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“Wond’rous Machines”: How Eighteenth-Century Harpsichords Managed the Human-Animal, Human-Machine Boundaries

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“Wond’rous Machines”:
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A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Musicology

by

Patrick David-Jung Bonczyk

2021

ABSTRACT OF THE DISSERTATION

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Doctor of Philosophy in Musicology

University of California, Los Angeles, 2021

Professor Mitchell Bryan Morris, Chair

The tenuous boundaries that separate humans, animals, and machines fascinate and sometimes unsettle us. In eighteenth-century France, conceptions of what differentiates humans from animals and machines became a sustained topic of interest in spaces that were public and private, recreational and intellectual. This dissertation argues that eighteenth-century harpsichords were porous sites where performers, composers, artisans, academics, and pedagogues negotiated the limits of these fragile boundaries. French harpsichords are at the center of my dissertation because they embodied an experimental collision of animal parts and other biomatter, complex machinery, and visual and musical performance. Taken together, I consider the ways that instruments had social import apart from sound production alone, expanding the definition of

"instrument" beyond traditional organological studies of style in craftsmanship and musical aesthetics.

I use an "entangled organology" that traces economic, technological, scientific, and environmental convergences to reveal the thick networks through which harpsichords traveled and the behavioral codes and motivations that instrument makers, performers, listeners, composers, and philosophers embedded into them. I follow the 1687 French embassy to Siam to show how harpsichords were crucial in intercultural, diplomatic exchanges as gifts, bribes, or as sources of teachable knowledge. I examine Jacques de Vaucanson's 1738 flute-playing android to show how musical instruments mobilized debates in human anatomy and the mechanical arts. I then focus on bird and monkey genre paintings (*singerie*) on harpsichords' surfaces to show how harpsichords evoked the contested human-animal divide. Next, I use Jean-Philippe Rameau's harpsichord manual of 1724 and songbird *pièce* to narrate musical confrontations with nature between player and machine. Finally, I bring together early modern brain and nerve theories and an analysis of a pair of keyboard rondeaux by Joseph-Nicolas-Pancrace Royer to demonstrate how harpsichord music embraced neurocultural findings on the exceptionalism of human cognition over animals and machines. Drawing from historically informed performance practices, the history of the book, the history of science and technology, art history, and material culture, "Wond'rous Machines" questions implicit assumptions about music, music making, and the fixity of musical instruments to argue that there are kinds of musical engagements, or musicking, that conventional organologies cannot explain.

The dissertation of Patrick David-Jung Bonczyk is approved.

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University of California, Los Angeles

2021

This dissertation is dedicated

to Constance G. Arnold, M.D.

and

to my parents, Dave and Judi Bonczyk.

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ACKNOWLEDGMENTS

My final research trip to New Jersey and New York City in mid-February 2019 was generously supported by the Lennart Fund in UCLA's Department of Musicology. I visited the Morris Museum in Morristown, the largest collection of musical automata in the United States, and the Metropolitan Museum's exhibit, "The Making of Marvels: Science and Splendor at the Courts of Europe." I thank the Lennart Fund for providing me with a final burst of inspiration.

Many people supported me in my final writing year. I have to thank Laurie, Justin, and Matthew LaCrosse for their help after I moved away from the 2020 California Fire Season. In their basement study space—which happened to be in my childhood neighborhood in Northern Michigan—I was able to continue all of my teaching, writing, and administrative work in peace.

I thank Mitchell Morris, my committee chair, for his kind and humane guidance. Since I began working with him in 2014, he encouraged me to read broadly, to nurture my imagination, to daydream, and to never apologize for my curiosity: these "soft" practices were to be as critical to my academic pursuits as the hard skills of scholarship. He never missed a meeting with me, even amidst his duties as chair of both the Department of Musicology and LGBTQ Studies. He has, above all, improved the quality of my intellectual life.

Raymond Knapp has been a valued mentor, reader, and conversationalist since my first year at UCLA. I composed the first germ of this dissertation, a short critical essay on bird song and Rameau's harpsichord *pièces*, in his analysis class for first year Ph.D. students. I have appreciated his patience and sensitivity to performance practices and musicianship, as well as his attention to shared writerly concerns.

Mary Terrall has also been with me since my first term at UCLA. The course on the historiography of early modern science did more to change my intellectual direction than any seminar. Much of the writing on natural history and the circulation of illustrated books originated in her history of the book and material culture seminar in my second year.

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Patrick David-Jung Bonczyk

Curriculum Vitae

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2014	———. "Breastfeeding the Soul: Spiritual Hunger and Baby-Death in Henry Purcell's 'With sick and famish'd Eyes,' Z200," *Newberry Essays in Medieval and Early Modern Studies*, Vol. 8: 5-16.

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2012	Eileen Southern Travel Fund, The American Musicological Society
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2013	Vancouver Baroque Vocal Programme: Early Music Vancouver
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INTRODUCTION

"Wond'rous Machines":

How Eighteenth-Century Harpsichords

Managed the Human-Animal, Human-Machine Boundaries

The tenuous boundaries that separate humans, animals, and machines fascinate and sometimes unsettle us. In eighteenth-century France, conceptions of what differentiates humans from animals and machines became a sustained topic of interest in spaces that were public and private, recreational and intellectual. This dissertation argues that eighteenth-century musical instruments were porous sites where performers, composers, artisans, academics, and pedagogues negotiated the limits of the fragile boundaries between humans, animals, and machines. French harpsichords are at the center of my dissertation because they embodied an experimental collision of animal and plant biomatter, complex machinery, and visual and musical performance. Resisting any claims to fixity, the harpsichord also advanced political, scientific, and economic agendas whether in their exportation abroad, in rationalist compositional techniques and manuals for domestic music making, in the rapid transformations in the mechanical arts, or developments in medical and anatomical theories. In all, I consider the ways that instruments had social import apart from sound production alone, expanding the definition of "instrument" beyond traditional organological studies of style in craftsmanship and musical aesthetics.

Through an "entangled organology" that traces material, economic, technological, scientific, medical, and environmental convergences, I reveal the thick networks through which harpsichords traveled and the behavioral codes and motivations that instrument makers, performers, listeners, and beneficiates embedded into them. With a lens toward material culture,

I follow French embassies and missions abroad to show how harpsichords were crucial to intercultural, diplomatic exchanges as gifts, bribes, or as sources of teachable knowledge. From the perspective of the history of science, I examine early music-making androids in France to show how musical instruments mobilized debates in the mechanical arts, human anatomy, and the extraction of natural resources. With techniques from art history and the history of the book, I focus on bird and monkey genre paintings (*singerie*) on harpsichords' surfaces that both evoked the contested human-animal divide and also telegraphed the harpsichord's free exchanges with music-adjacent objects, such as illustrated books of natural history, panel paintings and furniture, and the exotic animal trade for pets. With attention to historically informed performance practices, I use French harpsichord manuals and songbird *pièces* to narrate the musical confrontations with nature and the physical demands that the instrument-machine imposes on the performer's body. I also highlight how anatomists of nerve and brain theory and *philosophe* used the metaphor of plucked stringed instruments to argue for the eighteenth-century style of sensibility and human cognitive exceptionalism. Taking all this together, I question implicit assumptions about music, music making, and the fixity of musical instruments and argue that there are kinds of musical engagements, or musicking, that conventional organologies cannot explain.

This dissertation takes as its model the resonant space of an eighteenth-century French salon. Much like in the salon, the connections between sources can be evanescent, and language can often escape us. Yet together, sources still reside in proximity and vibrate in sympathy. In contrast to other diachronic scholarship of the human-machine dyad in early modern and

Enlightenment cultures, this dissertation gathers representative objects and ideas as a synchronic study of androids, music, and technology at certain dense moments.[1]

Musicians seldom think of musical instruments with the same social sensitivity as, say, medical or scientific instruments that measure, correct, and arrange relationships to nature, people, spaces, other objects, or instruments. Rather, traditional study of musical instruments, or organology, has limited itself to the taxonomy, cataloguing, and reconstruction of historical instruments. These pursuits are largely governed by the following questions: How and with what is it made? How does the action you perform on it determine its typology? In many taxonomical organologies, the craftsmanship of bringing together precious resources—rare woods, paints and pigments, strings and metals—take center stage. Any focus on the craftsperson(s) centers on style and lineage. Seldom is there consideration of the material, local, and social disposition of the objects that instrument makers, luthiers, performers, listeners, and onlookers arrange together.

