Sir Jagadis Chandra Bose, author of *Life Movements in Plants* (Delhi: B. R. Publishing, 1985 [wr. 1918–1931]); J. G. Ballard, *Vermilion Sands* (NY: Carroll and Graf, 1971) esp. 31–46; Dorothy L. Retallack, *The Sound of Music and Plants* (Santa Monica: DeVorss, 1973) 19–24, 42; http://en.wikipedia.org/wiki/Journey_through_the_Secret_Life_of_Plants. For several variations on Tompkins and Bird: Carlos Cassaba, ed., *Roots of Evil: Beyond the Secret Life of Plants* (L: Transworld, 1976); Brain J. Ford, *The Secret Language of Life: How Animals and Plants Feel and Communicate* (NY: Fromm Intl, 2000); Anselm Kiefer, *The Secret Life of Plants* (Munich: Schirmer/Mosel, [2003]). Audiophiles belong in this endnote

because they too claim to be able to distinguish sounds, and tonal differences, inaccessible not only to the ordinary listener but to acoustic measuring devices: Marc Perlman, “Golden ears and meter readers. The contest for epistemic authority in audiophilia,” *Social Studies of Sci* 34 (2004) 783–807.

316. Susan Barber, “*The Secret Life of Plants and Diet for a Small Planet* with Frances Moore Lappé,” *Spirit of Maat* 3,1 (Aug. 2003?), as also “Viewing the inner life of plants [an interview with Dr. Konstantin Korotkov],” at www.spiritofmaat.com; David Tame, *The Secret Power of Music* (Wellington: Turnstone, 1984) subtitle and ch. 5; L. George Lawrence, *Galactic Life Unveiled* (privately printed, 1987) iv, xx, 1, 16, 67, 150ff., 302–303, and interview in Green’s film, *The Secret Life of Plants*, at 1:14:09–1:19:09; Michael Theroux, “Detecting biodynamic signals: interstellar communication” (1997), describing Project LUCAS, continuation of Lawrence’s work as a “Borderlands Sciences SETI Project,” at www.borderlands.com/archives/arch/icomm.htm; George W. Van Tassel, *When Stars Look Down* (LA: Kruckeberg, 1976) and www.integratron.com. For a musicological analysis of *Close Encounters* in the context of the interspecies communication (and Mozart’s starling): Meredith J. West et al., “Singing, socializing and the music effect,” *Nature’s Music: The Science of Birdsong*, eds. P. Marler and H. Slobberkoorn (Amsterdam: Elsevier Academic, 2004) ch. 14.

317. Michael J. Arlen, *Thirty Seconds* (NY: Farrar Straus Giroux, 1980) 12–13; Helmreich, *Alien Ocean*, 250–84 on astrobiology; Amir Alexander, “The Search for Extraterrestrial Intelligence (SETI): a short history,” at www.planetary.org/explore/topics/seti/seti_history_00.html (1993–2009); Stella Doon, blurb/review for *Mars*, 78+ (Atavistic, 1977?), and Lydia Lunch, blurb/review for *Mars*, *The Complete Studio Recordings NYC 1977–1978* (No More Records, 1979) at www.forcedexposure.com/artists/mars.html; Jim DeRogatis, “Screamo,” *Guitar World* (Nov. 2002) at www.jimdero.com/OtherWritings/OtherScreamoGW.htm; Andy Greenwald, “Screamo 101,” *Entertainment Weekly* (Nov. 21, 2003) at www.EW.com/ew/article/0,,543090,00.html. I thank Anabel Lai for introducing me to Screamo. I have also been informed here by an interview with Steve Norton of Debris (Boston, Oct. 15, 1996), and conversations with the bassist Mark Dresser and the singer Diamanda Galàs, whose *Litanies of Satan* with its “Wild Women With Steak-Knives” (Y Records, 1982), *Schrei X* (Mute, 1996), and more recent *Defixiones, Will and Testament* (Mute, 2003) return the scream to historical contexts of lamentation, abjection, defiance, and visceral anger, on which: David Schwarz, *Listening Subjects: Music, Psychoanalysis, Culture* (Duke U, 1997) ch. 7, and see Pierre A. Castanet, *Tout est bruit pour qui a peur: pour une histoire sociale du son sale* (P: Michel de Maule, 1999) esp. 150–51, relating musical screaming to the paintings of Munch and of Francis Bacon, as also Gilles Deleuze, *Francis Bacon: The Logic of Sensation*, tr. Daniel W. Smith (Continuum, 2003) 41–44. Cf. Gabriele Klein, *Electronic Vibration: Pop Kultur Theorie* (Wiesbaden: VS, 2004) on techno music and raves, 13–79; Jon Stratton, “Beyond art: postmodernism and the case of pop music,” *Theory, Culture & Society* 6 (Feb. 1989) 31–57.

318. Sophia Roosth, “Screaming yeast: sonocytology, cytoplasmic milieu, and cellular subjectives,” *Critical Inquiry* 35 (Winter 2009) 332–50; Catherine Zandonella, “Dying cells dragged screaming under the microscope,” *Nature* 423 (2003) 106; Jean G. Harrell,

Soundtracks: a Study of Auditory Perception, Memory, and Valuation (Buffalo: Prometheus, 1986) q. 16, 22, 25–26, q. 27, q. 41, 43, 85, and cf. Sandra E. Trehub, “Musical predispositions in infancy,” in *Cognitive Neuroscience of Music*, eds. I. Peretz and R. Zattore (Oxford U, 2003) 3–20 on the sophisticated music-processing capacities of infants; Peggy S. M. Hill, *Vibrational Communication in Animals* (Harvard U, 2008); “Squirrels emit ‘silent scream,’” BBC News Online (July 28, 2004) at <http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/3932943.stm>. In 2010, Rama Venkatasubramanian announced the creation of “Nanothermal trumpets,” *Nature* 463 (Feb. 4, 2010) 269, so the limits of brass have not yet been reached, nor apparently the detection of noise at that scale: Daniel Rugar et al., “Feeling the noise in nanoscale systems: studies based on ultrasensitive force detection,” in *Noise as a Tool for Studying Materials* (=SPIE Proc, Vol. 5112), eds. Michael B. Weissman et al. (Bellingham: SPIE, 2003) 1–9.

319. Hubert Markl, “Vibrational communication,” in *Neuroethology and Behavioral Physiology: Roots and Growing Points*, eds. F. Huber and H. Markl (Berlin: Springer, 1983) 332–53, cited by Hill, *Vibrational Communication*, 17, and q. 14.

320. Didier Anzieu, “L’Enveloppe sonore du soi,” *Nouvelle revue de psychanalyse* 13 (1976) 161–79; idem, *The Skin Ego*, tr. Chris Turner (Yale U, 1989), esp. 71–95, 157–73; Naomi Segal, “The other French Freud: Didier Anzieu—the story of a skin” (May 10, 2006), a paper presented at U Sussex, at <http://hdl.handle.net/10065/62>; Lisa Appignanesi, *Mad, Bad, and Sad: A History of Women and the Mind Doctors from 1800 to the Present* (NY: Norton, 2000) 258–68 on Marguerite; Mordaunt Hall, “Le Mystère De La Chambre Jaune, a French mystery picture,” *NY Times* (May 26, 1931); Marcel L’Herbier, *La Tête qui tourne* (P: Belfond, 1979) 198–99; Denis Vasse, *L’Ombilic et la voix. Deux enfants en analyse* (P: Seuil, 1974) 14–21. Cf. Ashley Montagu, *Touching: The Human Significance of the Skin* (Columbia U, 1971); Steven Connor, *The Book of Skin* (L: Reaktion, 2004), and more extravagantly, Mark C. Taylor, *Hiding* (U Chicago, 1997). For Lacan in particular relation to detective fiction and duplicity: Slavoj Žižek, *Looking Awry: An Introduction to Jacques Lacan through Popular Culture* (MIT, 1991) throughout, esp. 40–41 on the enveloping psychic reality of sound in cinema; for a critique of Lacan’s intellectual trajectory in relation to issues of physicality and physiology: Dylan Evans, “From Lacan to Darwin,” in *The Literary Animal: Evolution and the Nature of Narrative*, eds. J. Gottschall and D.S. Wilson (Northwestern U, 2005) 38–55.

321. René Farabet, tr. Kaye Mortley, “In the beginning was the ear,” *Art & Text* 31 (Dec.–Feb. 1989) 14–21. Cf. the fascination of Hannah Merker, a woman who became almost entirely deaf as an adult, with the waterworld of the fetus and the embryonic sense of balance that comes with the development of the inner ear: *Listening: Ways of Hearing in a Silent World* (Southern Methodist U, 1992/94) 22–24.

322. Alfred A. Tomatis, *The Conscious Ear: My Life of Transformation Through Listening*, trs. S. Lushington and B.M. Thompson (Barrytown: Station Hill, 1991 [1977])1,

323. *Ibid.*, esp. ch. 13; idem, *L’Oreille et le langage* (P: Seuil, 1963); John R. Kershner et al., “Two-year evaluation of the Tomatis Listening Training Program with learning disabled children,” *Learning Disability Q* 13 (Winter 1990) 43–53, negative results rebutted in part by Billie M. Thompson and Susan R. Andrews, “An historical commentary on the

physiological effects of music: Tomatis, Mozart and neuropsychology,” *Integrative Psych and Behavioral Sci* 35 (July 2000) 174–88; Billie M. Thompson, interview (Pasadena, Feb. 25, 2000), who kindly provided me with a copy of her 1999 address to the Annual Convention of the New Jersey Speech-Language-Hearing Association, “Tomatis, sound training, and auditory processing for children,” and a photocopy of an interview with Ricki Robinson, “Tomatis, auditory processing, and autism” (1995, rev. 2000); Sound Listening Corporation, *Introducing Solisten Training Courses* (mail solicitation received April 22, 2002); Paul Chutkow, *Depardieu: A Biography* (NY: Knopf, 1994) 135–51. On circumspectral space: Denis Smalley, “Space-form and the acousmatic image,” *Organised Sound* 12,1 (2007) 35–58, at 51–52.

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137-41, q. 137. For a more political lineage of children's literature: Julia L. Mickenberg and Philip Nel, comps., *Tales for Little Rebels: A Collection of Radical Children's Literature* (NYU, 2008).

333. Antler, *Lucy Sprague Mitchell*, 20-39; idem, "Having it all, almost: confronting the legacy of Lucy Sprague Mitchell," in *The Challenge of Feminist Biography*, eds. Sara Alpern et al. (U Illinois, 1992) 97-115; Mason Warner, *Sprague Warner & Company, Incorporated* (Chicago, 1912) at www.archive.org/stream/spraguelwarnercomoowarn/spraguelwarner-comoowarn_djvu.txt; Lucy Sprague Mitchell, *Two Lives: The Story of Wesley Clair Mitchell and Myself* (NY, 1953) esp. 46-48, 58, 63, 66, 69-74, q. 108, 121, 126; idem, "Pioneering in education: oral history transcript," MSS C-D 4047 (Aug. 29, 1962), ch. I, 6-7, 24 in Regional Cultural History Project, Bancroft Lib, UC Berkeley.

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336. Howard Chudacoff, *Children at Play: An American History* (NYU, 2007) 45ff.; Richard H. Brodhead, *Cultures of Letters: Scenes of Reading and Writing in Nineteenth-Century America* (U Chicago, 1993) esp. 18-33, on the decline of corporal punishment in schools; Colleen McDannell, "Parlor piety: the home as sacred space in Protestant America," in *American Home Life, 1880-1930*, eds. J. Foy and T. Schlereth (U Tennessee, 1992) 162-89; Steven Mintz, *Huck's Raft: A History of American Childhood* (Harvard U, 2004) 79ff.; "Troublesome children," *The Christian Recorder* (July 6, 1861); "Social entertainments for Sunday-Schools," *ibid.* (Dec. 7, 1861); "The art of being quiet," *Chambers's J* 21 (1854) 149-51, the quoted sentence exactly paraphrased by W. Maclerie, "Silence," *Tinsley's Mag* 21 (1877) 423-28, at 424; Uncle George cartoon in *Harper's New Mo Mag* (March 1864). On 19th-century children's literature, a good resource is Pat Pflieger, comp., "Nineteenth-century American Children & What They Read," at www.merrycoz.org (1999-2009), which includes her dissertation, "A Visit to Merry's Museum; or, Social Values in a Nineteenth-Century American Periodical for Children." Cf. Peter N. Stearns, *Anxious Parents:*

A History of Modern Childrearing in America (NYU, 2004) ch. 6, on increasing demands in the 20th century for entertainments for children.