What we know of and recognize as a musical instrument is called into question when we move beyond traditional typologies of styles, lineages, and sound production. What kinds of affordances arise from an instrument's social, material, economic, technological, scientistic, environmental, and psycho-social reverberances and ostentations? Who, then, are the actors involved? What are the protocols and disciplinary thresholds of that involvement? What values does the confluence of instruments reinforce and which values do they modify? These are the

[1] Recent diachronic studies of androids and cyborgs include Allison Muri's *The Enlightenment Cyborg: A History of Communications and Control in the Human Machine, 1660-1830* (Toronto: University of Toronto Press, 2007); Adelheid Voskuhl, *Androids in the Enlightenment: Mechanics, Artisans, and Cultures of the Self* (Chicago: University of Chicago Press, 2015); Minsoo Kang, *Sublime Dreams of Living Machines: The Automaton in the European Imagination (*Cambridge, MA: Harvard University Press, 2011); Jessica Riskin, *The Restless Clock: A History of the Centuries-Long Argument Over What Makes Living Things Tick* (Chicago: University of Chicago Press, 2016). Koen Vermeir makes a similar point in his review of Muri, "RoboCop Dissected: Man-Machine and Mind-Body in the Enlightenment," *Technology and Culture* 49, no. 4 (2008): 1036-1044.

kinds of questions that push beyond traditional organologies and into an inquiry that my dissertation will undertake: an entangled organology. While a coterie of scholars have recently called a socially minded study of instruments "new" organology, I choose "entangled" because it provides more holistic ways of reading non-human things as humans interact with them in diverse social contexts, and, in particular, invites people and other things into musical engagement and play. An entangled organology also places itself against fossilized, inward-looking organologies that divide and separate out instruments on performative, economic, and aesthetic value within the domain of sound production alone. Rather, an entangled organology draws instruments from outside, reversing instrument study from a formulation of difference and contrasts to a formulation of similarity and likeness. In addition, an entangled organology can expand the corpus of musical objects from those that produce sound in one direction to an organology of objects or things that traditionally have not been understood as musical instruments in a conventional way.

In its modes of demonstration or ostentations, an entangled organology can draw from earlier studies of material culture and the history of collections as social spaces. Paula Findlen has written extensively on how early modern Italian museums of natural objects were sites of "civility, [where] the primary rubric under which all forms of gentlemanly behavior were subsumed, shaped the conventions by which collections [objects natural and mechanical] were arranged and the conditions under which naturalists gained access to them. Museums," Findlen writes, "designed to facilitate social interaction, were laboratories of human behavior."[2] The museum, an orchestrated collection of natural wonders, was where manners were made and, in turn, defined how and with what people communicated with each other, either in contemplative

[2] Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley and Los Angeles: University of California Press, 1994), 16.

silence or in conversation. This dissertation also "gathers in" by placing musical objects adjacent to other objects previously understood as different, and as such is a constructed collection with its own entangled categories and narratives.

Studies of how music making and its genres reinforce or modify social relationships have had recent purchase in musicology. Elisabeth Le Guin has written about how eighteenth-century string quartet music was both a genre of music and a social space of conversation and manners, where protocols were made and etiquettes tested and performed.[3] Extending that line, Raymond Knapp has recently discussed how Haydn's quartets replicated a conversation of laughter, humor, and wit.[4] Bonnie Gordon's forthcoming book, *Voice Machines: The Castrato, The Cat Piano and Other Strange Sounds*, studies the body of the castrato and "[explores] the porous relationship of voices and instruments and the inherent materiality of sound."[5] She uses the castrato's body as an example of pre-industrial, technological manipulation that was, as previous studies by Martha Feldman have shown, an expression of monarchical sovereignty, early celebrity, but also an experiment in the artificiality of sound production.[6] Gordon's book displays the intersection of technology and craftsmanship by moving through several early modern cities—Rome, Florence, Ferrara, Venice—all major nexuses of music, technology, and instrument making and dealership.

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[3] Elisabeth Le Guin, *Boccherini's Body: An Essay in Carnal Musicology* (Berkeley and Los Angeles: University of California Press, 2005).

[4] Raymond Knapp, *Making Light: Haydn, Musical Camp, and the Long Shadow of German Idealism* (Durham: Duke University Press, 2018).

[5] "Bonnie Gordon: Robert Lehman Visiting Professor," *Villa I Tatti: Harvard University Center for Italian Renaissance Studies*, http://itatti.harvard.edu/people/bonnie-gordon.

[6] See Martha Feldman, *Opera and Sovereignty: Transforming Myths in Eighteenth-Century Italy* (Chicago: University of Chicago Press, 2007).

The work of musicologist Rebecca Cypess deserves more space for explanation especially for its alignment with historians of technology and science who look toward the early modern fascination with and production of instruments and instrumentality. In *Curious and Modern Inventions: Instrumental Music as Discovery in Galileo's Italy* (2016), Cypess explains that interest in instruments in a wide variety of disciplines—artisanal crafts, the sciences, and natural history—also displaced emphases on spoken and literary texts in music composition, the best representation being the Mantuan and Venetian schools of Monteverdi and Gabrielli, respectively. She argues that instruments no longer merely repeated tasks or replicated objects but were repurposed to create new knowledge about the world. She builds on studies by Jean-François Gauvin who posited that

> earlier theories regarded instruments as tools to be used merely for a purpose determined in advance, [of which] the classic example is the equipment of a blacksmith, which produces copies of objects already in existence. In the early seventeenth century, however, instrument came to be seen instead as a starting point for open-ended inquiry into the nature of the world.[7]

Her primary thesis is that while technical instruments displaced repetitive labor and mimetic production in favor of "discovery," so too was there a boom in instrumental music. In fact, a new instrumental conception of the obsession with Orfeo reframed his vocal powers as logocentric.

> Orpheus, who was, for Renaissance theorists, the model for all musicians, becomes a [newly] disembodied instrument—his voice animated by some strange divine force—when, having lost Euridice for the second time, he is dismembered by the bacchantes. Of the musician who had sung his way into Hades itself, all that remains is a severed, singing head.[8]

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[7] Rebecca Cypess, *Curious and Modern Inventions: Instrumental Music as Discovery in Galileo's Italy* (Chicago: University of Chicago Press, 2016), 21, paraphrase of Jean-François Gauvin, "Instruments of Knowledge," in *The Oxford Handbook of Philosophy in Early Modern Europe*, ed. Desmond M. Clarke and Catherine Wilson (Oxford: Oxford University Press, 2011), 333.

[8] Ibid., 44.

Whether a passive instrument or "[a] consummate skilled performer, in complete control of his tools" the Orpheus tragedy in the instrumental age comes less from the loss of Euridice than from his "change in status, from an instrumentalist affecting and controlling his world to a passive being—and inanimate instrument himself."[9] She then describes the dangerous new territory in instrumentality: "while instruments were sometimes seen as a means to open doors to new ways of thinking about the world, their use also involved a risk: a risk of the loss of autonomy."[10] Cypess investigates the sudden influx of instrumental-specific works often titled inventions (*inventione*) and "curious" (*curiose*). For example, Biagio Marini's collection of violin sonatas, *curiose e moderne inventioni* (1626) is already self-conscious about instrumental theory as a modern invention.

The Deutsches Museum in Munich has provided physical and conversational spaces for research groups in their explorations that move away from conventional studies of instruments. "The Materiality of Musical Instruments: New Approaches to the Cultural History of Organology" research group breaches traditional organologies "to encompass the social, cultural, historical, and aesthetic dimensions in dialogue with their material and mechanical bases," and is supported by the Leibniz Association.[11] They "develop organology as cultural history—a methodology combining aesthetics and history of science."[12] This aligns with Deutsches Museum's mission to collect "masterpieces of science and technology," with over 1800 musical

[9] Ibid., 45.

[10] Ibid.

[11] Hayley Fenn, Conference report on "The Keyboard as a Musical Interface: Materiality, Experience, Idiom," Deutsches Museum, Munich (January 12-13, 2018), Galpin Society Newsletter (May 2018): 11.

[12] *Materiality of Musical Instruments: New Approaches to a Cultural History of Organology*, "Research group description," http://www.deutsches-museum.de/en/research/forschungsbereiche/wissenschaftsgesch/sonic-visual-exhibit/materiality-of-musical-instruments/.

instruments, 200 musical automata, and 3000 piano rolls. For instance, a recent 2018 conference examined the keyboard as an interface not just for music making, but for daily routines and tasks that are not limited to sound and vocality, but also for "calculating the shopping bill to playing video games to typing a letter."[13] Such research and collaboration between instrument making, cultural and aesthetic history, and the history of science and technology is at the frontier of research in organology.

Other writers have attended to craftsmanship of musical instruments as well as the histories of how that material production shaped listening practices. In her 2013 book, *The Orchestral Revolution: Haydn and the Technologies of Timbre*, Emily Dolan reveals emerging discourses about timbre in the eighteenth-century orchestra to emphasize the material and technologic nature of sound. Her main interest is to show how Haydn's success was not due to his mastery of abstract musical forms and genres, but to his manipulation of "orchestral effects" (or orchestration).[14] In other words, through his careful control over the material possibilities of sound, Haydn was able to generate and shift the emotional sensibilities of eighteenth-century audiences.

Dolan's historicization of discourses of sound and sonority outweighs her disciplinary analysis of symphonies and quartets in ways that are useful to me. In particular, Dolan shows that the "ideality" of music is a historical mode of thought that is situated against earlier ideas about sound and instrumentality.[15] For Dolan, musicology has over-invested in the history of ideas and has taken for granted its foundations in the material concerns that constitute sound.

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[13] Fenn, "The Keyboard as a Musical Interface," 11.

[14] Emily Dolan, *The Orchestral Revolution: Haydn and the Technologies of Timbre* (Cambridge: Cambridge University Press, 2013), 6.

[15] Speaking of Wagner's philosophy of the binary between "reality" and "ideality," which in turn was informed by Johann Nepomuk Mäzlel, ibid., 258.

Studying the Enlightenment discourses of timbre shows us how to create new ideas about sound, listening, and perception. As such, her book is part of broader interest in the convergences of the senses, technology, and medicine in the eighteenth century, such as in George Rousseau's *Nervous Acts: Essays on Literature, Culture, and Sensibility* (2004).[16]

Dolan's work on instrumentality also points to forces driving early modern scientific inquiry. She draws from Thomas Hankins and Robert Silverman's *Instruments and the Imagination* (1995), which shows how early modern and eighteenth-century instruments (anatomical, musical, and theoretical) advance the language of early scientific inquiry. An overarching argument of Hankins and Silverman's is that instruments themselves generate their own ideas. Their study of instruments that did not work (the "losers" or those that were "on the margin") shows that an instrument's limitations and possibilities articulate nascent, disciplinary boundaries and thinking and thus shaped the language of the fields of anatomy and perception, acoustics, engineering, and natural history.[17] For instance, the discussion on Louis Bertrand Castel's publications on the ocular harpsichord, which he never built, demonstrates how the harpsichord straddled two opposing ideas of knowledge: the primacy of a Baconian paradigm of observation and direct experience against the scholastic and cognitive regime. Jean-Philippe Rameau and Voltaire pushed Castel to make his elaborate machine, but he resisted, arguing that his thought piece, the ocular harpsichord, was only ever an example of how knowledge was

[16] Penelope Gouk has also written extensively on the emerging disciplines of acoustics, hearing, and music studies in early modern England, "Music and the Nervous System in Eighteenth-Century British Medical Thought," *Music and the Nerves, 1700-1900*, James Kennaway ed., (New York: Palgrave Macmillan, 2014), 44-71; and with Ingrid Sykes: "Hearing Science in Mid-Eighteenth-Century Britain and France," *Journal of the History of Medicine and Allied Sciences* 66, v. 4 (October 2011): 507-545; see also Sykes, "*Le corps sonore*: Music and the Auditory Body in France, 1780-1830," *Music and Nerves*, 72-97; and Kennaway, *Bad Vibrations: The History of the Idea of Music as a Cause of Disease* (Abingdon: Routledge, 2016) and "From Sensibility to Pathology: The Origins of the Idea of Nervous Music around 1800," *Journal of the History of Medicine and Allied Sciences* 65, v. 3 (July 2010): 396-426.

[17] Thomas L. Hankins and Robert J. Silverman, *Instruments and the Imagination* (Princeton: Princeton University Press, 1995), 72-73.

calculable and how direct experience could not be trusted. For their project, Hankins and Silverman discuss how it is only by way of the mediation of instruments—in this case, musical instruments—that we are able to know anything.

Similarly, Robert K. Merton's *Science, Technology, and Society in Seventeenth-Century England* (2001) and Pam Smith's *The Body of the Artisan: Art and Experience in the Scientific Revolution* (2004) draw together shared commitments to the study of instruments, materiality, and the new science. Merton's argument runs parallel to Max Weber's foundational theory on Calvinism as an accidental parent of capitalism.[18] For Merton, it was Puritanism that set the stage for the new sciences in England. Smith expands on Merton's assertion that visual art about nature in the Western European Renaissance represented a kind of artisanal knowledge and thus underpinned growing ideas of the world and the new sciences. Further artisanal making was a kind of thinking in itself—"artisanal cognition" is her term—about nature and its separations from humanness. The comingling and reflexive nature of objects, labor, and natural history invites a discussion about their social entanglements, particularly between humans, animals, and the agency of things.

Loraine Daston's *Things That Talk* (2004) brings together the history of science and the agency of objects. There is a "mode of thinking with things," she writes, "in how things helpfully epitomize and concentrate complex relationships that cohere without being logical in the strict sense."[19] Joseph Leo Koerner also addresses equipment failure in examining Hieronymus Bosch's "Garden of Earthly Delights" (1490-1510) and recalls Heidegger's *Being and Time*:

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[18] Max Weber, *The Protestant Ethic and the Spiritual of Capitalism*, reprint of the 1st edition, 1905 (Routledge: 2001).

[19] Lorraine Daston, ed., "Speechless," in *Things that Talk: Object Lessons from Art and Science* (New York: Zone Books, 2004), 20.

"When we discover its unusability, the thing becomes conspicuous" and apparent.[20] Bosch's panel painting is a thing that is unusable, and hence conspicuous, both because it escapes a referential structure of what it is (let alone what it might be for) and because it consists of things that are, in a spectacular manner, "improperly adapted for their specific use."[21] Involved in everyday actions, equipment stands unperceived but ready at hand until the moment it breaks, at which point it becomes an "object" in a strict sense and is open to theoretical exploration.

Another circulating theory about the agency of humans, animals, and things, is Ian Hodder's recent articulation of material contingencies of things and their social entanglements. At stake for Hodder are the definitions of human nature and its engagements with the material conditions of human life. In *Entangled: An Archaeology of the Relationships Between Humans and Things* (2012), Hodder departs from the earlier discussions on the agency of things in significant ways. "Things do have a primary agency," writes Hodder, but "not because they have intentionality but because they are vibrant and have lives and interactions of their own."[22] Hodder describes a three-tiered theory of how humans depend on things, how things depend on other things, and how things depend on humans, which I describe briefly below.

Humans depend on things

That humans depend on things for existence or to perform tasks needs little explanation. What has received less attention is how a person and thing as a dyad create continuous chains of

[20] Joseph Leo Koerner, "Bosch's Equipment," in ibid., 53.

[21] Ibid.

[22] Ian Hodder, *Entangled: An Archeology of the Relationships Between Humans and Things* (Chichester, UK: Wiley-Blackwell, 2012), 68.

connections with other people and things.[23] The agency of things, plants, and animals "traps" humans into patterns of "care, regulation and discipline" to allow them to do "as people want."[24] Hodder argues that relationships between matter, things, and our material needs demand labor, other things, and human exchanges that "[draw] humans deeper into the orbit of things" and creates social, economic, and physio-psychological dependences on things.[25] Yet, many of these dependences are what Hodder calls "human-centered."[26] What happens when we consider an entanglement that includes material cognition alone? What happens when we take the agency of things on its own terms?

Things depend on other things

When "things depend on other things," non-human things form an assemblage together upon which, in turn, humans depend. Things depending on other things does not mean there is an independence of things from humans, nor does it encourage a fetishization of non-human objects and actors.[27] These dependences are broken up into five loose chains: production and reproduction, exchange, use, consumption, discard, and post-deposition.[28] As it concerns this dissertation on musical instruments, I want to touch briefly on only two chains here. In production and reproduction, "processes of production link together all the tools and materials in

[23] Ibid., 17.

[24] He also occasionally uses the word, "behavior," in place of agency; ibid., 69, 86.

[25] Ibid., 86.

[26] Ibid., 39.

[27] See also Alasdair Macintyre, *Dependent Rational Animals: Why Human Beings Need the Virtues* (Chicago and La Salle: Carus Publishing Comp., 1999).

[28] Hodder, *Entangled*, 42-43.

procurement and manufacture, all the locales and knowledge involved in obtaining raw materials and transforming them into products for human use."[29] "Consumption" implies all the means of absorption, material or otherwise, such as appropriation, imitation, and emulation, such as androids or painted monkey motifs that imitate musicians.[30] Thus, things depend on other things when processes of production and consumption are brought into play.

Things depend on humans

Finally, things depend on humans. Hodder's central claim here is that things are never inert or fixed or ever stable (recall the lack of fixity of the harpsichord as it traveled abroad).[31] They depend on humans for maintenance, but also for viability, and for categorization as they pass through ontological transformations.[32] "Things depend on things" adds to an entangled organology because it does not necessarily require conventional menial labor and repair but could include surrounding conversations and discourses that sustain a musical instrument's interest, social usability, and functions. These discourses may also shift given the needs and reception of other things and humans.[33]

Harpsichords were not just instruments for music and music alone. One of the reasons for its candidacy for showing the social disposition of other musical instruments—this balance between entangled organology and the entanglements of things with humans and non-anthropoids—is that what is natural in its materials and what is human in its construction and

[29] Ibid

[30] Ibid.

[31] Ibid., 64-65.

[32] Ibid.

[33] Ibid., 69.

activation collide in the harpsichord. The body of the harpsichord as an admixture of craftsmanship, animal parts, and other biomatter together with human action is evidence for the convergence of human, animal, and machine. Rather than just a machine designed for optimal sound production and tailored to the human body, the harpsichord was a manifestation of the tenuous relationship between nature and man. The birds and other *naturalia* that decorated the harpsichord's surfaces both aestheticized natural knowledge as visual art and offered artisanal cognition giving the performer a sense of domination over animals and nature generally.