337. Lucy Matthews Chambers autobiography (1963), ch. 1, p. 7, on her “crying room,” in Box 1, f. 23 of the Matthews-Chambers Papers, Western Historical Manuscript Collection, U Missouri-St. Louis; Annmarie Adams, *Architecture in the Family Way: Doctors, Houses, and Women, 1870–1900* (McGill-Queen’s U, 1996) 140–43; Calvert, *Children in the House*, 67, 71, 81–83, 128–31; Chudacoff, *Children at Play*, 65–79; Paul Boyer, *Urban Masses and Moral Order in America, 1820–1920* (Harvard U, 1978) 242–51 on the playground round-ups; Mintz, *Huck’s Raft*, 188ff. on pediatrics; Catherine M. Buckton (daughter of a physician), *Health in the House: Twenty-Five Lectures on Elementary Physiology in its Application to the Daily Wants of Man and Animals, Delivered to the Working Wives and Children of Working-Men in Leeds and Saltaire* (Toronto, 1877) 158–63 on ear-care; Avery, *Behold the Child*, 146–52 on the periodicals, as also Pflieger (→n.336); Sarah Robbins, *Managing Literacy, Mothering America: Women’s Narratives on Reading and Writing in the Nineteenth Century* (U Pittsburgh, 2004) esp. 64–65, 101–102 on mothers as reading teachers; Worthington Hooker, *The Child’s Book of Nature* (NY, 1882 [1857]) vol. II, ch. 13 on hearing, and III, 127–29 on noise of boilers and steam whistles; Charles Kingsley, *The Water-Babies* (NY, 1864) 32 for “noise, row, hubbub, babel, shindy, hullabaloo, stramash, charivari, and total contempt of dignity, repose, and order,” and 262 for ocean floor; *Charlie’s Discoveries: or, A Good Use for Eyes and Ears* (B, 1841, rev. from 3rd English ed.) 97, 154; Charles Bartholomew, *Mechanical Toys* (Feltham: Hamlyn, 1979) 29–33, 73, 78–83, 89–100, 127; Columbia Teddy Bear Manufacturers advertisement, “The Laughing Teddy Bear,” *Playthings* 6 (April 1908) 64; “Two new ideas in crying dolls,” *Playthings* 6 (Feb. 1908) 86.

338. “Domestic toys,” *Playthings* 6 (Jan. 1908) 98; Gary Cross, *Kids’ Stuff: Toys and the Changing World of American Childhood* (Harvard U, 1997) 18, 22, 24, 31; Blair Whitton, *Toys: The Knopf Collectors’ Guides to American Antiques* (NY: Knopf, 1984) throughout; Mitchell Papers, Box 7 (→n.334), note of Dec. 17, 1935; N. W. Ayer Collection, Series One, Box 151, f. 1, Wilkinson Mfg Company advertisement (n.d.), in NMAH.

339. Aunt Laura, “Hush!” *The Nursery: A Mo Mag For Youngest Readers* 15 (1874) 83; John Habberton, *Helen’s Babies: With Some Account of Their Ways Innocent, Crafty, Angelic, Impish, Witching, and Repulsive* (B, 1876) q. 31, 36, 133; Young America series, *The Noisy Boy* (NY, 1870?) 1; Josephine Franklin, *Nelly’s First Schooldays* (B, 1860) 119; idem, *Nelly’s Illness* (NY, 1881) 25–27; Frances H. Burnett, *Editha’s Burglar* (B, 1888) 27, 31, 35; Joyce Wilson, *Party Games for all Occasions* (Portland? 1938) 13, Shouting Proverbs; Calvert, *Children in the House*, 109–12, and 115–16, observing that boys and girls were far more eclectic in their choice and use of toys than gendered advertising would lead one to believe; Mintz, *Huck’s Raft*, 84–87 on the imposition of greater gender distinctions among boys and girls when childhood is romanticized and female purity emphasized. Cf. Christine Stansell, *City of Women: Sex and Class in New York, 1789–1860* (U Illinois, 1987) 47–49, 202–205, and noting (pp. 57–58) the large number of women whose legal depositions revealed that they were awake long into the night listening to “sounds of discord and crying babies” through thin tenement walls; Hugh Cunningham, *The Children of the Poor: Representations of Childhood since the Seventeenth Century* (Oxford: Blackwell, 1991) ch. 5 on street “savages” in England.

On Palmer Cox's Brownies: Avery, *Behold the Child*, 143-44, who also (pp. 155-83) contrasts English "restraint" with American "latitude" in books about and for girls.

340. Carl Sandburg, *The Rootabaga Stories* (1922) 138 for newsies, put online by Joseph William Perry at <http://josephperry.net/rootabaga/>; David Nasaw, *Children of the City: At Work and At Play* (Garden City: Anchor, 1985) on tenement children in the street and ch. 5 on newsies female and male; Chudacoff, *Children at Play*, 42, 69-70, q. 164 on play, and ch. 4, esp. 101; Cross, *Kids' Stuff*, 33-34, 69; Nancy G. Osterud, *Bonds of Community: The Lives of Farm Women in Nineteenth-Century New York* (Cornell U, 1991) 72-73; Roy Lubove, *The Professional Altruist: The Emergence of Social Work as a Career, 1880-1930* (NY: Atheneum, 1980).

341. Mintz, *Huck's Raft*, ch. 8, "Save the Child"; Ellen Key, *The Education of the Child* [an excerpt from *The Century of the Child*] (NY, 1909) 19-21; Viviana A. Zelizer, *Pricing the Priceless Child: The Changing Social Value of Children* (Princeton U, 1994); Metropolitan Life Insurance Company, inquiry, Oct. 14, 1922, wanting to know "the cost of living and ages and cost of bringing up a child in various social classes," in Children's Bureau Records, Box 189, f. 4-7-0, at NARA II, College Park, MD.

342. Peter Fritzsche, *Stranded in the Present: Modern Time and the Melancholy of History* (Harvard U, 2004) 4 on Romantic children; Carolyn Steedman, *Strange Dislocations: Childhood and the Idea of Human Interiority, 1780-1930* (Harvard U, 1995) esp. 76-88; Sally Shuttleworth, "The psychology of childhood in Victorian literature and medicine," in *Literature, Science, Psychoanalysis, 1830-1970*, eds. H. Small and T. Tate (Oxford U, 2003) 86-101; Limin Bai, "Children as the youthful hope of an old empire: race, nationalism, and elementary education in China, 1895-1915," *J H of Childhood and Youth* 1 (Spring 2008) 210-31; Lord Horder, "Noise and health," *Quiet Mag* 1 (July 1937) 11; Robert Lynd, "Do we hate noise?" *ibid.* 2 (April 1938) 15-16; Henry Richards, "Education and the noise problem," *Report of the Second Conference [of the Anti-Noise League] on the Abatement of Noise* (L, 1935) 38.

343. Abraham A. Brill, "Psychopathology of noise," *NY Med J* 104 (1916) 1134-37, and cf. Heinz Kohut and Siegmund Levarie, "On the enjoyment of listening to music," *Psychoanalytic Q* 19 (1950) 64-87. Children who screamed constantly and became violent or reclusive were adjudged as "feble-minded" or suffering from "congenital moral defects" or, later, "juvenile psychopathologies": Kathleen W. Jones, *Taming the Troublesome Child: American Families, Child Guidance, and the Limits of Psychiatric Authority* (Harvard U, 1999).

344. Mitchell, *Two Lives* (→ n.334) ch. 23; Patsy Stoneman, *Elizabeth Gaskell* (Indiana U, 1987) 29-30; Jenny Uglow, *Elizabeth Gaskell: A Habit of Stories* (L: Faber and Faber, 1993) 93-98, q. 95; Charles Darwin, "Biographical sketch of an infant," *Mind* 2 (1877 [from diary entries of 1840-1842]) 285-94.

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Sandburg's *Rootabaga Stories*," *Children's Lit* 8 (1980) 118-32, q. 120 from his letters. Sandburg was subject to the same criticisms as leveled by Richard Burton against other "New Verse" in his "Noise in art," *The Weekly R* 3 (July 1920) 40: "The writers of New Verse throw 'pep' into poetry very much as Billy Sunday throws pep into preaching. It is a method by way of noise." Sandburg did not likely know that the first children's books published in the United States for other than school or religious instruction were of a noisy sort: manuals for making fireworks and illustrated collections of street cries: Leonard Marcus, *Minders of Make-Believe: Idealists, Entrepreneurs, and the Shaping of American Children's Literature* (B: Houghton Mifflin, 2008) 14-18.

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352. Margaret Wise Brown, illust. [by her sister] Roberta Rauch, *The Fish with the Deep Sea Smile* (NY: Delacorte, 1966 [1938]) 76-81. Was the title fish a coelacanth?

353. Marcus, *Margaret Wise Brown*, 35-36, 40, 72-73, 112, 144, q. 148 about

SHHhhh. . . *Bang* (NY, 1941), and cf. Shannon Mattern, “Resonant texts: sounds of the American public library,” *The Senses and Society* 2 (Nov. 2007) 277–302; Anna Commire, ed., “Brown, Margaret Wise,” *Yesterday’s Authors of Books for Children* (Detroit: Gale, 1978) II, 9–14, q. 12 on Weisgard; Margaret Wise Brown, *The Noisy Book* (NY, 1939).

354. Margaret Wise Brown, *On Christmas Eve* (NY, 1938); Lucy Sprague Mitchell, “How children re-create their world” (typescript carbon ca. 1950) q. 6, in Box 7, f. “About Language,” Mitchell Papers (→ n.334); Margaret Wise Brown, “Writing for five-year-olds” (n.d.) q. 12, in f. 9–8, Brown Collection, as also typescript letter to Messrs. E.P. Dutton (Feb. 16, 1945) in “Personal” file, and “Quiet Noisy Book file”; Margaret Wise Brown, “Creative writing for very young children,” *The Book of Knowledge 1951 Annual*, ed. E. V. McLoughlin (NY: Grolier, 1951) 77–81, q. 81; idem, *The Quiet Noisy Book* (NY: HarperTrophy, 1978 [1950]).

355. Marcus, *Margaret Wise Brown*, 272–79, 315; Margaret Wise Brown, *The Quiet Noisy Book*.

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357. Dr. Seuss Collection, Ser. 2, Box 7, f. 13, “5,000 Fingers of Dr. T. (Screenplay)—Rough Notes,” and Ser. 4, Box 17, *Judge* file, in Mandeville Special Coll Lib, Geisel Lib, UC San Diego; “The Advertising Artwork of Dr. Seuss,” esp. sections on Flit, Holly Sugar, and Stromberg-Carlson radios (“What is a wild tone?”), at <http://orpheus.ucsd.edu/speccoll/dsads/index.shtml>; *OED*, s.v. “rumpus room,” first use 1940; Margaret DeForest, “The children’s orchestra,” *Amer Childhood* 13 (Sept. 1927) 20.

358. The conclusions in this paragraph are based upon my reading of some twelve hundred children’s books, the majority published since 1930, whose plots are driven by noise or by noise or a quest for quiet, as well as one hundred works of children’s nonfiction dealing with acoustics, thunder, soundmaking, or related subjects. A bibliography will be found on the Zone/MIT website for this book. As for the works cited here: Edward Hemingway, *Bump in the Night* (NY: Putnam’s, 2008); Michael Rex, *Goodnight, Goon: A Petrifying Parody* (NY: Putnam’s, 2008); Kate Klise, *Why Do You Cry? Not a Sob Story* (NY:

Holt, 2006); Steve Parker, *Earsplitters! The World's Loudest Noises* (Mankato: Capstone, 2009); Jacqueline Woodson, *Hush* (NY: Putnam's, 2002); Jane Yolen, illustrated by John Schoenherr, *Owl Moon* (NY: Philomel, 1987); Jonah Winter, illustrated by Barry Blitt, *The 39 Apartments of Ludwig van Beethoven* (NY: Schwartz and Wade, 2006); Emily Kingsley (words), Sam Pottle (music), "Noise" (1977) and Jeff Moss (words and music), "Honk, Bang, Whistle and Crash," in *Oscar's Trashy Songs* (NY: Sony Wonder, for Sesame Street, 1997) tracks 6 and 13; David Elliott, illustrated by Timothy B. Ering, *Finn Throws a Fit!* (Somerville: Candlewick, 2009).

359. Margaret Wise Brown, "The Squeaky Book," in second file of "Unpublished Stories," Brown Collection; Marcus, *Margaret Wise Brown*, 166, 176, 237.

360. Binneveld, *From Shellshock to Combat Stress* (→ n.37) 94–95.

361. "How industry battles noise to win production," *Modern Industry* 6 (Dec. 15, 1943) 46–49, q. 46 on dispensary; Alice Hamilton, *Exploring the Dangerous Trades* (New England U Press, 1985 [1943]) 399, Hitler's voice over the radio, and cf. Carolyn Birdsall, "All of Germany listens to the Führer: Radio's acoustic space and 'imagined listening community' in Nazi Germany," in *Hearing Places: Sound, Place, Time and Culture*, eds. Ros Bandt et al. (Newcastle: Cambridge Scholars, 2009) 205–14; Peter C. Smith, *The Stuka at War* (Sheperton: Allan, 1971) 11, q. 15; Roy R. Grinker and John P. Spiegel, *War Neuroses in North Africa: The Tunisian Campaign (January–May 1943)* (NY, 1943) 16, 34–35, 81. Cf. Sir James Purves-Stewart, "Noise and nerves in wartime," *Quiet Mag* 2 (March 1941) 7. Les Back, *The Art of Listening* (Berg, 2007) 119–24, tracks aspects of the domestic noise of war and terrorism since 1914.

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363. P.S. Meyrick, "Observations on the incidence of acoustic trauma in the training of infantrymen," *JLO* 61 (1946) 248–50; Albert E. Cowdrey, *Fighting for Life: American Military Medicine in World War II* (NY: Free Press, 1994) ch. 7, q. 135 on curtain, q. 136 on

rubbing of leaves, q. 137 on concussion, q. 151 on Surgeon General; Studs Terkel, *The Good War: An Oral History of World War Two* (NY: Ballantine, 1984) esp. 56-63; Leo Beranek, comments reported in memo (May 27, 1943), in 713.9030, Box 1, file "Ear Wardens, General," in PAL (→n.242); Ronald J. Drez, ed., *Voices of D-Day: The Story of the Allied Invasion, Told by Those Who were There* (Louisiana State U, 1994) 34, 74, 82; U.S. Signal Corps, "Sonic Deception" (16mm, 1945) in Record Group 111, M1151, NARA II, College Park, MD; Philip Gerard, *Secret Soldiers: The Story of World War II's Heroic Army of Deception* (NY: Dutton/Penguin, 2002) ch. 5 on the "sonic campaign"; Omer Bartov, *The Eastern Front, 1941-45: German Troops and the Barbarisation of Warfare* (Houndmills: Macmillan, 1985) 26-27, 35; R.F. Powell and M.R. Forrest, *Noise in the Military Environment* (L: Brassey's Defence Publications, 1988) 1; Grinker and Spiegel, *War Neuroses*, 34-37, 81-83, 103-104, 141; Binnevel, *From Shellshock to Combat Stress* (→n.37) 23 for English regiment; Shephard, *A War of Nerves* (→n.36) 223 on Guadalcanal.

364. W.R. Bion, *Experiences in Groups and Other Papers* (NY, 1959); idem, *The Long Week-End 1897-1919: Part of a Life*, ed. Francesca Bion (Abingdon: Fleetwood, 1982) q. 18, q. 143 Dante, and 119ff. for tank warfare; idem, "The 'war of nerves': civilian reaction, morale and prophylaxis," in *The Neuroses of War*, ed. Emanuel Miller (L, 1940) 180-200; Jacobus, "Palinurus and the tank: Bion's war" (→n.37); John A. Mills and Tim Harrison, "John Rickman, Wilfred Ruprecht Bion, and the origins of the therapeutic community," *H Psych* 10 (Feb. 2007) 22-43; Alison Winter, "The making of 'truth serum,'" *Bull H Med* 79,3 (2005) 500-33; Grinker and Spiegel, *War Neuroses*; Heims, *The Cybernetics Group* (→n.235) 40, 134; Hans Pols, "The repression of war trauma in American psychiatry after World War II," in *Medicine and Modern Warfare*, eds. Roger Cooter et al. (Amsterdam: Rodopi, 1999) 251-76; idem, with Stephanie Oak, "War and military mental health: the U.S. psychiatric response in the twentieth century," *Amer J Pub Health* 97 (Dec. 2007) 2132-42. Discussions of war trauma during the 1940s were muted in other countries as well.

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368. Howard Scott, “Quiet! Noise Wastes Energy” poster published by the NNAC (NY, 1939–1945); “Careless Talk” category in Princeton University Posters Coll, including 8035–A (handbill, 1942–1945), U.S. Marines transit advertisements (May 18, 1942, June 29, 1942), Steven Dohanos poster for Office of War Information (1943), Office for Emergency Management poster “He’s Watching You” (1942), Office of Facts and Figures poster “The Enemy Is Listening” (1942–1945), Association of American Railroads poster “Head clear” (1942–1945), and a series of Seagram Distillers posters by Henry Sharp Goff, Jr., a.k.a. Essargee (1943–1944), all in NMAH; David J. Jacobson, *The Affairs of Dame Rumor* (NY, 1948) 381–87; Raymond H. Greenman of the American Society for the Hard of Hearing, letter (May 15, 1944), in Box 1, f. 1.1.3 of the Hughson Papers (→ n.366); Charles W. Nixon, *Glimpse of History: The Origin of Hearing Conservation Was in the Military* (DC: Dept. of Commerce, for the U.S. Air Force Research Lab, Wright-Patterson Air Force Base, 1998), esp. 2, noting that audiometry at discharge was so much more comprehensive than any testing done at induction that many soldiers received lifelong compensation for apparent hearing loss incurred during the war, absent precise baselines, and cf. Charles W. Shilling et al., “Hearing tests,” *US Naval Med Bull* 44 (Jan. 1945) 100–16; PAL and

CID (Central Institute for the Deaf, St. Louis), Press Release (Feb. 17, 1946), “War time research hearing aids and aural rehabilitation,” in Box 3, “Aural Rehabilitation,” in PAL, 713.9030, as also Box 3, “Aural Reconditioning,” 713.9021, memos throughout reflecting surprise at number of soldiers sent home for reconditioning; S. N. Stevens et al., *Effects of Environment and Atmospheric Conditions on Workers*, American Management Association Production Series, 119 (NY, 1940) 5; “The Case of the ‘War Nerves’ Victims,” *Time* (Sept. 11, 1944); Edwin G. Boring, letter to “Smitty” (Feb. 5, 1943), passing along questions from Miss Van de Water, in 2.10, Correspondence 1934–1972, file “Boring,” in Stanley S. Stevens Papers (→n.129); Frank McDowell, “Plastic surgery in the twentieth century,” *Annals of Plastic Surgery* 1 (March 1978) 217–24 at 222; J. S. Rogers, *Protecting Plant Manpower*, Special Bulletin No. 3, Division of Labor Standards (DC, 1942); “How industry battles noise to win production,” *Modern Industry* 6 (Dec. 1943) 46–49. PAL, as above (→n.242), was the acronym by which Harvard researchers referred to the Psycho-Acoustic Laboratory during the war, and by which in these endnotes I refer to its records. For more on PAL and noise: Edwards, *The Closed World* (→n.267) 208–37.

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370. John S. Parkinson, letter to Stevens (June 4, 1954), with reply (June 5), in Box 3, PAL (→n.242), 713.9010; “PAL Job Schedule,” Notebook 1944, Jobs in Progress, in Box 1, Smith Papers (→n.129) 2.45. On the disconnect between annoyance and ear damage: Aram Glorig and Anne Summerfield, “Noise— is it a health problem?” *JAMA* 168 (Sept. 27, 1958) 370–76 at 372.

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398. Leo Szilard, *Leo Szilard, His Version of the Facts*, eds. S. R. Wear and G. W. Szilard (MIT, 1978) 185, quoted in Norris, *Writing War* (→ n.38) 158-59. For a chronology of all nuclear tests, James E. Leonard, "Catalog of known and putative nuclear explosions from unclassified sources" (Aug. 5, 1996) at <http://nuclearweaponarchive.org/Library/Catalog>.

399. On radioastronomy in the 1950s: Jon Agar, *Science and Spectacle: Jodrell Bank in Postwar British Culture* (Amsterdam: Harwood, 1998), esp. 41 on the noise level of the equipment itself, of man-made static and police radio frequencies in the neighborhood, and extraneous noise from charged rain and other atmospheric and solar disturbances, all of which led (ch. 4) to interpretive problems of interference. I also use here Charles Hard Townes, "A life in physics: Bell Telephone Laboratories and World War II, Columbia University and the laser, MIT and government service, California and research in astrophysics: oral history transcript," interviews by Suzanne B. Riess (1991-92), 102-04 on American resistance to his proposal for a program of radioastronomical research in 1945, in MSS 95/51, Bancroft Library, UC Berkeley; Donald H. Menzel, letter/mimeo (April 13, 1954), "Survey of the potentialities of cooperative research in radio astronomy," q. 2-3, in Box 39, f. 8, of Spitzer Papers (→ n.267), as also letter from Spitzer to John N. Wheeler (Dec. 22, 1949), replying to Wheeler's letter of (Dec. 13, 1949) in which he asks, "What practical advantage beyond navigational possibilities may evolve from discovery of the 'screaming stars'?" in Box 28, f. 4. On solar activity: E. Oystein Elgaroy, *Solar Noise Storms* (Oxford: Pergamon, 1977) xi-2 for a history of the connections gradually drawn between solar activity and terrestrial radio/radar noise, elaborated in K. Kai et al., "Storms," in *Solar Radiophysics*, eds. D. J. McLean and N. R. Labrun (Camb U, 1985) 415-41; New Portrait of Our Planet, IV, "The sun's awesome impact: IGY maps solar outbursts and way they upset earth," *Life* (Nov. 28, 1960).

400. *L. L. Olds Seed Co. v. Commercial Union Assurance Co.*, 179 F.2d 472 (7th Cir. 1950); *Lever Bros. Co. v. Atlas Assurance Co., Ltd.*, et al., 131 F.2d 770 (7th Cir. 1942); *Hartford Fire Insurance Co. v. Empire Coal Mining Co.*, 30 F.2d 794 (10th Cir. 1929) at 798.

401. Seal advertisement in britannica.com series, "What's on your mind?," *Sci Amer* (Dec. 1999) 47; Christopher Impey, "Worlds [interview]," *Pop Sci* (Jan. 2000) 60; Cheryl J. Beatty and Richard T. Fienberg, "Participatory cosmology: the Big Bang challenge," *Sky & Telescope* 87 (March 1994) 20-22.

402. Marcia Bartusiak, *Einstein's Unfinished Symphony: Listening to the Sounds of Space-Time* (DC: Joseph Henry, 2000) 63; "Penzias and Wilson's Discovery is One of the Century's Key Advances," www1.bell-labs.com/project/feature/archives/cosmology; Sharov and Novikov, *Edwin Hubble*, 143-47, popularized by Richard Panek, with reference back to Jansky, in "Heavenly hiss," *Natural H* (July-Aug 1999) 20-21; Edward N. Skomal, *Man-Made Radio Noise* (NY: Van Nostrand Reinhold, 1978); Hoyle et al., *Different Approach to Cosmology*, ch. 8; Robert P. Crease and Charles C. Mann, *The Second Creation: Makers of the Revolution in Twentieth-Century Physics*, rev. ed. (Rutgers U, 1996) esp. 151-66 on cosmic

rays; R. H. Dicke, "The measurement of thermal radiation at microwave frequencies," in Sullivan, ed., *Classics in Radio Astronomy*, 105–13; R. H. Dicke et al., "Cosmic black-body radiation," *Astrophysical J* 142 (1965) 414–19. A revisionist history appears in A. K. T. Assis and M. C. D. Neves, "History of the 2.7K temperature prior to Penzias and Wilson," *Apeiron* 2 (July 1995) 79–64. The findings of COBE, the Cosmic Background Explorer, launched in 1989, and the Wilkinson Microwave Anisotropy Probe, launched in 2001, encouraged a revisionist acoustics, as described by David L. Chandler, "Universe started with hiss, not bang," *New Scientist* (June 12, 2004) 15, quoting the astronomer Mark Whittle, who translated and transposed the high-resolution mapping of the CMBR into audible octaves and argued that, acoustically, the universe "began not with a bang but with a low moan, building into a roar that gave way to a deafening hiss," sound bytes of which are at www.astro.virginia.edu/~dmw8f/BBA_web/index_frames.html. For a poetic evocation of the Big Bang ("Our prehistory is frozen sound"): Greg Milner, *Perfecting Sound Forever: An Aural History of Recorded Music* (NY: Faber and Faber, 2009) 3–4.

403. On car alarms: Raymond J. Bouley, letter (Sept. 18, 1971), Alfred Loewy (Sept. 14, 1971), and Paula Rubovits (June 30, 1972) on alarms continuing two to four hours, in Box 12, f. "Complaints, Complaints," in Citizens for a Quieter City, Records 1950–1977, Manuscripts and Archives Division, NY Public Library; Marc Lacey, "War declared on alarms that go chirp in the night," *LA Times* (April 5, 1993) B1; Bill Weber, "Bill to quiet wailing car alarms draws criticism," *NY Times* (April 21, 1992) B1–2; Steven Birmingham, "Rethinking the regulation of car horn and car alarm noise: an incentive-based proposal to help restore civility to cities," *Columbia J Env Law* 19 (1994) 391–44; Shepherd 2-Wire Car Alarm with Voice Warning, *Damark Catalog*, item B-5743–406978 (1996), siren of 120 db; Pioneer DFS Alarm advertisement, "Hello Car Thieves," *SPIN* (May 1997).

On synaptic noise: Louis J. DeFelice, *Introduction to Membrane Noise* (NY: Plenum, 1981) 37off.; P. Fatt and B. Katz, "Spontaneous subthreshold activity at motor nerve endings," *J Physiology* 117 (1952) 109–28; Vincent E. Dionne, "Synaptic noise," in *Membranes, Channels, and Noise*, eds. Robert S. Eisenberg et al. (NY: Plenum, 1984) 139–59.

On television "rain" and "snow": Albert Rose et al., "The image orthicon—a sensitive television pickup tube," *Television. Vol. IV (1942–46)*, eds. Alfred N. Goldsmith et al. (Princeton: RCA, 1947) 81, and, same vol., Albert Rose, "A unified approach to the performance of photographic film, television pickup tubes, and the human eye," 90–111; David J. Carlson, "Galactic noise, an important design consideration of VHF television tuners," RCA Camden Reports EM-5103, Advanced Development Section, RCA Victor TV Division (Sept. 17, 1956); "The sun's awesome impact," *Life* (Nov. 28, 1960);

On pulsars: Bartusiak, *Einstein's Unfinished Symphony*, 70; Jocelyn Bell-Burnell, "The discovery of pulsars," in Kellermann and Sheets, eds., *Serendipitous Discoveries* (→ n.391) 160–71; idem, interview (June 2007), at www.jodcast.net/archive/200706/20070601-jodcast-interview-high.mp3.