The way the harpsichord moved through its economic environment is also telling of its social situation. Seventeenth- and eighteenth-century harpsichords were involved in para-musical markets, such as furniture, pets, precious woods, and the book trade. Harpsichords also engendered social and disciplinary protocols, such as close listening, presentation and disciplining of bodies of both the performers and of audiences. Closely related is how the harpsichord has a capacity to modify or reinforce relationships: exchanges between performer and composer, between performer and listeners, between performer and spaces and other non-human things. When Rameau spoke of relearning how to walk "naturally" in his *Pièces de Clavessin avec une Méthode pour la Méchanique des Doigts* (Paris, 1724), he did so with the intent of projecting bodily control and mental poise. Earlier François Couperin wrote in his book, *Pièces de Clavecin, Premier Livre* (Paris, 1713), about avoiding "la grimace" when performing, suggesting practicing in front of a mirror, communicating the adherence to a style of bodipolitics registered on the machine. And when the Swiss clock maker Pierre Jacquet-Droz designed his harpsichord playing automata (1768-1774) in woman's clothing to breathe, blink, and sigh in the way a young woman player might, he prescribed a gendered sentimentality to playing on that instrument and how that instrument bears on its player.

Agency has been a sustained line of inquiry in the study of objects, and scholars have asked questions on the way objects circulate and the way they operate upon other objects and people. The harpsichord itself is made up of bio-matter that at one point arguably had agency. I borrow from Jessica Riskin in defining agency in the broad sense that things have agency when they perform actions and behave with purpose. In *The Restless Clock: A History of the Centuries-Long Argument over What Makes Living Things Tick* (2016), Riskin sets out to define pre-modern agency by separating it out from consciousness.[34] Plants have agency, she writes, because they seek out sunlight to photosynthesize, but they are not *conscious*. Expanding on the point, she remarks that agency is "an intrinsic capacity to act in the world, to do things in a way that is neither predetermined nor random. Its opposite is passivity."[35] If we are to believe that the harpsichord is composed of materials that had a multitude of agencies, does it retain those agencies in its new, composite body? Moreover, the harpsichord is distinct from other instruments in that it is made up of a complex and enclosed structure of strings, mechanical actions, depressible keys, and metal fixtures that protect and accentuate its internality. That is to say, we can more easily imagine an internal subject-hood for the harpsichord in the way we cannot with the early modern flute or recorder, which are porous, hollow tubes, often made out of a solid, homogenous piece of wood. In short, the harpsichord has heterogenous "guts" with discrete parts that perform discrete actions. Its outward presentation as well enforces this internality with its shell that can open to reveal its innards. In the early modern period, this holistic reading of musical instruments is precisely the story I want to tell: early modern musical

[34] The argument for either an autonomous nature and a passive nature was, in fact, a seventeenth-century dispute, guided by the impulse to argue for a divine design; that is, a passive, "mechanical" nature is God's "artifact" and proves his omnipotence Jessica Riskin, *The Restless Clock: A History of the Centuries-Long Argument Over What Makes Living Things Tick* (Chicago and London: University of Chicago Press, 2016), 4.

[35] Ibid., 3.

instruments, both traditional and unconventional, were nodes where disciplinary boundaries we take for granted are disputed and ultimately defined.

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I begin with a "Prologue" to introduce the harpsichord as a multi-faceted instrument. Each of the following chapters chart the story of this dissertation divided among machines, animals, and humans, respectively. Chapter one recounts the royal French embassy's journey to Siam in 1687. The ship *L'Oiseau*, carried musicians and composers but also a harpsichord along with other technical instruments. The harpsichord was a gift for the wife of the first minster to Siam, Maria Guyomar de Pinha "Phaulkon," which was consistent with a European tradition of giving keyboard instruments as diplomatic gifts. The instrument was part of a package traveling with other technologies of mechanical, mathematical, and religious import intended to instruct the Siamese on French learning, to convert the King of Siam and his subjects to Christianity, and to display French aesthetic arts. In the harpsichord's case, the instrument was not only an aesthetic object, but a display of what the Siamese could do had they utilized their natural resources, such as tin, effectively. Lastly, the chapter argues that the harpsichord, while remaining musical, had the flexibility to be employed as a diplomatic body to advance French commercial and political programs.

Chapter Two begins by exploring the long-standing human-android distinction and Jacques de Vaucanson's first musical android, the flute playing faun (1738) as a point of departure. I argue that, besides the marvels of it allegedly playing music on its own, Vaucanson's musical android, as a machine, advanced notions of freedom and imagination made possible through independence of motion and the individual actions of body parts—fingers, arms, lips,

breath—in performing music. I transition then to Rameau's 1724 harpsichord manual, *Une Méthode pour la Méchanique des Doigts,* ("A method for the machining of the fingers") and his extensive discussion on the independence and anatomizing of the arms and hands as key to free and imaginative play. As in Vaucanson's android, freedom and independence was only made possible through mechanization.

In the second half of the chapter, I explore how Louis Bertrand Castel's "ocular harpsichord" participated not only in mathematical musical arguments about the limits of the senses but also the imaginative possibilities available through machines. Rameau again features prominently as a supporter of the Castel's ocular harpsichord, especially regarding how its mathematical precision bolstered his own theoretical arguments for the *corps sonore* manifest in the fundamental bass. Rameau believed, with plenty of skepticism from the philosophes, that the *corps sonore* opened up vistas of discovery hitherto unexplored. Again, the harpsichord not only features as a machine that produces music but is also at the center of debates on human freedom, independence of the body, and arguments within the liberal sciences.

In Chapter Three, I explore the flooding of natural knowledge into early modern Europe from natural historians. In particular, the commentaries from Georges-Louis Leclerc, the Comte de Buffon, on bird speech and song in illustrated books on bird species parsed out the differences between human and animal societies and cultural formations. Ultimately, the Comte de Buffon argued that the birds were under-developed but teachable beings. They could also advance in society with proper social development. Until then, humans are free to catch, breed, instruct, trade, and control them. Similar confrontations between human and animal appeared on harpsichords themselves, particularly in *singerie* paintings on harpsichords. I use Christophe Huet's musical monkey paintings on an Étienne Blanchet harpsichord as another interface

between humans and animals that occurs while playing the harpsichord. I close the chapter with an analysis of a bird song *pièce* on the harpsichord by Rameau, "Le Rappel des Oiseaux," listening for moments where the mechanical representation of bird song departures from the mechanical by way of more nuanced harmonic ventures. Overall, eighteenth-century books of natural history, decorations on harpsichords, and keyboard literature often staged confrontations along the human-animal, human-machine divides.

Finally, I conclude in Chapter Four with a look into eighteenth-century brain and nerve theories that anatomists and philosophers used to argue for the unique exceptionalism of human sensory reception and the resulting aptitude for consciousness, imagination, and memory. Like Descartes before him, Thomas Willis argued that the nerves were central to sensation and cognition, and used musical instruments as models for his brain and nerve theory and to determine the location of the soul in the brain. Importantly, the two philosophers differed in their choice of instruments: whereas Descartes used the pipe organ as an analogy for hollow, porous nerves in the automaton animal-machine, Willis and others after him used plucked string instruments as models in which the strings were fibrous, semi-solid nerves that vibrated sympathetically to external vibrations thereby generating consciousness.[36]

Consistent with the themes of my other chapters, the theories of nerves and cranial receptivity to sensations in humans proved a dividing line between humans, animals, and

[36] René Descartes, *L'Homme… et un Traité de la Formation du Foetus* (Paris: Charles Angot, 1664), 165-166, translated as *Treatise on Man* by John Cottingham, Robert Stoothoff, Dugald Murdoch, in *The Philosophical Writings of Descartes*, vol. 1 (Cambridge: Cambridge University Press, 1984), 104; Thomas Willis, *De anima brutorum quae hominis vitalis ac sensitiva est, exercitationes duae. Prior physiologica ejusdem naturam, partes, potentias & affectiones tradit. Altera pathologica morbos qui ipsam, & sedem ejus primariam, nempe cerebrum & nervosum genus afficiunt, explicat, eorumque therapeias instituit* (London: George Wells and Robert Scott, 1672), translated into English by Samuel Pordage as *Two discourses concerning the soul of brutes which is that of the vital and sensitive of man. The first is physiological, shewing the nature, parts, powers, and affections of the same. The other is pathological, which unfolds the diseases which affect it and its primary seat; to wit, the brain and nervous stock, and treats of their cures: with copper cuts* (London: 1683), 34-35, *Early English Books Online Text Creation Partnership*, 2011, https://quod.lib.umich.edu/e/eebo/A66518.0001.001/1:5?rgn=div1;view=fulltext.

machines. All are capable of sensations, but only humans possessed cognition, memory, and imagination. In the second part of the chapter, I use Diderot's imagined dialogues on the aesthetic manifestations of nerve theory on sensations and memory in the eighteenth-century style of "sensibility." Reviving the harpsichord as a model, Diderot articulated that the idiosyncratic sensibility of people could either cause nervous distress and sickness (vertigo or madness) or an acute and refined judgment of the world. The chapter closes, thus, with an analysis of Joseph-Nicolas-Pancrace Royer's pair of rondeaus in his first book of pièces for harpsichord (Paris, 1746): "Le Vertigo" and "La Sensible." I argue that the two rondeaux are a union of sensibility with human memory and its indelible connection to the harpsichord.

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One of my favorite publications on the long eighteenth century is *The Rambling*, an eclectic online journal that publishes scholarly public writing, poetry, and criticism in the discursive spirit of the eighteenth century. Similarly, this dissertation also embraces the "sprawling" peripatetics of its subject, "[evoking] the eighteenth century as a state of mind or as a style rather than as an historical time period."[37] In this dissertation, music opens channels to transgress disciplinary boundaries and affords ways of managing disparate materials and labor. The eighteenth-century task to delineate what it means to be exceptionally human finds uneasy residence in musical instruments. So entangled are eighteenth-century musical instruments with the histories of other instruments and knowledges that what arises from them is a protean amalgam of human, animal, and machine. In communion with a broad range of disciplinary attitudes, "Wond'rous Machines" embraces the enduring instability of those boundaries to

[37] "About," *The Rambling*, https://the-rambling.com/about/.

explain why musical instruments still articulate what it means to inhabit different modes of being in the world.

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PROLOGUE

"And they touched them for a long time."

15 mars 1687[1]

Mon cher abbé,

Our royal French embassy set sail for Ayutthaya, the capital of the South Asian Kingdom of Siam in March 1687 (Figure 1). Among us company are mathematicians, astronomers, and Jesuit priest-teachers (me). We bring with us musical instruments and musicians (also me).[2] One of the six ships, the *Gaillard* (perhaps after the vigorous French-style dance) carries the celebrity composer André Cardinal Destouches (d. 1749) who has with him precious cargo of scores of operas by our Jean-Baptiste Lully (d. 1687).[3] The crew of another ship, *L'Oiseau* (the bird), carries one, maybe two, harpsichords "painted and sculpted," two organs also "painted and sculpted," a pair of bass viols, and tools for the organs and the organ bellows.[4] While us Jesuits and crewmen use the instruments to say and sing daily prayers onboard, these instruments are both for enterprising priests to perform their rites of conversion while in Siam and as gifts to key persons in the royal court. Musical performance has served the King's diplomatic industry well in ceremonies both in Siam and in France. But in the absence in Siam of opera as well as the

[1] The following letters are a fictional narrative based on real events. All sources mentioned, however, are authentic. I explain the historiographical reasons for my approach beginning on page 35.

[2] Importantly, these musical instruments traveled with other instruments of astronomical, mathematical, and religious significance. See David R. M. Irving, "Lully in Siam: Music and Diplomacy in French-Siamese Cultural Exchanges, 1680-1690," *Early Music* 40, no. 3 (August 2012): 393, 396, 405-406.

[3] Ibid., 405.

[4] "*Estat des Instruments, Pendules, Tableaux, hardes et autres provisions que les PP. Jesuites font transporter de Paris a Brest pour envoyer a Siam*" (7 February 1687) in *Registre des expeditions de Siam 1687-1688-1689*, Archives Nationales d'outre Mer, C[1]27, ff. 43v-44v, quoted in ibid., 406.

academies of science and dance that could properly advance our narrative, we must employ other means to transport French ingenuities with us.[5] And so we give harpsichords as gifts along with other mechanical instruments and tools of learning, as other missions and embassies have done before us.[6]

One of the harpsichords is a gift for Madame Phaulkon (or Maria Guyomar de Pinha), the wife of Constance Phaulkon, King Phra Narai's chief minister. Maria was said to have Portuguese, Japanese, and Bengali heritage from her father who was born in Portuguese Goa, and as such, seems to perfectly represent the alchemy of forces in the region. That such a woman had risen to influence speak well for the gifts we carry, as they too are admixtures of people and materials from distant worlds. An Ayutthaya native, she had a Japanese Christian mother who found her way to Siam after the Tokagawa Shogun suppressed Christianity (the Jesuit order having long labored there in hardship). She is a countess and protectorate of Louis XIV, as is her husband. Certainly, a gift of a harpsichord to Madame Phaulkon is to show her some French heritage and ingenuity, for few instruments are as complex and varied in their mechanics as the *clavecin*. She may have also introduced many new desserts and delicacies to the Siamese palate, much of them are from her Portuguese dialect, and use egg, more refined sugars, bean starches, and nuts. To us French, she appears a person who enjoys choice diversities of tastes in all things,

[5] Irving calls this "virtual travel," 412.

[6] He would not have been the only missionary or ambassador to require the harpsichord as a technological retrieval system. The diplomatic exchange (or bribing as some have written about) of keyboard instruments and automata had already been "best practices" and extended well into the eighteenth century. In the late sixteenth century, the Portuguese were practicing the intercultural exchange of keyboard instruments, mechanical devices, and automata, such as clocks, with their contacts in Africa and Japan. See Ian Woodfield for why the harpsichord overcame the automata, clock, and organ as the instrument of choice as a gift in the early seventeenth century, "The Keyboard Recital in Oriental Diplomacy, 1520-1620," *Journal of the Royal Musical Association* 115, no. 1 (1990): 33-38. The Dutch soon followed this tactic, then the English as part of their expansionist ambitions. In the case of the French, so firm had the exchange of keyboard instruments settled into the early phases of diplomacy that the kings of Siam were still receiving keyboards as gifts into the eighteenth century: in the 1740s, a ship, also named *L'Oiseau*, carried to King Boromakot of Siam (r. 1732-1758) a precious *serinette*: a crank-operated organ that taught birds to sing. See Irving, "Lully in Siam," 410.

and the harpsichord will please her with its wide repertoire of styles in painting, furniture craftsmanship, and musical variety.

The other harpsichord will be gifted at my discretion if it survives the inevitable humidity and water damage from the sea voyage that causes bulging and wood rot. Once in Siam, the harpsichord must defend against the intense heat and humidity of South East Asia, fending off rust and deterioration of the strings and leather, peeling of paint and melting of varnish, and repelling bugs. I don't have to tell you that it is an expensive project to carry it over and an even more ambitious one to keep it alive once there.[7] Still, it is cheaper than sponsoring the entire *chambre du roy*. Tomorrow I shall tell you more about Phaulkon.

Votre très obéissant serviteur,

Paul-Henri Champain, Musicien de la chambre du roy

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le 1er avril 1687

Cher abbé,

The story of Constance Phaulkon is an interesting one. He was personally obscure but remarkably well-known and important to the embassy's missions. He was born in the Venetian Republic, perhaps in Erisso, but is said to be Greek. His original name is "Gerakis" after his Greek father, and he had a Venetian mother (née Supianto), and so he changed his name to

[7] See Woodfield who, in gathering evidence from embassies and missions from the late sixteenth century to Japan, Russia, the Levant, and China, argues that an intercultural diplomatic gift needed to "[display] the best aspects of European artistry, craftsmanship and mechanical ingenuity and the need to keep costs to a reasonable level." The harpsichord satisfied all these needs: it was often elegantly painted and crafted like a furniture piece and thus became an *objet d'art*, "with its method of sound reproduction, it could also be presented as a mechanical device; it was certain to be regarded as a novelty," and the costs related to craftsmanship and transport and the need to only pay one musician made the harpsichord a thrifty choice (even though diplomats gave, at times, a number of highly ordained harpsichords with panel paintings and mother of pearl), "The Keyboard Recital in Oriental Diplomacy," 33-34.

"Gerachi." When he moved to London as a younger boy, he anglicized himself as "Falcon," but then restored it yet again to a Hellenization, "Phaulkon." I am dizzy just thinking that these names are the same man. I gather that he has joined the English East India Company and in 1669 sailed to Bantam in Java, Indonesia on an English ship named the "Hopewell." He became a clerk with the company after making friends with senior members of the Company, learned Malay and was introduced in 1681 to King Narai in Siam through the trader Phra Khlang Kosa Lek, who happens to be the older brother of Kōsa Pān, the lead ambassador to the previous embassy to France.

As an interpreter to King Narai, he spoke Thai, Malay, Portuguese, French, English, and his native languages of Venetian and Greek. An enterprising man, he worked in the treasury. I'm pleased to know he converted to our religion after dissolving his brute, Anglican ties. We Jesuits expect fine and easy dealings with him. His wife, the aforementioned Maria Guyomar de Pinha, was also of our religion, though which order she favors is unknown. Phaulkon's success is so well-known that many of his former colleagues in the English East India Company abandoned their positions and swore fealty to King Narai, with promises of favors from the court, of course. So troubled was the East India Company, that James II decreed that all Englishmen are to serve his interests and his alone while on English ships. The story takes a darker path when some Englishmen, loyal to King Narai, were butchered in Mergui by the Governor of Tenasserim, including close friends of Phaulkon. Having no choice, King Narai declared war against the Company. And that is how we have come into this French moment of rapprochement with Siam: Phaulkon organized these exchanges of embassies. But now I am exhausted from writing and the sea wind and chill are tough on my nerves. I do not suffer from the *mal de mer*, only anxiety that our cargo will decay before we arrive. *-P.-H. Ch., Clavecinist*

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13 mai 1687

I think it's timely to give you a short history of musical exchanges before this diplomatic mission. A Siamese embassy to France landed in Brest on 18 juin 1686, a year earlier than our current mission, and was met with a pomp and circumstance meant to replicate, in French fashion, the reception in Siam of yet another French embassy prior (Figure 2).[8] (We are now carrying the same Siamese embassy back.) Most displays were processional and ceremonial music and not chamber concerts.