The Sixties scene I leave to others, except for two often overlooked sources: Baxter Art Gallery, *Fluxus etc./Addenda II: The Gilbert and Lisa Silverman Collection* (Pasadena: The Gallery, 1983); Herbert Blau, *The Dubious Spectacle: Extremities of Theater, 1976–2000* (U Minnesota, 2002) 118–31 on voice during the Sixties.

404. Sam Baynoff, "Councilmen to hear cosmic ray 'cure' dispute," *LA Daily News* (Aug. 30, 1945) 37, in Box 172, f. 5, "Cosmic Rays, 1943-52," in AMA Archives, courtesy of the American Medical Association, Chicago; Jonathan Cott, *Stockhausen: Conversations with the Composer* (1973), excerpted in *Composers on Music*, 2nd ed., ed. Josiah Fisk (North-eastern U, 1997) 450-52; Joachim-Ernst Berendt, *Nada Brahma: The World Is Sound: Music and the Landscape of Consciousness*, tr. Helmut Bredigkeit (Rochester: Destiny, 1987 [1983]) throughout, q. 57 from Kippenhahn, and cf. "The quest for the youngest galaxies," *Sci* 262 (Dec. 24, 1993), quoting Mauro Giavalisco of the Space Telescope Science Institute: "As galaxies come into this world, they give a huge cry in Lyman alpha [a bright spectrographic line of excited hydrogen], the beautiful cry of the baby galaxy." Cosmic rays would continue to intrigue astrophysicists, providing them with new subatomic particles and an explanation for most of the universe's lithium, beryllium, and boron: Richard Lingenfelter et al., "Cosmic rays, nuclear gamma rays, and the origin of Li, Be and B," *Physics Today* 51.4 (1998) 30; Michael Friedlander, *A Thin Cosmic Rain: Particles from Outer Space* (Harvard U, 2000).

405. Bartusiak, *Einstein's Unfinished Symphony*, 9-10, 149. The search for one more noise, or set of noises, to complete the "symphony" might be compared to the adding of noise, post-production, to CD albums so that the listener experiences a greater "liveliness" or completeness in the recording: Stan Link, "The work of reproduction in the mechanical aging of an art: listening to noise," *Computer Music J* 25 (2001) 34-47.

406. All from the following folders of Box 1, Committee for a Quiet City, Records 1954-1958, in Municipal Archives, NY City: prefatory letter to Mayor, 1956; "Applications," letter from Harry-Edgar Daeché to Arde Bulova (April 11, 1956) on radio and television; "Public Relations: Barkas and Shalit, Inc.," "Citizens' Letters No Response Required," anon. postcard (Aug. 31, 1957) on drone, anon. (Aug. 7, 1957) on singer, anon. (n.d.) on shutters, Irate Citizen (June 28, 1957) on carters, and Mrs. B. (March 16, 1956) on Bonwit-Teller; "Citizens' Letters A-F," M. M. Berg (June 23, 1956) churchbells; *ibid.*, response of R. W. Watt to Mr. and Mrs. Henry R. Bernhardt (Aug. 14, 1956); *ibid.*, summary of letter from Joseph Bernstein (Sept. 5, 1956) on power house; *ibid.*, Emil O. Boehnke (July 17, 1956) also on power house and signed "Yours for a non-barbiturate tranquility"; *ibid.*, Mrs. M. Bruckheimer (Aug. 6, 1957) on the soprano; *ibid.*, Mrs. R. Camerino (Dec. 19, 1956) on fish tank; "Screwball Citizens Letters," John Carmichael (March 20, 1955) for noise cancellation; *ibid.*, Clayton Hawks (March 20, 1956); *ibid.*, Mary T. Heitkemper (Oct. 1, 1956), with a letter on her case from Richard M. Barr to Ernest H. Peabody (March 29, 1956), "It sounds to me like a case for either the Central Intelligence Agency or Bellevue," in Box 2, f. "League for Less Noise"; "Citizens' Letters G-L," Mrs. M. F. Hardenbaugh (Jan. 17, 1956) on airplanes; "Citizens' Letters M-O," Virginia MacAuley (Nov. 8, 1956) on doormen; "Citizens' Letters P-R," Mrs. R. Richman (Sept. 17, 1957) on airplanes and nightmare; "Citizens' Letters, S," Esther L. Sheridan (June 10, 1956) on "insidious harassment," and Mrs. A. Simchow (Sept. 24, 1956) on Angel Harp; "Citizens' Letters, T-Z," H. H. Turchin (Aug. 9, 1956) on tugs.

407. *Ibid.*, Box 1, f. "Public Relations: Barkas and Shalit, Inc.," Report no. 4 (March 28, 1956) script for Garry Moore Daytime Show, and Report no. 6 (1956) on Johnny Carson;

Box 1, Screwball, Jim Richards (March 21, 1956) on Els; Box 2, Correspondence—Miscellaneous—A-K, Edward L. Bernays to Martin Dodge (May 1, 1953); Pierre Grivet and Austin Blaquièrre, *Le Bruit de fond* (P, 1958) vii for Gabor, who had long been interested in acoustical phenomena: “Acoustical quanta and the theory of hearing,” *Nature* 159 (1947) 591–94. Kellogg’s began directing attention to the noise of Rice Krispies in 1929 with advertisements such as that on the inside cover of *Delineator* (Aug. 1929), and was still promoting loud cereal noises in 2005 for its “Sounds Good” Raisin Bran Crunch, which however paled in comparison with the Frito-Lay Company 1997 campaign for its Doritos chips, “The loudest taste on earth.” Cf. Jean-Pierre Ciattoni, *Le Bruit* (Toulouse: Privat, 1997) 33 on marketing the noise of foods.

408. Panel on Noise Abatement, *The Noise Around Us: Findings and Recommendations* (DC: U.S. Dept. of Commerce, 1970) q. 6, 9, q. 19; “Sound approach to noise hunted,” *[DC] Evening Star and Daily News* (Oct. 5, 1972) A3, for Goodfriend. Hesitancy and self-conscious half-heartedness in the quashing of noise would become as sociophilosophical as it had been technoscientific: James Donald, “Noisy neighbours: on urban ethics,” in his *Imagining the Modern City* (U Minnesota, 1999) ch. 6; Salome Voegelin, *Listening to Noise and Silence: Toward a Philosophy of Sound Art I* (Continuum, 2010) 41–76.

409. In the United States, some \$835,000,000 was paid out in workers’ compensation for occupationally induced hearing loss between 1978 and 1987: Centers for Disease Control, *Morbidity and Mortality Weekly Report* 37 (March 18, 1988) 158. For anti-noise activity: Chudnov, *Noise Abatement* (→ n.271) 45–46 for Lvov; [National] Noise Abatement Council, *The Memphis Story* (NY, 1953), and its *Noise Abatement Digest* (1959–) for other campaigns, as also the entire issue of *UNESCO Courier* 20 (July 1967). For the riveter: “Quiet, peace unknowns in New York” (April 14, 1955) in Noise clippings, *B Herald Trib* morgue, Mugar Memorial Lib, Boston U, and Bruce Ingersoll, “Domestic din ruining homes,” *B Globe* (June 21, 1971), from the *Chicago Sun-Times*, also in the morgue. For another and quite comprehensive campaign in New York City a decade later: Robert A. Baron, *The Tyranny of Noise* (NY: St Martin’s, 1970); Citizens for a Quieter City, Records 1950–1977 (→ n.403), from which I draw the complaint by Kranch (April 15, 1970), and Box 23, “Extent,” for anti-noise campaigns worldwide. Eventually, FCC rules would prohibit any commercial from being louder than the loudest sound in regular television programming, which led to a new stratagem: producing commercials whose volume was, each second, as loud as the loudest sound in the intervening program: Jeremiah Moore, presentation at Haliburton Soundscape Workshop, Haliburton, Ontario, July 31, 1996.

410. Robert E. Uhrig, coordinator, *Symposium on Noise Analysis in Nuclear Systems* (Oak Ridge, AEC, 1964) esp. R. K. Osborn and S. Yip, “Physical theory of neutron noise in reactors and reactor-like systems”; J. L. Muñoz-Cobo and F. C. Difilippo, eds., *Noise and Nonlinear Phenomena in Nuclear Systems* (NY: Plenum, 1989) esp. 211, “anomalous fluctuations” at start-up “may dominate the evolution of a system.” For a more philosophical take: Albert Borgmann, *Holding on to Reality: The Nature of Information at the Turn of the Millennium* (U Chicago, 1999) esp. ch. 15, “Fragility and Noise.”

411. Committee for a Quiet City, Box 1, Citizens’ Letters, P-Z, Mrs. Ruth Zoubek (April 10, 1956); Chronicle Foreign Service report from Munich, in *Quiet!* [NY] 2,2

(Winter 1972) 4, in Box 12, f. “Construction,” Citizens for a Quieter City, Records, as also Anna Maria Levine (May 11, 1972), in Box 12, f. “Complaints” and Brown Scrapbook for quotation from broadcast by Edwin Newman, “Emphasis: Critic at Large” (Oct. 23, 1970). Cf. Kenton D. McMahan of the Research Lab, General Electric Company, “The noise problem in the application of fans,” *JASA* 7 (Jan. 1936) 204–207.

412. Tony Schwartz, *The Responsive Chord* (Garden City: Anchor, 1973) 129–33, 136, 140–41, 146. Schwartz produced a dozen recordings for Folkway Records between 1953 and 1970, including *1,2,3 and a Zing, Zing, Zing: Street Songs & Games of the Children of New York City* (FP 703, 1953); *Millions of Musicians* (FP60 or FD 5560, 1954); *Sounds of My City: The Stories, Music, and Sounds of the People of New York* (FC 741, 1956); *Nueva York: A Tape Documentary of Puerto Rican New Yorkers* (FP 58–2, 1956); *Sound Effects, Vol. 1: City Sounds* (F6170, 1958). Cf. Grace Glueck, “Sound profile of 86th St. is taped; varied noises make beautiful music to enthusiast,” *NY Times* (Aug. 5, 1968) 46. For sound-effects, Max K. Culver, “A History of Theatre Sound Effects Devices to 1927,” Ph.D. thesis, U Illinois, 1981; on Foley artists, I have been entertained by the clippings file on “Sound Effects,” at the Margaret Herrick Lib, Center for Motion Picture Study, Academy of Motion Pictures Arts and Sciences, LA.

413. On tape recording (which I am slighting despite a personal connection to Ampex, for whom my father worked as an industrial chemist, designing coatings for the first mylar tapes and videotapes): D.H. Howling[!], “Noise in magnetic recording tapes,” *JASA* 28 (Sept. 1956) 977–87; Symes, *Setting the Record Straight* (→ n.222) 69–72; Matthew Malsky, “Stretched from Manhattan’s back alley to MOMA: a social history of magnetic tape and recording,” in *Music and Technoculture*, eds. R. T. A. Lysloff and L. C. Gay, Jr. (Wesleyan U, 2003) 233–63, q. 233 from Jay S. Harrison, “Sonic contours,” *NY Herald Trib* (May 5 and Oct. 29, 1952); Helga de la Motte-Haber, “Soundsampling: an aesthetic challenge,” in *I Sing the Body Electric*, ed. Braun (→ n.71) 211–18; Mark Clark, “Suppressing innovation: Bell Laboratories and magnetic recording,” *Tech and Culture* 34 (1993) 516–38; Eric C. Daniel et al., *Magnetic Recording: The First 100 Years* (NY: IEEE, 1999). On surveillance: John E. McGrath, “Intimate screaming: the sound of surveillance,” *Women & Performance: A J of Feminist Theory* 18 (1997) 9:2. On EVP: Marc Macey, “ITC: Instrumental contact with the dead?” *Perforations* 4,1 at www.spiritweb.org/Spirit/itc-macy.html (posted May 8, 1996, closed Aug. 2003); Tom Butler and Lisa F. Butler, *There Is No Death and There Are No Dead* (LaVergne: Lightning Source, 2003–2004) 1–30; Carl Michael von Hausswolff, “Friedrich Jürgenson” (2000), at www.fargfabriken.se/fjf/life.html; Konstantin Raudive, *Breakthrough: An Amazing Experiment in Electronic Communication with the Dead*, ed. Joyce Morton, tr. Nadia Fowler (NY: Taplinger, 1971); Peter Bander, *Voices from the Tapes* (NY: Drake, 1973); Parapsychic Acoustic Research Cooperative, *The Ghost Orchid. An Introduction to EVP* (PARC CD-1, Ash, 1999); Mark Poysden, “EVP—Voices of the Dead” formerly at www.strangenation.com.au/Articles/Voices%20of%20the%20Dead.htm (viewed Aug. 25, 2003, now vanished); Christine Bergé, “Machines à convertir. Les magnétophones transmettant la voix des morts,” *Techniques et culture* 17–18 (1991) 331–43, focused on Sarah Estep, author of *Voices of Eternity* (NY: Ballantine, 1988) and founder in 1982 of the American Association for Electronic Voice Phenomena; R. A. Von Behren, “Various

aspects of ‘tape noise,’” *Sound Talk* 34 (ca. 1954) in folder on “Tape and Film Standards,” in MSS 81/95, Alexander Mathew Poniatoff Papers, 1948-1980, in Bancroft Library, UC Berkeley. The history of EVP excitements would seem at once to confirm and undermine Greg Hainge’s thesis in “No(i)stalgia: on the impossibility of recognising noise in the present,” *Culture, Theory & Critique* 46,1 (2005) 1-11, since tape noise was heard very early on, but used toward nostalgic (recuperative) purposes regardless. Cf. also Cindy Patton, “How to do things with sound,” *Cultural Studies* 13 (1999) 466-87 at 474-77.

414. Berendt, *Nada Brahma* (→ n.404) 58, citing Jeff Lichtman and Robert M. Sickels, *Amateur Radio Astonomer’s Notebook* (1977); Fiorella Terenzi, at www.fiorella.com; John Gribbin, “Supernova debris broadcasts its latest hit,” *New Sci* 133 (Jan. 18, 1992) 19; Hiroshi Kikuchi, et., *Dusty and Dirty Plasmas, Noise and Chaos in Space and in the Laboratory* (NY: Plenum, 1994) esp. 323-500, 545-49 on quakes; Big Noise (producers), *Andy Kelli and the Big Bang* (ATCO 91296, 1994).

415. For some half-metaphorical, half-phenomenological adaptations of background noise: Johannes Fabian, *Moments of Freedom: Anthropology and Popular Culture* (U Press of Virginia, 1998) 5-6, 24-25; Harry Harootunian, *History’s Disquiet: Modernity, Cultural Practice, and the Question of Everyday Life* (Columbia U, 2000) 7, q. 21, 126; Michael Rogin, *Blackface, White Noise: Jewish Immigrants in the Hollywood Melting Pot* (UC, 1996) 115, 220; Bruno Sapparelli et al., *Des bruits, des cafés, des hommes: la ville au quotidien* (Geneve: Institute d’études sociales, 1983) esp. 120ff.; James C. Scott, *Domination and the Arts of Resistance: Hidden Transcripts* (Yale U, 1999) ch. 6, esp. 154-56 on grumbling; Deborah Tannen, *You Just Don’t Understand: Women and Men in Conversation* (NY: Ballantine, 1990) ch. 7 on interruption and overlap. On white noise: *OED*, s.v. “white,” 1(f) and 2(e); William Shakespeare, *The Art of Singing* (B, 1910) 31; Max Meyer, “On the attributes of sensations,” *Psych R* 11 (1904) 83-103, at 97 for “pure noise,” for which no judgments as to pitch are possible; John D. Barrow, *The Artful Universe* (Oxford: Clarendon, 1995) 230-42, q. 233. On white noise machines: Francis W. White[!], “Demonstration of a new noise-producing apparatus,” *Trans 9th Intl Otological Congress*, ed. Henry D. Reik (Baltimore, 1912) 475-76; B. M. Becker, “The Bárány noise apparatus,” *Annals of Otology and Rhinology* 41 (1932) 222-26; Box 1, 713.9023, Communications (I) Electrical Interference, and Communications (III) Noise Generators, in PAL (→ n.242), as also S. S. Stevens to Paul H. Geiger, letter (March 21, 1942) responding to letter (March 16) asking, “How do you obtain the ‘thermal’ noise used to simulate windage noises in planes?” in Box 2, 713.9010; Stevens Papers (→ n.129), Box 1, Notebook no. 21, Patent for Static Generator, May 21, 1944; Stevens, “Science of noise” (→ n.369) 99.

416. This lexical-technical positioning of “black noise” is another instance, of course, of an ostensibly neutral but defamatory use of “black” by non-blacks. For affirmations of “black noise,” listen to Tricia Rose, *Black Noise: Rap Music and Black Culture in Contemporary America* (Wesleyan U, 1994); Ewan Allinson, “It’s a Black thing: hearing what whites can’t,” *Cultural Studies* 8,3 (Autumn 1994) 438-55; Anthony B. Pin, ed., *Noise and the Spirit: The Religious and Spiritual Sensibilities of Rap Music* (NYU, 2003), esp. Noel L. Erskine, “Rap, Reggae and religion: sounds of cultural dissonance,” 71-84, and Mark L. Taylor, “Bringing noise, conjuring spirit: Rap as spiritual practice,” 107-30; Ron Eglash,

“From hip-hop to flip-flop: black noise in the master-slave circuit,” in *Sound Unbound: Sampling Digital Music and Culture*, ed. Paul D. Miller a.k.a. DJ Spooky the Subliminal Kid (MIT, 2008) 203–14. *Per contra*, Lester Bangs equates “white noise” with racism in “The white noise supremacists,” in *Rip It Up: The Black Experience of Rock ‘n Roll*, ed. Kandia Crazy Horse (NY: Palgrave Macmillan, 2004) 103–14. Consider also the nature and implications of evidence for a correlation between skin pigmentation and susceptibility to noise-induced hearing loss: Marie-Louise Barrenäs, “Pigmentation and noise-induced hearing loss,” in *Biological Effects of Noise*, eds. D. Prasher and L. Luxon (L: Whurr, 1998) 59–70.

417. Joseph S. Wisniewski, “Colors of Noise” (1996) originally at Martin Saxon, www.msaxon.com/colors.htm (last updated March 28, 2000, now defunct), currently available at Project Technology Partners, www.ptpart.co.uk/colors-of-noise; Martin Gardner, “White and brown music, fractal curves, and one-over-f fluctuations,” *Sci Amer* 238,4 (1978) 16–32, q. 16 on brown noise; Marten Scheffer et al., “Catastrophic shifts in ecosystems,” *Nature* 413 (Oct. 11, 2001) 591–96, on resilience; K. M. Cuddington and P. Yodzis, “Black noise and population persistence,” *Proc Royal Soc L: B, Biological Sci* 266 (1999) 969–73; Vasilos Dakos et al., “Slowing down as an early warning signal for abrupt climate change,” *Proc Natl Acad Sci* 105 (Sept. 23, 2008) 14308–12, and cf. Mikko Heino, “Noise colour, synchrony, and extinctions in spatially structured populations,” *Oikos* 83,2 (1998) 368–75 on red noise; Heart and Sound Soother, *The Sharper Image Catalog* (June 1995); Nun-Nun Productions, Richmond, VA, “fussy baby?” CD at www.cryingbaby.com; Baby’s First White Noise CD, at www.purewhitenoise.com. On the “harmonichaos” of a 2006 concert of vacuum cleaners whose mouths were attached to harmonicas: “Céleste Boursier-Mougenot [review],” *The New Yorker* (Oct. 16, 2006) 3. On the noisiness of life in space: Richard H. Lyon, *Random Noise and Vibration in Space Vehicles* (DC: Shock and Vibration Info Center, U.S. Dept. of Defense, 1967); V. I. Myasnikov et al., “Peculiarities of human sleep under conditions of continuous prolonged influence of broad-band noise of average intensity,” tr. Wright-Patterson Air Force Base Technical Division (1969) as summarized in Infomatics, Inc., *An Assessment of Noise Concern in Other Nations* (DC: EPA, 1972) 78; Susmita Mohanty, conversation and correspondence (2001–2002) regarding her work with the Flight Crew Support Division, NASA Johnson Space Center, where she interviewed astronauts on the habitability of the Mir space station; Lee Dye, “In space, no one can hear . . . because it’s so darn noisy up here,” ABCNews.com (2000) available at <http://eugen.leitl.org/tt/msg01465.html>.

418. Don DeLillo, *White Noise* (NY: Penguin, 1985) q. 4, 23, q. 35–36, q. 44, q. 98–99, 118–19, 125, q. 184, and cf. Frank Letricchia, ed., *News Essays on White Noise* (Camb U, 1991) as also J. Peter Euben, *Platonic Noise* (Princeton U, 2003) 141–73, and Peter Sloterdijk, *Sphären III: Schaume* (Frankfurt am Main: Suhrkamp, 2004) 195 on foam as a postmodern figure, akin to white noise. Consider also Greg Lynn’s “blob tectonics” as discussed by Steve Goodman, “Sonic anarchitecture,” in *Autumn Leaves: Sound and the Environment in Artistic Practice*, ed. Angus Carlyle (L: CRISAP, 2007) 63–65. For Malamud: “Zora’s noise” (1985) in *The People and Uncollected Stories*, ed. Robert Giroux (NY: Farrar Straus Giroux, 1989) 230–46. Note Malamud’s implicit reference to subliminal messages,

which were a great concern in the 1980s and 1990s for critics suspicious of advertising, for pedagogues seeking faster ways to teach languages, and for personal growth. Consider, e.g., F. Borgeat and J. Goulet, "Psychophysiological changes following auditory subliminal suggestions for activation and deactivation," *Perceptual and Motor Skills* 56 (1983) 759-66, with 40-db white noise masking; "Mind control is a terrible thing to waste," *Time Mag* (March 1, 1993) 9 on reports of the KGB's acoustic "psycho-correction" research using white noise; Centerpointe Research Institute, Beaverton, Ore, "The End Personal Growth Through Technology" advertisement, *Utne Reader* (Sept./Oct. 1994) 135; Fox TV, "Millennium" episode (Feb. 5, 1999), twenty-second white-noise tapes with hidden message.

419. Jacques Dupraz, *Théorie de la communication: signaux, bruits, et modulations* (P: Eyrolles, 1973) 75; Joe Basilone, *White Noise* (Elkins: Basilone, 1982) 1; Jacob J. Freeman, *Principles of Noise* (NY: Wiley, 1958) 139; John Hollander, with art by Virgil Burnett, *White Noise* (broadside, 197-?); John Rockwell, "Reverberations: move over, middle C: the speculative case for the cosmic B flat," *NY Times* (Jan. 30, 2004) on the Taos hum, as also Toshiro Tanimoto, "Geophysics: humming a different tune," *Nature* 452 (April 3, 2008) 539-41, and the Taos Hum page at www.eskimo.com/~bill/hum/hum.html; Nobuaki Obata, *White Noise Calculus and Fock Space* (Berlin: Springer, 1994) vii. Other cross-modalities of white noise in fiction, cultural criticism, music, and the visual arts: David Batchelor, *Chromophobia* (L: Reaktion, 2000) esp. 10-50; Josten Berge, "Dream machines: new media as new intoxicants," in *Stimuli: Too Much Noise, Too Much Movement*, ed. Bartomeu Marí, tr. Brian Holmes (Rotterdam: Witte de With Center for Contemporary Art, 1999); Elizabeth Diller and Ricardo Scofidio, *Blur: The Making of Nothing* (NY: Abrams, 2002), esp. 10, 172, and exchange (pp. 192-203) with Ben Rubin on visual and audible white noise, or "ghosting"; Laurie Sheck, "White Noise," *The Willow Grove* (NY: Knopf, 1996) 3; David Vorhaus, *White Noise 2: Concerto for Synthesizer* (V2032, Virgin, 1972); Eve Zaremba, *White Noise: A Helen Keremos Mystery* (Toronto: Second Story, 1997). For a wonderfully clear gallimaufry from the ears of an electrical engineer: Bart Kosko, *Noise* (NY: Viking, 2006) 61-104.

420. Alka-Seltzer Files, Box 1, NMAH; Seneca, tr. Robin Campbell, "On Noise," in *The Art of the Personal Essay*, comp. Phillip Lopate (NY: Anchor, 1994) 5-8; "The New Cathedral," *NY Daily Trib* (May 26, 1879) 1; J. C. R. Licklider, "The manner in which and extent to which speech can be distorted and remain intelligible," *Cybernetics: Circular Causal and Feedback Mechanisms in Biological and Social Systems*, ed. Heinz von Foerster (NY, 1953) II,61. Cf. idem, with Edwin B. Newman, "Simulated static for radio receiver tests," *Electronics* 20 (June 1947) 98-101. Alka-Seltzer's "plop-plop" audicon approaches what computer interface designers call an "earcon": Meera M. Blattner et al., "Earcons and icons: their structure and common design principles," *Human Computer Interaction* 4,1 (1989) 11-44.

421. John S. Barlow, *The Electroencephalogram: Its Patterns and Origins* (MIT, 1993) 353; M. E. Delany, "Traffic noise," in *Acoustics and Vibration Progress*, eds. R. W. B. Stevens and H. G. Leventhal (L: Chapman and Hall, 1974) 5-48 at 13; Roy Blount, Jr., "Now let's hear it for antinoise," *Atlanta Constitution* (Nov. 13, 1970); John M. Ortiz, *The Tao of Music: Sound Psychology—Using Music to Change Your Life* (York Beach: Weiser, 1997) 283-84;

Peter Wayner, *Disappearing Cryptography*, 2nd ed. (Amsterdam: Morgan Kaufmann, 2002) 16–17, 20, 149–82; Grace Glueck, “Artist, citing ‘noise,’ withdraws Whitney Exhibit,” *NY Times* (July 25, 1968) 20; Building Research Institute, *Noise Control in Buildings* (DC: NRC, 1959), throughout, esp. Robert B. Newman, “Basic concepts of engineering design,” p. 4 for fluorescent light noises; Louis de Moll, “Is the real culprit sound or noise?” *Administrative Management* 29 (Oct. 1968) 40–42 on architecture and perfume, updated and amplified in William Allen and Jeff S. Charkas, “The aural environment,” *The Ergonomics Payoff: Designing the Electronic Office*, ed. Rani Lueder (NY: Nicholas, 1986) 215–48; Joseph Reilly, “New Chicago pain: not enough noise,” *Chicago Sun-Times* (Jan. 11, 1970) 5, 26; “When noise annoys,” *Time Mag* (Aug. 19, 1966) 24–25 on air conditioning and the confessional; Philip Goldsmith, letter to Robert A. Baron (July 3, 1970), with reply (July 24), in Box 12, “Complaints 1969–70,” Citizens for a Quieter City, Records. I have discussed in previous sections the problems of hearing loss among aging populations, but I have not attended to the distinctive noises that aging bodies may make, on which begin with Lorraine O. Ramig, et al., “The aging voice: a review, treatment data, and familial and genetic perspectives,” *Folia Phoniatica et Logopaedica* 53,5 (2001) 252–65; Jesse F. Ballenger, *Self, Senility, and Alzheimer’s Disease in Modern America* (Johns Hopkins U, 2006) 75 pass.