The receptions were inspired from the accounts of Chaumont's reports of musical and ceremonial rituals in Siam with Phra Narai, and thus were mostly composed of outdoor trumpets (twenty-four, I'm told) and thirty-six drummers.[9] Kōsa Pān, the lead ambassador, did keep a detailed diary (of which only sixty-eight pages remain). Only one musical anecdote survives, and it is of his observations of military music in France.[10] In it, the ambassador describes how military drums will change beat patterns based on the rank of the military officer to whom they are saluting.[11] It is likely that the ambassador was interested in local musical customs and that the governor of the navy wanted to express that the military precision of France reflected the divine status of the monarch.

That same relationship between music and divine monarch was re-fabricated during the reception of the embassy as well, in which the grandiosity of the musical displays and the

[8] Irving, "Lully in Siam," 400.

[9] Ibid.

[10] Ibid., 405.

[11] Ibid.

elevation of *le Roi Soleil* on a platform of steps was very much like the Siamese customs.[12] Several transcriptions of newly composed music from those events are in circulation. Michel-Richard de Lalande wrote an "Entrée des Siamois" (S144a/19) and another "2.e air des Siamois (S144a/20)" transcribed from his *Simphonies de M. De La Lande Qu'il faisoit exécuter tous les 15 jours pendant le Souper de Louis XIV et Louis XV. Mises dans un nouvel ordre, et ses augmentations*.[13] Both are in trite two-part forms and were part of a larger dance suite or *divertissement*: that is to say, they had nothing to do with Siamese music.[14]

The ambassadors attended other concerts as well, including an opera by Lully, smaller concerts by lutenist Jacques Gallot, and violin ensembles in Dunkirk. All of these were reported by Jean Donneau de Vizé in the serial the *Mercure galant*. It should be noted, as others have, that the *Mercure*'s reports on the reactions of the Siamese were likely embellished by de Vizé or inflected in such a way to pique French readership and reflect well on French diplomatic interests.[15] We've learned from these accounts, and in addition to the harpsichords and the organ gifts, the musicians will play the violin reductions of Lully's operas. Though, once in Siam, we suspect that the Siamese will react similarly as in the accounts of de Vizé's journalism and Kōsa

[12] Ibid., 400.

[13] See transcriptions by Irving, 404-405 of Michel-Richard de Lalande, "Entrée des Siamois," S144a/19 and S144a/20, Simphonies de M. De La Lande Qu'il faisoit executer tous les 15 jours pendant le Souper de Louis XIV et Louis XV. Mises dans un nouvel ordre, et ses augmentations, 2 volumes, 1736–1745, Bibliothèque nationale de France, Rés.581, ii, pp. 217–18.

[14] According to Irving, they appear only as "intermèdes for the comedy *Mirtil et Melicerte* [and] were also appended to a score of Lully's *Le Bourgeois Gentilhomme*," 403. The closest the get to reflecting something other than France is that both are in minor keys, a common way to represent exotic others (including the Near East) in the early modern period. Irving also notes that the *entrée* makes use of strong duple rhythms. He writes that the fact that Asian or 'exotic' cultures were often viewed as interchangeable and part of a monolithic 'Other' is demonstrated by the fact that the '2.e air des Siamois' (s144a/20) was reused by Lalande in *Les folies de Cardenio* (s152/i/12) and renamed 'La Pagode'.48," ibid., 403.

[15] Ibid., 404.

Pān's diary: that is to say, they will be interested in musical customs but only in so much as our ceremonial behavior indicates status.

I find it interesting that in these stories not many seem to notice that the Siamese returned to the musical instruments as objects rather than comment on the beauty and ingenuity of the music. De Vizé reported that the Siamese ambassadors took particular interest in organs at visits to Notre Dame, the Cathedral of Arras, at Cambrai, and at the Abbaye de Saint Jean des Vignes, frequently asking about them and, in one case, touching them for an extended time ("[I]ls les touchèrent fort longtemps.").[16]

Le clavecinist

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15 novembre 1687

We've been in Siam for a month or more. Mr. Simon de la Loubère apparently has begun an account of his meetings, which he intends to expand across two tomes: *A New Historical Relation of the Kingdom of Siam… in the years 1687 and 1688, Wherein a full and curious*

[16] The ambassadors' observations of organs are reported several times in the *Mercure galant*. For example, at Notre Dame: "ils eurent de vouloir apprendre ce que c'est que l'Orgue qu'ils écouterent avec une grande attention, & sur laquelle ils firent des demandes pleines d'esprit" (*Mercure galant*, September 1686, Part 2, p.150); in Saint-Médéric, Paris: "Les Ambassadeurs en s'en retournant entrerent dans S. Mederic, pour entendre les Orgues de cette Eglise, qui ont la reputation d'estre aussi bonnes que l'Organiste est habile. Elles leur donnerent beaucoup de plaisir, mais ils y en auroient encore pris d'avantage, sans la foule extraordinaire de peuple qui s'y rencontra" (*Mercure galant*, December 1686, Part 2, pp.62–3; on this visit, see also N. Dufourcq, *Nicolas Lebègue (1631–1702): étude biographique suivie de nouveaux documents inédits relatifs à l'orgue français au xviie siècle* (Paris: 1954), 47; at the Cathedral of Arras: "Ils prirent beaucoup de plaisir à entendre les Orgues de cette Cathedrale, qui sont fort bonnes; & sortirent de cette Eglise aprés avoir fait de nouveaux remercîmens au Prevost & aux Chanoines" (*Mercure galant*, December 1686, Part 2, p.174); at Cambrai: "Ce Prélat [the archbishop of Cambrai] leur fit voir tout ce qu'il y avoit de plus curieux dans son Eglise, & leur en fit entendre la Musique & les Orgues" (*Mercure galant*, January 1687, Part 2, p.57); and at the Abbaye de Saint Jean des Vignes: "Ils monterent aux Orgues, qui sont neuves & trés-belles, & ils les toucherent fort longtemps" (*Mercure galant*, January 1687, Part 2, pp.120–1), in Irving, "Lully in Siam," note 53, 403.

Account is given of the Chinese Way of Arithmetic, and Methematick Learning. I was privy to the description of one of the musical meetings:

> The King of *Siam,* without shewing himself, heard several Airs of our *Opera* on the Violin, and it was told to us that he did not think them of a movement grave enough.[17]

I recall that the music the French played for processionals and official ceremonies was meant in some ways to replicate the ceremonial ethos and grandeur of the Siamese receptions of the French embassies, but they ostensibly played French repertoire. Perhaps because there was nothing particularly Siamese about the music played.

Recalling my earlier letter, I find myself wondering still, what does it mean to touch an instrument for longer than was spent listening to it? Though the Siamese went to listen to many concerts in France, it also seems as if touching is an equally valuable form of knowing. Touch also gives "body" to sound and puts us in touch with its source. (And, indeed, the early modern verb that means "to play" the harpsichord is "toucher.") The Jesuit way is sympathetic to this sensuous species of knowing.

P.-H.

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28 December 1687

I have to remind myself why I am here from time to time. Allegedly, we, under Guy Tachard, had an expressed interest to convert the King of Siam to Christianity to firm up ties with those at home who desire their natural resources, preferably those from mining. Mining is of no interest

[17] Simon de la Loubère, *Du Royaume de Siam*... (Paris: 1691), translated into English as *A new historical relation of the Kingdom of Siam. By Monsieur de La Loubère, Envoy Extraordinary from the French King to the King of Siam in the years 1687 and 1688. Wherein a full and curious account is given of the Chinese way of arithmetick, and the mathematick learning. In two tomes. Illustrated with sculptures* (London: F. L. for Tho., et al., 1693), facsimile reproduction (Kuala Lumpur: Oxford University Press, 1969), 67.

to me, but I must admit that the 1685 embassy was successful in procuring a monopoly over the tin trade in Phuket, southwest Siam.[18] Perhaps that is why harpsichords accompanied our trip as it had already been discussed that strings made of tin and gold, two metals that Siam was said to be rich in, had a direct connection to the refinement of an instrument. Indeed, I've heard second hand of the published report from the 1676 meeting of the *Académie Royale des Sciences* where "in speaking of different types of gold, Monsieur L'Abbé Galloys says that gold from Siam is more flexible and less likely to break than ours; the sound of the harpsichord strings that are made from it is deeper in pitch."[19] Because France wants to seize control over key South Asian ports and establish monopolies of (reportedly) huge unmined assets of Siamese tin and gold, harpsichords have surprisingly become "ambassadorial" in our economic maneuvering if not in our religious designs.[20]

Alexandre the Chevalier de Chaumont (d. 1710), and the Abbé François-Timoléon de Choisy (d. 1724) had failed at converting the King in 1685, only reaching an agreement to protect converts to Christianity from persecution in Siam.[21] The continued difficulty of achieving this feat was expressed again by de la Loubère:

> From what I have said concerning the Opinions of the Orientals, it is easie to comprehend how difficult an enterprize it is to bring them over to the Christian Religion... it seems very rational to me, that the Missionaries, who have not the gift of Miracles, ought not presently to discover to the Orientals, all the Mysteries nor all the Practices of Christianity. T'would be convenient, for example, if I am not mistaken, not to preach unto them, without great caution, the worshipping of Saints: and as to the knowledge of Jesus Christ, I think it would be necessary to manage it with them, if I may so say, and

[18] Irving, "Lully in Siam," n. 35, 398.