422. Jacobson, *Affairs of Dame Rumor* (→ n.368) 424; National Noise Abatement Council (NNAC) [on CBS-TV Special, “The search”], *Newsletter* 4,3 (Fall 1959) 2, noise-cancellation earphones created by the Army’s Signal Research and Development Lab, in Box 1, f. 5, of NNAC Records, 1940–1963, AIP; Harold Rosenthal, “Noise can drive you nutty,” *Mechanix Illustrated* (March 1955) 78–81, 211–12, q. 212, and cf. Evinrude advertisement, “Some People Have the Most Fun,” *ibid.*, inside back cover, vaunting “the quiet, vibrationless *Whispering Power*” of an outboard motor whose “annoying engine noises are cancelled at their source”; Joe Alper, “Antinoise creates the sounds of silence,” *Sci* 252 (April 26, 1991) 508–509, more technically described, with a history going back to 1957, by S. A. Billings and F. A. Alturki, “Performance monitoring in non-linear adaptive noise cancellation,” *J Sound and Vibration* 157 (Aug. 22, 1992) 161–75; Philip Ball, “Sculpted sound,” *New Scientist* (March 23, 2002) 32–34. For what was actually being done to reduce industrial, office, and hospital noise: Martin Hirschorn, “The standard of silence—recollections of the early years of Industrial Acoustics Company, Parts I–III,” *Sound and Vibration* (July 1990) 30–39, (Oct. 1990) 32–36, and (Jan. 1991) 28–34; Raymond D. Berendt et al., *Quieting: A Practical Guide to Noise Control* (DC: Natl Bureau of Standards, 1976). On the noise inherent in digital systems: William J. Dally and John W. Poulton, *Digital Systems Engineering* (Camb U, 1998) ch. 6. On music, noise, and (necessary?) violence: Ronald Bogue, “Violence in three shades of metal: death, doom and black,” in *Deleuze and Music*, eds. I. Buchanan and M. Swiboda (Edinburgh U, 2004) 95–107.

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424. Barrow, *The Artful Universe* (→ n.414) 233; William H. Press, "Flicker noise in astronomy and elsewhere," *Comments on Astrophysics* 7,4 (1978) 103-19, q. 104; Manfred R. Schroeder, "Noises: white, pink, brown, and black," in *Fractals, Chaos, Power Laws: Minutes from an Infinite Paradise* (NY: Freeman, 1991); Bruce J. West and Michael F. Shlesinger, "The noise in natural phenomena," *Amer Sci* 78 (Jan.-Feb. 1990) 40-45; Arnold J. Mandell and Kara A. Selz, "Brain stem neuronal noise and neocortical 'resonance,'" *J Statistical Physics* 70, 1-2 (1993) 355-73, and entire issue; Frank Moss et al., "Stochastic resonance in sensory biology: from single neurons to the human visual cortex," in *Chaos and Noise in Biology and Medicine*, eds. M. Barbi and S. Chillemi (Singapore: World Scientific, 1997) 3-21, as also Ilse C. Gebeshuber et al., "Brownian motion and the ability to detect weak auditory signals," 230-35, boldly complicated by Cristina Masoller et al., "Interplay of sub-threshold activity, time-delayed feedback, and noise on neuronal firing patterns," *Physical R E* 78 (2008) 041907; Jonghan Shin, "The noise shaping neural coding hypothesis: a brief history and physiological implications," *Neurocomputing* 44-46 (2002) 167-76; Michel Planat, "Time measurements, $1/f$ noise of the oscillators, and algebraic numbers," in Rosolino Buccheri et al., *The Nature of Time: Geometry, Physics, and Perception* (Dordrecht: Kluwer, 2003) 187-95; Michel Planat, ed., *Noise, Oscillators, and Algebraic Randomness: From Noise in Communication Systems to Number Theory* (Berlin: Springer, 2000) 1-5. Or go off on a tangent with Leonid Korogodski's science fiction, *Pink Noise: A Posthuman Tale* (Sharon, Mass: Silverberry, 2010).

425. Joseph Sataloff and Paul Michael, *Hearing Conservation* (Springfield: Thomas, 1973) 13; D. A. Ramsdell, "The psychology of the hard of hearing and the deafened adult," in *Hearing and Deafness*, eds. S. R. Silverman and H. Davis (NY: Holt Rinehart Winston, 1970 [1947]) 461-64; Michael Drury, "Privacy: there's too little noise, there's too much," *House Beautiful* (Aug. 1970); Richard Sennett, *The Fall of Public Man: On the Social Psychology of Capitalism* (NY: Vintage, 1976) esp. 259-65, my translation of noise rhetoric into his argument. Cf. Yve Lomax, *Sounding the Event: Escapades in Dialogue and Matters of Art, Nature and Time* (NY: Tauris, 2005) 11-15 on Michel Serres and background noise, "The Outside that is always inside." Contrast the advocates of silence as "uncertainty, and therefore life": Matthew D. Cashion, *How the Sun Shines on Noise* (U West Alabama, 2004) 158; J. Bottum, "The soundtracking of America," *Atlantic Mo* (March 2000) 56-70.

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variability whose 'wildness' vividly impressed itself upon me in the early nineteen-sixties." He considered this a "new second stage of indeterminism."

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429. "Stochastic resonance," http://en.wikipedia.org/wiki/Stochastic_resonance; M. I. Dykman et al., "Stochastic resonance and its precursors," *Fluctuations and Order: The New Synthesis*, ed. Mark Millonas (NY: Springer, 1996) 11-34; A. F. Rozenfeld et al., "On the influence of noise on the critical and oscillatory behavior of a predator-prey model: coherent stochastic resonance at the proper frequency of the system," *Physics Letters A* 280 (2001) 45-52. On noise and complex or multi-stable systems: M. I. Dykman et al., "Quasimonochromatic noise: new features of fluctuations in noise-driven nonlinear systems," *Physical R Letters* 67 (1991) 933-36; idem, "Optimal paths and the prehistory problem for large fluctuations in noise-driven systems," *ibid.* 68 (May 4, 1992) 2718-21; J. H. Brown et al., "Complex species interactions and the dynamics of ecological systems: long-term experiments," *Sci* 293 (2001) 643-50.

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in *Otolaryngology* 3,2 (2002) 120-39.

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435. Keller, *Face of the Deep*; Jacques Attali, *Noise: The Political Economy of Music*, tr. Brian Massumi (U Minnesota, 1985 [1977]); Karl Marx, *The 18th Brumaire of Louis Bonaparte* (NY: International, 1963 [2nd ed., 1869]) 53; Madsen, "The call of the wild" (→n.276) 29-43. For more on Attali and the politics of noise: Myriam Gaume, *Jacques Attali: ou, l'ordre et le bruit* (P: Candeau, 1979); Bruce Andrews, "Praxis: a political economy of noise and information," in *Close Listening: Poetry and the Performed Word*, ed. Charles Bernstein (Oxford U, 1998) 73-85; Romandson (with Andy Cameron and Andy Allenson), "Who gives form to noise?" in *noise* (→n.422) no. 33; Craig D. Dworkin, "The politics of noise," *Reading the Illegible* (Northwestern U, 2003) 31-49; Alan Durant, "Improvisation in the political economy of music," in *Music and the Politics of Culture*, ed. Christopher Norris (NY: St. Martin's, 1989) 252-82. For the slogan: Castanet, *Tout est bruit* (→n.317) 55. For parabolically, poetically ambivalent treatments of noise and silence in terms of political and social renewal: Marcos, subcommandante, *Our Word Is Our Weapon*, ed. Juana Ponce de León (NY: Seven Stories, 2001) 83-84, 386-88.

436. Henri Atlan, *Entre le cristal et la fumée: essai sur l'organisation du vivant* (P: Seuil, 1979) esp. 39-60, 57 on history, 133; René Girard, *Violence and the Sacred*, tr. Patrick Gregory (Johns Hopkins U, 1977); Ilya Prigogine and Isabelle Stengers, *Order Out of*

Chaos: Man's New Dialogue with Nature (NY: Bantam, 1984); Gaume, *Jacques Attali*, 52; Mary Russo and Daniel Warner, "Rough music, Futurism, and postpunk industrial noise bands," in *Audio Culture*, eds. C. Cox and D. Warner (NY: Continuum, 2004) 47-54, 52 for "unworking class." On the glitch: Rob Young, "Worship the glitch: digital music, electronic disturbance," in *Undercurrents*, ed. Young (→n.68) 45-55; Greg Hainge, "Of glitch and men: the place of the human in the successful integration of failure and noise in the digital realm," *Communication Theory* 17 (2007) 26-42; Steve Goodman, "Contagious noise," in *Spam Book: On Viruses, Porn, and other Anomalies from the Dark Side of Digital Culture*, eds. T.D. Sampson and J. Parikka (Cresskill: Hampton, 2009) 125-40; Caleb Kelly, *Cracked Media: The Sound of Malfunction* (MIT, 2009) on the music of (p. 61) "Cracked lines, lost data, static and hiss, broken signals, chaotic production, earth hum, piercing tones, and digital glitch." On Place Saint-Augustin: Chudnov, *Noise Abatement* (→n.271) 1. The mythical Midas had--wouldn't you know?--an acoustic aspect: almost deranged by his golden touch, he quit his palace for the countryside, where he became a devotee of Pan, When Pan-the-piper challenged the lyrical Apollo to a music contest, the prize was awarded to Apollo at his lyre, but Midas, tutored in music by Orpheus, challenged the decision of the mountain gods and was rewarded for his temerity with asses' ears.

437. Gaume, *Jacques Attali*; Denis Macshane, "Misjudgments," *Critical Q* 36,2 (2007) 120-30; Marc Guillaume, *Eloge du désordre* (P: Gallimard, 1978); Benoît Mandelbrot and Richard L. Hudson, *The (Mis)Behavior of Markets: A Fractal View of Risk, Ruin, and Reward* (NY: Basic, 2004). Cf. Urs Stäheli, "Market crowds," in *Crowds*, eds. J. T. Schnapp and M. Tiewes (Stanford U, 2006) 271-87.

438. Ida Pfeiffer, *A Visit to Iceland and the Scandinavian North* (L, 1853) April 18; "A visit to the States, XXIX-XXX," *L Times* (Oct. 21 and 24, 1887) reprinted in Bessie L. Pierce, comp., *As Others See Chicago: Impressions of Visitors, 1673-1933* (U Chicago, 1933) 236. On the debate over noise as a stimulus or handicap: D. R. Davies and D. M. Jones, "Noise and efficiency," in *The Noise Handbook* (L: Academic, 1985) 87-141. For the market value of noise: [Charles M. Haar], "HUD assistant proposes 'noise rights' lease," *Georgetown Spectator* (July 24, 1968) 1; David N. M. Starkie and D. M. Johnson, *The Economic Value of Peace and Quiet* (Lexington: Saxon House, 1975), evaluating the "luxury of less noise," as also David Peace, *Social Cost of Noise* (P: OECD, 1976); Anthony Milne, *Noise Pollution: Impact and Countermeasures* (Newton Abbot: David & Charles, 1979); Rodney Thorpe and Thomas Holmes, *Economic Welfare Impacts of Urban Noise*, EPA Report 600/5-76-002 (DC: Office of Research and Development, EPA, May 1976) 1, q. 2, 3-4; Assembly of Behavioral and Social Sciences, *Noise Abatement: Policy Alternatives for Transportation* (DC: Natl Academy of Sciences, 1977) 6-7, q. 17, 18. Cf. Euston Quah and Joseph Chun, "The law and the economics of noise nuisance: the Singapore experience," *J Env Law* 4,2 (1992) 203-19.

439. For this and next paragraph: Robert E. Lucas, Jr., "Autobiography," in *Les Prix Nobel. The Nobel Prizes 1995*, ed. Tore Frängsmyr (Stockholm: Nobel Foundation, 1996) online at http://nobelprize.org/nobel_prizes/economics/laureates/1995/lucas-autobio.html; idem, "Expectations and the neutrality of money," *J Economic Theory* 4 (1972) 103-24, q. 121 for J. G. Gurley's rhyme; idem, "Nobel Lecture: Monetary Neutrality," *J Political Economy* 104, (Aug. 1996) 661-82, esp. 670-73 on optimization and his 1972 paper, and cf.