[19] "*Mémoires de l'Acadêmie des Sciences de l'Institute de France (1687)*," in *Histoire de l'Academie Royale des Sciences depuis 1686 jusqu'à son renouvellement en 1699* (Paris: Gabriel Martin, Jean-Baptiste Coignard, fils, and Chez Hippolyte-Louis Guerin 1733): ii, 13, quoted in Irving, "Lully in Siam," 410.

[20] Ibid., 398.

[21] Ibid., 398.

> not to speak to them of the Mysterie of the Incarnation, till after having convinced them of the Existence of a God Creator.[22]

We have found that it was far better, in a sense, to ease the Siamese into Christianity by way of gift giving and demonstrations, but not concerts so much as they did not seem to understand them. But rather, they did enjoy giving and receiving gifts. In the audience,

> after the King has spoken to the Ambassador, he gives him *Arek* and *Betel,* and a Vest, with which the Ambassador cloaths himself immediately, and sometimes a Sabre, and a Chain of Gold… This Prince gave Sabres, Chains of Gold and Vests, or sometimes only Vests to the principal *French* Officers.[23]

The harpsichord then, for the Siamese, is part of a package of instruments of conversion to French science, philosophy, religion, engineering, and natural history. This is our way of life, and only we can harness its enormous potential by using gold, silver, tin for more than simple ornament alone.

Learning from de la Loubère's example, in which he did not find it wise to berate them with the abstract nature of our sciences and natural laws, we saw it best to introduce the Siamese to a complete instrument that brought together all that we are able to do. The harpsichord combined, in my view, the various results of other instruments, including measurement of sound and time, the best of artisanal craftsmanship, painting and representation (where there was such paintings, an agreement with French character pieces, Flemish and Dutch still lifes, and French dramatic and historical allegory), the project of collecting of rare materials and woods and our extensive knowledge of them, and achievements in human dexterity and motion. But now we hope to return to France, and I shall see you soon. *P.-H.*

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[22] de la Loubère, *Du Royaume de Siam*, CHAP. XXV. "Diverse Observations to be made in preaching the Gospel to the Orientals," 140.

[23] Ibid., 109.

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I have narrated this semi-fabricated opening account to display the harpsichord as something more than a musical instrument in a limited sense, but rather as an ornate political gift and an informatics of control. That is to say, the harpsichord can store, retrieve, and replicate European, and especially French, knowledge making. Such a Jesuit priest and musician as the letter writer, interested in technical matters and a protégé of Guy Tachard the mathematician-Jesuit on that voyage to Siam in 1687, would have had to rely on a complex machine to retrieve and replicate knowledge far from home in a compact but easily accessible form, called up by a number of commands on a keyboard. Much like Clifford Geertz's thick descriptions, writing creative non-fiction has been useful to me in capturing the texture of the diplomatic missions in which harpsichords found themselves. In so doing, I wanted to ask questions unasked and record those answers, if somewhat speculatively.[24]

At key moments, Europe required a thing that stood in for the "body of Europe" that traveled and expressed craftsmanship, engineering with raw materials, and an advanced auditory, literary, and embodied language. And so the harpsichord was sent abroad as a diplomatic gift and ambassadorial demonstration. Key insights arise from events that inspired these letters. First, music alone, as a collection of pitches, did not seem to be the focus of attention in diplomatic ceremonies. Rather, the Siamese were more interested in how sound and ceremony aligned with the hierarchies of royal power. Next, few accounts remain for the specific music that was played,

[24] Early modern French writers were already embellishing reactions and describing motivations in publications already. The *Mecure galant* described in detail the Siamese embassy's visit but without verification from the Siamese themselves. For instance, Charles Rivière Dufresny wrote an imagined conversation in 1699 between a Parisian hosting a visitor from Siam in his *Amusemens sérieux et comiques*. In describing visits to the Parisian opera, Dufresny argues that "the traveller has no need to race from country to country; it is the countries which come to him. Without moving from one place, you travel from one end of the world to the other, and from the underworld to the Elysian Fields." Caroline Wood and Graham Sadler, eds., *French Baroque Opera: A Reader* (Aldershot and Burlington, VT, 2000), 25, quoted in Irving, "Lully in Siam," 412.

but where there are transcriptions, they have little to do with Siam specifically and merely recycled then-current racialized, orientalist tropes. Conventional analyses of music can only go so far in such situations. Finally, the Siamese themselves were reportedly less concerned with the way music works and more interested in the mechanical construction of the instruments as objects themselves.

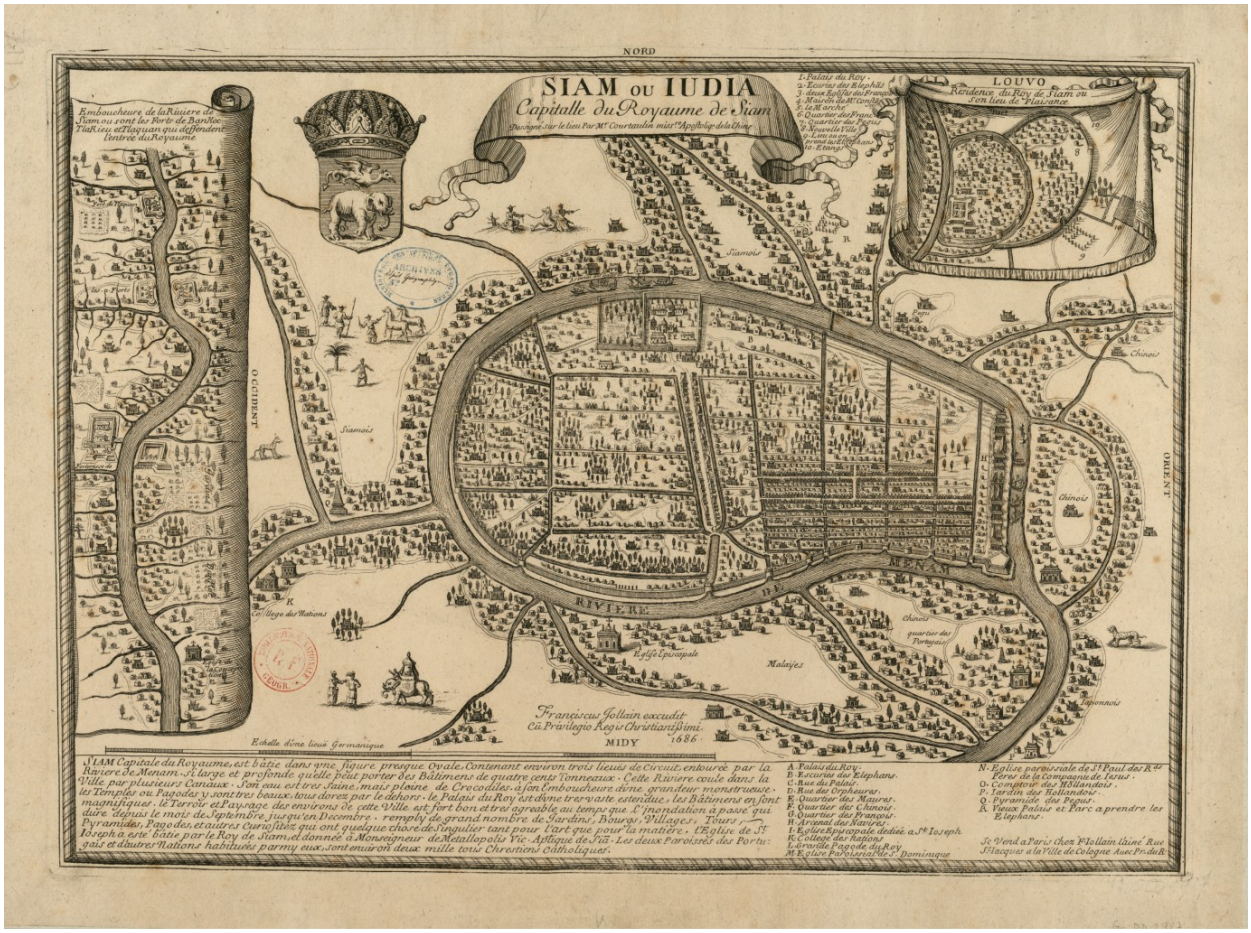

Figure 1. Map of Ayutthaya by Jean de Courtaulin de Maguellon, Paris, 1686. “Siam ou Iudia, capitalle [sic] du royaume de Siam,” Bibliothèque nationale de France, Département Cartes et Plans, CPL GE DD-2987 (7119), http://catalogue.bnf.fr/ark:/12148/cb40577015h.

Source gallica.bnf.fr / Bibliothèque nationale de France

Figure 2. The Royal Kingdom of Siam as it was prior to our journey in 1686. The largest of the ships at the bottom left of the map was an older *L'Oiseau*, here called *L'Oiseau Vaißeau de guerre de sa majesté* and it charts the 1686 route for Mr. Alexandre, le Chevalier de Charmont, French ambassador for Louis XIV. Pierre Du-Val, **"**Carte du royaume de Siam et des pays circonvoisins," Paris, 1686, Bibliothèque nationale de France, Département Cartes et Plans, GE BB 565 (14, 39), http://catalogue.bnf.fr/ark:/12148/cb42208557c.