Stanley Fischer, "Money, interest and prices," NBER Working Paper No. 3595 (Jan. 1991) at www.nber.org/papers/w3595. Cf. James R. Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Harvard U, 1986) 376-84 on "market feedback technologies" in the form of ratings systems and consumer surveys that were designed to help predict consumer demand, based on statistical sampling theories that, it was thought, took into account all kinds of noise.

440. Lucas, "Expectations," 122; Stephen Morris, "The common prior assumption in economic theory," *Economics and Phil* 11 (1995) 227-53; Pierluigi Balduzzi et al., *Asset Price Nonlinearities and Coordinated Noise Trading* (NY: NYU Salomon Center, 1992), popularized by Richard Bernstein, *Navigating the Noise: Investing with One of Wall Street's Top Investment Strategists* (NY: Wiley, 2001); Fischer Black (President, American Finance Assn), "Noise," *J Finance* 41 (1986) 529-43, using "noise" to mean many different things, and q. 531 on injection, as also Peterson Mack, "Trading noise, adverse selection and intraday bid-ask spreads in futures markets," *J Futures Markets* 12 (Oct. 1992) 519-38, at 520; James Dow and Gary Gorton, *Noise Trading, Delegated Portfolio Management, and Economic Welfare* (Camb: Natl Bureau Economic Research, 1984), esp. 2-3; Frederic Palomino, *Noise Trading in Small Markets* (San Domenico: European U Institute, 1994) on noise traders dominating in imperfectly competitive markets; Lee S. Redding, *Noise Traders and Herding Behavior* (DC: Intl Monetary Fund, 1996); Joel Seligman, "The reformulation of federal securities law concerning nonpublic information," *Georgetown Law R* 73 (1985) 1083-1140; Ellen Hertz and Vincent-Antonin Lépinay, "Markets-in-law: legal outeractionism in securities markets," unpublished paper presented at conference on *Inside and Outside Markets* (CSI-École des Mines, Paris, May 31-June 1, 2004). For a history and critique of theories regarding the messiness of markets, and then of markets set up to profit from the messiness, including that of terrorism: Mason Richey, "Thoughts on the theory and practice of speculative markets *qua* event predictors," *Essays in Phil* 6 (Jan. 2005) at www.humboldt.edu/~essays/richey.html. On denoising: Alan C. Bovik, *The Essential Guide to Image Processing* (L: Academic, 2009), esp. ch. 11, "Multiscale Denoising of Photographic Images."

441. Joseph E. Stiglitz, "Symposium on economics of information: introduction," *R Economic Studies* 44 (Oct. 1977) 389-93; Jerry Green, "The non-existence of informational equilibria," *ibid.*, 451-63, and Steven Salop, "The noisy monopolist: imperfect information, price dispersion and price discrimination," 393-406; Jean-Philippe Bouchard, "The subtle nature of market efficiency," in *Noise and Fluctuations in Econophysics and Finance*, eds. Derek Abbott et al. (Bellingham: SPIE, 2005) 124-28; Subu Venkataraman, *Noise Trade Disclosure and Liquidity* (Chicago: Federal Reserve Bank, 1995); Nicholas Bardsley et al., *Experimental Economics: Rethinking the Rules* (Princeton U, 2010) 286-330 on noise in experimental data.

442. R. V. Solé et al., "Nonequilibrium dynamics in lattice ecosystems: chaotic stability and dissipative structures," *Chaos* 2 (1992) 387-395; Schroeder, *Fractals, Chaos, Power Laws* (→ n.423); Mandelbrot and Hudson, *The (Mis)Behavior of Markets, 197-206*, q. 199-200; Benoît Mandelbrot and Nassim Taleb, "A focus on the exceptions that prove the rule," *Financial Times* (March 23, 2006); Mandelbrot, *Multifractals*, 4, bad news. For the spread into popular culture of Edward Lorenz's 1972 coinage of "the Butterfly Effect" as

the icon for René Thom's catastrophe theory: Eva Zaremba, *The Butterfly Effect: A Helen Keremos Mystery* (Toronto: Second Story, 1994); Pernille Rygg, *The Butterfly Effect*, tr. Joan Tate (L: Harvill, 1997 [1995]); Eric Bress and J. Mackye Gruber (wr./dir.), *The Butterfly Effect* (BenderSpink/ FilmEngine/ Katalyst Films/ New Line Cinema, 2004); Susan Hawthorne, *The Butterfly Effect* (North Melbourne: Spinifex, 2005). Contrast S. P. Ellner and P. Turchin, "When can noise induce chaos and why does it matter: a critique," *Oikos* 111 (Dec. 2005) 620–31. For post-autistic economics, Edward Fullbrook, ed., *Real World Economics: A Post-Autistic Economics Reader* (L: Anthem, 2007).

443. Riley Woodford, "Lemming Suicide Myth Disney Film Faked Bogus Behavior," *Alaska Fish and Wildlife News* (Sept. 2003); Robert Perkins, "[Review of] Lemmings," at Playstation Illustrated, www.psillustrated.com/psillustrated/soft_rev.php/3087/lemmings-ppsp.html; R. J. Brooks and E. M. Banks, "Behavioural biology of the collared lemming... An analysis of acoustic communication," *Animal Behaviour Monographs* 6 (1973) 1–83; Peter Turchin et al., "Are lemmings prey or predators?" *Nature* 405 (June 1, 2000) 562–65; O. A. Chichigina, "Noise with memory as a model of lemming cycles," *European Physical J. B-Condensed Matter* 65 (Oct. 2008) 347–52. Cf. Peter Turchin, "Population dynamics in the presence of noise," in his *Complex Population Dynamics* (Princeton U, 2003) 146–54. And could anyone forget Amon Düül II's Krautrock album, *Tanz der Lemminge* (Repertoire 4195A, 1971)?

444. David L. Burrows, *Sound, Speech, and Music* (U Mass, 1990) 1; Lily E. Kay, *Who Wrote the Book of Life? A History of the Genetic Code* (Stanford U, 2000) esp. 304–306 on redundancy and noise; W. Ford Doolittle and Carmen Sapienza, "Selfish genes, the phenotype paradigm, and genome evolution," *Nature* 284 (1980) 601–603; Phillip Yam, "Talking trash: linguistic patterns show up in junk DNA," *Sci Amer* 272 (March 1995) 24; G. Houen, "Evolution of the genetic code: the nonsense, antisense, and antinonsense codes make no sense," *Biosystems* 54 (Dec. 1999) 39–46; Bryant M. Shiller, *The Origin of Life* (Victoria, B.C.: Trafford, 2004) 408–409, extraterrestrials created the code. On SETI: Ray Spangenburg and Kit Moser, *Carl Sagan: A Biography* (Westport: Greenwood, 2004) 43–56, 107–108; Frank White, *The Seti Factor—How the Search for Extraterrestrial Intelligence Is Changing Our View of the Universe and Ourselves* (NY: Walker, 1990); Andrew Chaikin, "The seekers," *Pop Sci* (Dec. 1995) 84–89; Robert Zemeckis (dir.), *Contact* (Warner Brothers, 1997); Charles W. Petit, "An ear for E.T.," *U.S. News & World Report* (June 23, 2003) 46–47; and the intriguing entry for "SETI" at <http://en.wikipedia.org/wiki/SETI>. Listening through/to noise is conditioned by the way our minds construct continuity and handle interruption: Diana Deutsch, "Grouping mechanisms in music," in *The Psychology of Music*, ed. Deutsch, 2nd ed. (San Diego: Academic, 1999) 306–12 on auditory continuity; Elizabeth A. Styles, *The Psychology of Attention*, 2nd ed. (Hove: Psychology Press, 2006).

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445. Craig Reynolds, "Evolution of obstacle avoidance behavior: using noise to promote robust solutions," in *Advances in Genetic Programming, I*, ed. Kenneth E. Kinneer (MIT, 1994) 221–41, "use of noise appears to discourage brittle solutions"; Andreas

Wagner, *Robustness and Evolvability in Living Systems* (Princeton, 2005) 270–80; Mukund Thattai and Alexander van Oudenaarden, “Intrinsic noise in gene regulatory networks,” *Proc Natl Acad Sci* 98 (July 17, 2001) 8614–19; Johan Paulsson, “Unsolved problems of intracellular noise,” in *Unsolved Problems of Noise and Fluctuations . . . in Physics, Biology, and High Technology*, ed. S. M. Bezrukov (DC: AIP, 2002) 59–66, and O. V. Geraschchenko et al., “Noise-induced hypersensitivity and stochastic resonance: can living systems use them at a molecular level?” 67–73; E. M. Ozbudak et al., “Regulation of noise in the expression of a single gene,” *Nature Genetics* 1 (2002) 69–73; W. J. Blake et al., “Noise in eukaryotic gene expression,” *Nature* 422 (2003) 633–37; Jonathan M. Raser and Erin K. O’Shea, “Noise in gene expression: origins, consequences, and control,” *Sci* 309 (2005) 2010–13; Arren Bar-Even et al., “Noise in protein expression scales with natural protein abundance,” *Nature Genetics* 31 (May 2002) 636–43; John L. Spudis and D. E. Koshland, Jr., “Non-genetic individuality: chance in the single cell,” *Nature* 262 (Aug. 5, 1976) 467–71. For homeorrhexis: Scott F. Gilbert, “Diachronic biology meets evo-devo: C. H. Waddington’s approach to evolutionary developmental biology,” *Amer Zoologist* 40,5 (2000) 729–37; Marcello Buiatti et al., “The living state of matter: between noise and homeorrhetic constraints,” in *Nonextensive Entropy*, eds. M. Gell-Mann and C. Tsallis (Oxford U, 2004) 221–43. On using noise against genetic drift: Jeff Hasty and James J. Collins, “Translating the noise,” *ibid.* 31 (May 2002) 69–73.

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446. Wagner, *Robustness*, 273; Kingsland, *Evolution of American Ecology* (→ n.285) 220ff., esp. 227 on evidence in the 1970s that fires perturb forests in such a way as to increase biodiversity and accelerate growth; Joel B. Hagen, *An Entangled Bank: The Origins of Ecosystem Ecology* (Rutgers U, 1992), esp. 27, 87, on early-20th-century ideas of dynamic equilibrium, 194 on indeterminacy in ecosystems. For DNA compositions: Merrill Garnett, in conversation with Ben Neill and Bill Jones, “Does DNA have a pulse?” in *noise* (→ n.422) no. 26; Peter Gena, using an algorithm from Charles Strom, “Selected examples of DNA music” (1995–2006) at www.petergena.com/DNAMus.html; Rie Takahashi and

Jeffrey H. Miller, "Conversion of amino acid sequences in proteins to classical music: search for auditory patterns," *Genome Biology* 8 (May 3, 2007) 405, their algorithm borrowed by Frank K. Pettit for his "Online translation of genetic sequences to music," at www.doe-mbi.ucla.edu/cgi/pettit/gene2musicweb.

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On muscle fibers: F. V. Brozovich and G. H. Pollack, "Muscle contraction generates discrete sound bursts," *Biophysical J* 41 (Jan. 1983) 35–40; Gerald Oster, "Muscle sounds," *Sci Amer* (March 1984) 108–14; Maria Stokes and Max Blythe, *Muscle Sounds in Physiology, Sports Science, and Clinical Investigation* (Horspath: Medintel, 2001).

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447. Georg von Békésy, *Sensory Inhibition* (Princeton U, 1967) q. 11 and throughout; Jürgen Tonndorf, "Georg von Békésy and his work," *Hearing Research* 22 (1986) 3–10, an issue dedicated to his studies and theories. Cf. Robert S. Sainsbury, "Hippocampal Theta: a sensory-inhibition theory of function," *Neurosci & Biobehavioral R* 22 (March 1998) 237–24; Brian C. Moore, *An Introduction to the Psychology of Hearing*, 2nd ed. (L:

Academic, 1982) 46 on jitter, a term also used now in connection with electronic circuitry: Mike Peng Li, *Jitter, Noise and Signal Integrity at High Speed* (Upper Saddle River, NJ: Prentice-Hall, 2008). Although some of von Békésy's work has since been disproven or dismissed because he did much of his research on cadavers (Moore, 32–34), it is still relied upon for otological basics, as in William A. Yost, *Fundamentals of Hearing*, 3rd ed. (San Diego: Academic, 1994), who notes (pp. 70–71) that despite middle ear impedances, reflexes, and stapes footplate motion, “the ear does not really have an adequate protective mechanism against our present levels of acoustic stimulation.” Contrast Vittorio Colletti and Francesco Fiorino, “The role of acoustic reflex in the development of resistance to noise-induced hearing loss in humans,” in Prasher and Luxon, eds., *Biological Effects of Noise* (→ n.431) 52–58.

448. *Saia v. New York*, 334 US 558 (1948) at 561–62, 565; “The right not to listen,” *San Francisco Chronicle* (Feb. 2, 1949) 14. Half a century later, megaphones and soundtrucks were themselves neither loud enough nor democratic enough for effective political expression. According to one of many musicians who protested the ministerial conference of the World Trade Organization in Seattle in 1999: “No one listens to anyone with a megaphone anymore, and relying on one person to shout orders to a crowd is risky and disempowering of those being shouted at.” The answer was a well-drilled marching band, the Infernal Noise Brigade. “In the path to constructing a better reality, and in deconstructing a system based in the misery of alienation, we choose noise as our tool”: Jennifer Whitney, “Infernal Noise: the soundtrack of insurrection,” in *We Are Everywhere: The Irresistible Rise of Global Anticapitalism*, eds. Notes from Nowhere Collective (L: Verso, 2003) 218, 226. Cf. Davide Panagia, *The Political Life of Sensation* (Duke U, 2009) 46 ff., observing (p. 52) that “we can assume that democracy and noise go hand in hand. I imagine that there has never been a quiet democratic movement, like there has never been a peaceful democratic uprising.”

449. Elizabeth H. Boquet, *Noise from the Writing Center* (Utah State U, 2002) ch. 2; ATTIK, *Noise Four + Noise Lab* (NY: HarperCollins, 2001) f.10; Charles E. Kupchella and Margaret C. Hyland, *Environmental Science: Living within the System of Nature*, 2nd ed. (B: Allyn and Bacon, 1989) 495; C. Fenno Faulkner, “The tremendous toll of industrial noise,” *Connecticut Industry* 5 (Nov. 1927) 8–12, repr. from *Factory*; [Herbert Marcuse] “Le débat du Club de l’Observatoire,” *Le Nouvel observateur* (June 19–25, 1972) vii–viii; Brandon Labelle, “Pump up the bass—rhythm, cars, and auditory scaffolding,” *The Senses and Society* 3 (July 2008) 187–203; Kodwo Eshun, *More Brilliant Than the Sun: Adventures in Sonic Fiction* (L: Quartet, 1998) 04[063–064] sic, on the Echoplex; Bull, *Sounding Out the City* and Bull, *Sound Moves* (both → n.329). Cf. Frances Dyson, “When is the ear pierced? The classes of sound, technology, and cyberculture,” in *Immersed in Technology: Art and Virtual Environments*, ed. Mary Anne Moser, with Douglas MacLeod (MIT, 1996) 73–102 on virtual audio and the spatial displacements and projections of the sound profile ordinarily shaped “within the head.” For a programmer like Michael Vorländer, virtual audio presents the challenge of creating plausible acoustic scenarios from computer-generated data: *Auralization: Fundamentals of Acoustics, Modelling, Simulation, Algorithms, and Acoustic Virtual Reality* (Berlin: Springer, 2008).

Meanwhile, according to medical surveys, hearing loss was rising to epidemic proportions and in 2008 a report was published that one-third of Americans had some degree of hearing loss: George Prochnik, *The Pursuit of Silence: Listening for Meaning in a World of Noise* (NY: Knopf/Doubleday, 2010) 15 pass. As for making a virtue of necessity, consider Robert Worby, "Cacophony," in *Music, Electronic Media, and Culture*, ed. Simon Emmerson (Aldershot: Ashgate, 2000) 138-65, elevating cacophony into normalcy, or into a lovable zaniness, as with Seattle Cacophony Society, self-described as "a randomly gathered network of free spirits . . . surreal slapstick clowns of mirth, entrepreneurs of imagination and the innocuous agents of oxymorons" or as "daycare workers of the inner child, sailors on a sea of smirks, potholes in the information superhighway": *Machination* 8 (Dec. 1993) and 13 (May 1994).

450. Tom Montgomery-Fate, *Beyond the White Noise: Mission in a Multicultural World* (St. Louis: Chalice, 1997) q. 33-34, 41; William D. Ruckelshaus, "The environmental crisis—our work has just begun," typescript of talk to National Press Club, DC (Jan. 12, 1971) q. 2, q. 4, in Archives, Environmental Protection Agency, DC (title not listed as of Aug. 14, 2009 in the EPA's National Library Network catalog); Amar Bose, "Hi-fi for GM cars," audiocassettes of lecture at EECs Seminar, MIT (March 19, 1984), in Inst Archives and Special Coll, MIT, and cf. Julian Stallabrass, "Automobile aesthetics," in his *Gargantua: Manufactured Mass Culture* (L: Verso, 1996) 113-34, as also Michael Bull, "Soundscapes of the car," in *Car Cultures*, ed. Daniel Miller (Oxford: Berg, 2001) 185-202. On Dolby: Gary Reber, "The Dolby Stereo Story: Part 1: Dolby Noise Reduction Systems," *Widescreen R* (July-Aug 1993) 33-43; Ray M. Dolby, "An audio noise reduction system," *J Audio Engineering Soc* (Oct. 1967) offprint, reevaluated in his "The spectral recording process," *ibid.* 35 (March 1987) 99-118; Gianluca Sergi, *The Dolby Era: Film Sound in Contemporary Hollywood* (Manchester U, 2004) esp. 100-102, interview with Ioan Allen, and cf. Allen's "The production of wide-range, low-distortion optical soundtracks utilizing the Dolby Noise Reduction System," *Soc Motion Picture and Television Engineers J* 84 (Sept. 1975) 720-29; Craig C. Todd, "Efficient digital audio coding and transmission systems," *Proc 29th Annual Broadcast Engineering Conference* (Las Vegas, 1985) 385-94; Larry Blakely and George Petersen, "Dr. Ray Dolby," *The Mix* 6 (April 1982) 12-14; Diane D. Saeks, "At home in Presidio Heights with Ray and Dagmar Dolby," *San Francisco* (Feb. 1981) 45-49, 45 for Lois Lane, 46 for laundry. On Dolby and digital audio: Barry Fox, "Dolby isn't dead," *Hi Fi for Pleasure* (Dec. 1984) 78-82. I thank Dolby Laboratories for having made freely available to me the offprints and technical reports in their San Francisco archives, June 1995. With digital soundtracks, "which have a wider range and more peaks of volume," sound levels in cinemas were reaching 110 db by 1997, according to a European Commission working party on noise pollution: "New danger," *Sunday Telegraph Mag* (Sept. 21, 1997), Eureka column. Cf. William Whittington, *Sound Design and Science Fiction* (U Texas, 2007); Vivian Sobchack, "When the ear dreams: Dolby digital and the imagination of sound," *Film Q* 58 (Summer 2005) 2-15, on Dolby promotional trailers (1995-2003), which allegorized "ultra-hearing." And in that last regard: Seth Kim-Cohen, *In the Blink of an Ear: Toward a Non-Cochlear Sonic Art* (NY: Continuum, 2009). As for the crowd within: Wayne E. Oates, *Nurturing Silence in a Noisy Heart* (NY: Doubleday, 1979) 65; Arthur Jeon, *City Dharmā*:

Keeping Your Cool in the Chaos (NY: Harmony, 2004) 85–86, “How often is the noise in our head so much louder than anything happening around us?”

451. Seaks, “At home in Presidio Heights,” 46; Andrew Duncan, “The magic silence,” *Men* (Autumn 1981) 66–68; Jonathan Glancey, “The pearl of the Punjab,” *Guardian* (Jan. 28, 2008) 23, residents’ comments on the quietness of Chandigarh; Le Corbusier, *Towards a New Architecture*, tr. Frederick Etchells (NY: Dover, 1986 [1923]) 20. When, however, the Dolby process was applied to recordings of live concerts, it substituted for “real silence” what the violinist Isaac Stern called “a vacuum of ‘un-noise.’ There is very little ambient feeling, no sense of listeners tensing and concentrating.” Quoted by Arved Ashby, *Absolute Music, Mechanical Reproduction* (UC, 2010) 139.

452. Greg Lefevre, “Blower ban,” CNN-TV (Jan. 7, 1987), on an early ordinance in Belvedere, CA; Matthew L. Wald, “Blowers, earplugs, angst in Suburbia,” *NY Times* (Jan. 11, 1998) IV, 8; Jeffrey Shaffer, “Look out! He’s gonna blow!” *Christian Sci Monitor* (Sept. 18, 1998) 15; Jeffrey Kluger, “Just too loud,” *Time Mag* (April 5, 2004) 54–56; Emily Green, “Sound and fury in the garden,” *LA Times* (Aug. 18, 2005) F1, F7; Michael J. Yochim, *Yellowstone and the Snowmobile: Locking Horns over National Park Use* (U Press of Kansas, 2009); Aileen Pincus, “Grand Canyon noise,” CNN-TV (Dec. 31, 1996); Michelle Roberts, “Grand Canyon officials work to recapture a resource: quiet,” *San Diego Union-Trib* (May 22, 2005) A4; Gordon Hempton, *One Square Inch of Silence: One Man’s Search for Natural Silence in a Noisy World* (NY: Free Press, 2009) 2, 6, 23, 31, 128, and compare Anne D. LeClaire, who set aside a day each week for silence: *Listening Below the Noise: A Meditation on the Practice of Silence* (NY: Harper, 2009). More generally: Alberto Behar et al., *Noise Control: A Primer* (San Diego: Singular, 2000); Les Blomberg, director, Noise Pollution Clearinghouse, www.nonoise.org; Garret Keizer, *The Unwanted Sound of Everything We Want: A Book About Noise* (NY: Public Affairs, 2010).

453. Peter Donnelly, “More than a local nuisance,” *Right to Quiet Newsletter* (Fall 1998) 1–4; Right to Quiet Society for Soundscape Awareness and Protection, *Noise: A Serious Global Problem* (Vancouver, 1996) brochure; Valerie Gibson, interview (L, Oct. 9, 1997); “Update,” *News Peace Newsletter* (Oct. 1995: final edition); “Valerie’s victory in noise battle,” *Mail on Sunday* (Dec. 11, 1995) 13 for statistics; Michele Hanson, “No peace in our time,” *The Guardian* (Aug. 25, 1997) 5; Mark Slouka, “Listening for silence: notes on the aural life,” in *Audio Culture*, eds. Cox and Warner (→ n.67) 40–46, originally in *Harper’s Magazine* (April 1999); Steve Goodman, *Sonic Warfare: Sound, Affect and the Ecology of Fear* (MIT, 2009); Nick Nuttall, “Scientific brainwave quells pain of noisy neighbors,” *L Times* (March 16, 1995), reporting seventeen murders or suicides in the past four years due to noise, and cf. Stephen A. Stansfeld, “Noise, noise sensitivity and psychiatric disorder: epidemiological and psychophysiological studies,” *Psych Med* (1992) Suppl 22. I thank Valerie Gibson for giving me access to her files on the Noise Network and The Right to Peace and Quiet Campaign, and to Peter Donnelly for a conversation and materials. Contrast Great Britain: Committee on the Problem of Noise, *Noise: Final Report* (L: H. M. Stationery Office, 1964), commonly referred to as the (Alan) Wilson Report, which had been supposed to be the definitive governmental study, leading to legislative resolve to deal sternly and consistently with local noise issues, and cf. British Government Panel on Sustainable

Development, "A review of the extent to which domestic legislation and policy provides effective remedies to noise nuisance" (July 16, 1999) online at www.sd-commission.org.uk/panel-sd/position/noise.htm.

On the sociolegal aspects: Hillel Schwartz, "Hush (concerning a right to quiet)," paper for a *Symposium on Human Rights: Changes and Challenges* (Georgia Institute of Technology, April 30–May 1, 1999); James H. Hutson, "The emergence of a modern concept of a right in America: the contribution of Michael Villey," *Amer J of Jurisprudence* 39 (1994) 185–224; Tony Evans, ed., *Human Rights Fifty Years On: A Reappraisal* (Manchester U, 1998), esp. Flora Robinson, "The limits of a rights-based approach to international ethics," 58–76.

Per contra, on loudness and noise as a continuing means for the assertion of rights: Simon Jones, "Rocking the house: sound system cultures and the politics of space," *J Pop Culture* 7 (1995) 1–24; Jesse Stewart, "Freedom music: jazz and human rights," in *Rebel Musics: Human Rights, Resistant Sounds, and the Politics of Music Making* (Montréal: Black Rose, 2003) 88–119; Ray Pratt, *Rhythm and Resistance: Explorations in the Political Uses of Popular Music* (NY: Praeger, 1990); Lucy Winkett, *Our Sound Is Our Wound: Contemplative Listening to a Noisy World* (NY: Continuum, 2010), which features Munch's *Scream* on its bookjacket and argues (p. 34) that "In the Church, our sound is our wound when we ignore the dissonance in this aching world."

Would it also be the case that listening itself has been so severely compromised that we require a "right to listen," or at least "listener's rights," as set *en face* musical copyright by Peter Szendy, *Listen: A History of Our Ears* (NY: Fordham, 2008)? Cf. David Dunn, "Purposeful listening in complex states of time," in *Site of Sound: Of Architecture and the Ear*, eds. B. LaBelle and S. Roden (LA: Errant Bodies, 1999) 77–81, as also Christina Kubisch, commentary on her 1997 installation, *Über die Stille*, 31–33; David Beard, "A broader understanding of the ethics of listening: philosophy, cultural studies, media studies and the ethical listening subject," *Intl J of Listening* 23 (Jan. 2009) 7–20 on "the choice to listen individually, the choice to listen selectively, the choice not to listen, the choice to listen together, and only then the choice to listen to each other."

454. [Anon.], "Peirce on sound," *New-York R* 4 (1839) 164–78, q. 166. On provisional binaries/alterities in music and their relationship to constructions of subjectivity: Lawrence Kramer, *Classical Music and Postmodern Knowledge* (UC, 1995) esp. 33–66.

455. Rhonda G. Greene, illus. Joseph A. Smith, *Eek! Creak! Snicker, Sneak* (Atheneum, 2002); Monica A. Harris, illus. Susan Estelle Kwas, *Wake the Dead* (NY: Walker, 2004).