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CHAPTER TWO

Les Androïds et la Liberté du Mouvement

In 1724, two years after he published his *Traité de l'harmonie réduite à ses principes naturels*, Jean-Philippe Rameau published his first manual for harpsichord, *Une Méthode sur la Méchanique des Doigts*, as part of his *Pièces de Clavessin*. In the *méchanique*, Rameau discusses *la liberté* to be an internal independence of movement of the hand and fingers while playing the harpsichord. While *la méchanique* in this title is often now translated as "technique," it is probably closer to "mechanics," since *méchanique* is no longer in common use, and *la méchanique*—unlike "technique"— closely aligned the harpsichord with the mechanical arts, placing it within the domain of machines, an interdisciplinary eighteenth-century fascination.

In this chapter, I propose that harpsichords were not just musical instruments that could realize musical compositions for the keyboard but that they also served as ontological instruments of anatomical knowledge in eighteenth-century France. For those who used them as metaphors, they confirmed universal truths about sight and sound according to the rationalist tradition and promoting new discoveries about the senses in the Enlightenment spirit of direct observation and experimentation. Scholastic rationalists and Enlightenment musicians and composers turned to the harpsichord as a laboratory-machine to make claims about freedom and independence of the body. The chapter will be broken up into sections, each representing anatomical regions of the musical body. First, I take up music-making androids and their maker's claims of total independence of movement, detailing the converging definitions of androids as objects of wide fascination that freed human behavior from the realm of the automaton. Makers of androids delineated the independence and articulatory process of body parts (fingers, hands,

mouths, breath) in order to free bodily experiences from automaticity. In the second section, I explore hands and "handedness" embedded in playing on the keyboard, an under-examined aspect of harpsichord music. Ears and (in)audibility follow in a discussion of the rationalist theories of the vibrations of a string (the *corps sonore*). I then conclude the chapter with eyes, considering the invention and arguments around the *clavecin oculaire*, or the ocular harpsichord.

Throughout this chapter, the through-line is Rameau and his *mèchanique* that offers different kinds of anatomical thinking through composing and playing on the harpsichord. Previously understudied, Rameau's harpsichord manual contains the same energy and enthusiasm for "discovery" as in his harmonic theories. To be sure, there is no mention of harmony in his *méchanique* to the degree of the earlier *Traité de l'harmonie*. Still, the manual contains the same pursuit of what is natural through self-study, self-awareness, and the use of technology. Moreover, the *méchanique*'s linkage to freedom of gesture and handedness shows a remarkable affinity with the definition of androids. When taken seriously, we find that the *méchanique* represents a confluence of energies, all vying for attention about the nature of discovery in the Enlightenment. Together, these sections delineate a near-complete machine-body held together with the connective tissue of the harpsichord. And because all these regions of the body represent facets of the ongoing project of establishing freedom and independence of motion and play, the result is a kind of music-making android in itself, independent in its constituent parts.

Musicking Androids

In 1669 a new definition of an android emerged; and it stuck. Gabriel Naudé, French physician, librarian, and personal doctor to Louis XIII, rejected the much earlier sense of the

word used by Albert the Great (Albertus Magnus) in association with his thirteenth-century invention of an android made of bronze that could talk. According to Naudé in his *Apologie*, Magnus was mistaken that the bronze man was an android because it lacked "muscles, lungs, epiglottis, and all that is necessary for perfect articulation of the voice."[1] It simply did not have "the parts and instruments" with which to speak.[2] Naudé's new definition of an android separated itself from lower forms of automata, such as clocks and water fountains. A true android was an automaton that not only resembled humans but also had all the necessary machinery to perform human activities independently. Moreover, an android demonstrated not just automaticity but also evidence of human freedom and imagination.

Though Naudé's definition appeared in various texts such as Pierre Bayle's dictionary (1695) and famously in an article, "Androïde," in the *Encyclopédie* edited by Denis Diderot and Jean d'Alembert (1751), the first android that fit Naudé's rigorous definition did not materialize until February 1738. At the fair on Saint-German on Paris's Left Bank, Jacques Vaucanson presented a flute-playing android. Half-man, half-goat, the android allegedly played twelve tunes in succession on its transverse flute using three internal bellows to blow and articulate air with a pliant tongue and from flexible lips of leather across the flute's aperture.[3] Padded, leather fingers depressed keys or covered holes of the flute (importantly, a standard performance instrument and not a trinket fife). Though the flute player was an iteration of a popular subject of a faun playing the flute (mainly Antoine Coysevox's statue, "Faunt jouant de la flute," 1709,

[1] Jessica Riskin, *The Restless Clock: A History of the Centuries-Long Argument over What Makes Living Things Tick* (Chicago: University of Chicago Press, 2026), 12.

[2] Ibid.

[3] The shepherd, faune, satyr triad were interchangeable. At times a faune, as in Coysevox's marble "Faune," appeared to be a scantily-clothed shepherd. Though not technically a satyr, it is accurate to call it a faune as what distinguished the faune from a man was its shepherdic setting, its monstrous nakedness and thus sensuality, and its musicality; ibid., 117.

concurrently on display at the Tuileries Gardens), it was unlike other faun-flute musical automata because it did not operate by illusion. Furthermore, after finishing construction of the android, Vaucanson also submitted a *memoire* to the *Académie Royale des Sciences*, the first registered study of the acoustics of the flute, showing that since Vaucanson was deeply invested in music studies and acoustics, and that the android was not just a mechanical monstrosity ("AS, Registre des procès-verbaux des séances" for April 26 and 30, 1738).[4]

Vaucanson's android garnered an intense and enthusiastic reaction. The Académie, by way of Fontenelle, responded in May 1738 to his memoire with support:

> The Academy having heard the reading of a Memoir by Monsieur de Vaucanson containing the description of a wooden statue, copied from Coysevox's "Faune" in marble, which plays the transverse flute, on which it performs twelve different arias with a precision which merited the attention of the public, considered that this machine was extremely ingenious; that the author had to employ simple and new means, both to give the fingers of this figure the necessary movements and to modify the wind which enters the flute, by increasing or decreasing its speed according to the different tones, by varying the arrangement of lips and moving a valve that performs the functions of the tongue; finally, by imitating by art all to which man is obliged, and in addition, the Memoir of Monsieur de Vaucanson had all the clarity and precision of which this matter is susceptible, which proves the intelligence of the author and his great knowledge in the different parts of mechanics.[5]

[4] Jacques (de) Vaucanson, *Le Mécanisme du Fluteur Automate, Presenté a Messieurs de l'Académie Royale des Sciences* (1738), digitized facsimile by the Bibliothèque nationale de France, https://gallica.bnf.fr/ark:/12148/bpt6k1511726m/f5.item.

[5] "L'Académie ayant entendu la lecture d'un Mémoire de Monsieur de Vaucanson, contenant la description d'une Statue de bois, copiée sur le Faune en marbre de Coysevaux, qui joue de la Flûte traversière, sur laquelle elle exécute douze airs différens, avec une précision qui a mérité l'admiration du public, et dont une grande partie de l'Académie a été temoin; elle a jugé que cette machine étoit extrémement ingénieuse, que l'Auteur avoit sçû [sic] employer des moyens simples et nouveaux, tant pour donner aux doigts de cette Figure, les mouvements nécessaires, que pour modifier le vent qui entre dans la Flûte, en augmentant ou diminuant sa Vitesse, suivant les différens tons, en variant la disposition des lévres, et faisant mouvoir une soûpape qui fait les fonctions de la langue; enfin, en imitant par art tout ce que l'homme est obligé de faire; et qu'outre cela, le Mémoire de Monsieur de Vaucanson avoit toute la clarté et la précision dont cette matiére est susceptible: ce qui prouve l'intelligence de l'Auteur, et ses grandes connoissances dans les différentes parties de Mécanique. En soi de quoi j'ai signé le present Certificat." Fontenelle, "Extrait des Régistres de l'Académie Royale des Sciences du 30 Avril 1738," 19-20 (Paris: 3 May 1738), in *Vaucanson, Le Mécanisme de Fluteur Automate: Présenté à Messieurs de l'Académie Royale des Sciences* (Paris: 1739).

When it was moved to the Hôtel de Longueville, seventy-five people a day visited at an expensive admission of three livres, about a week's pay for the average Parisian.[6] Vaucanson's skill as a celebrated anatomist and now inventor did not go unnoticed. One viewer, admiring the anatomical precision of Vaucanson's flute-player, praised its "mechanics" that executed an embouchure and fingering. The flute-playing faun had "an infinity of wires and steel chains… [which] form the movement of the fingers, in the same way as in living man, by the dilation and contraction of the muscles. It is doubtless the knowledge of the anatomy of man… that guided the author in his mechanics."[7]

Emboldened by his success, Vaucanson later created three more machines: a piper, a duck, and drummer. Often thought of as a trio, these other machines accumulated so much attention and recognition (importantly from Voltaire) that Vaucanson was admitted to the popular salon of Madame de La Poupelinière. There, he could converse with composer and keyboardist Rameau and Georges-Louis Leclerc (the Comte de Buffon), a successful naturalist and publisher of lushly illustrated books on exotic birds that frequently commented on the musicality of bird species, themselves often thought of as machines and automata.

[6] Riskin, *The Restless Clock*, 118.

[7] Abbé Desfontaines, "Lettre," quoted in ibid., 138.

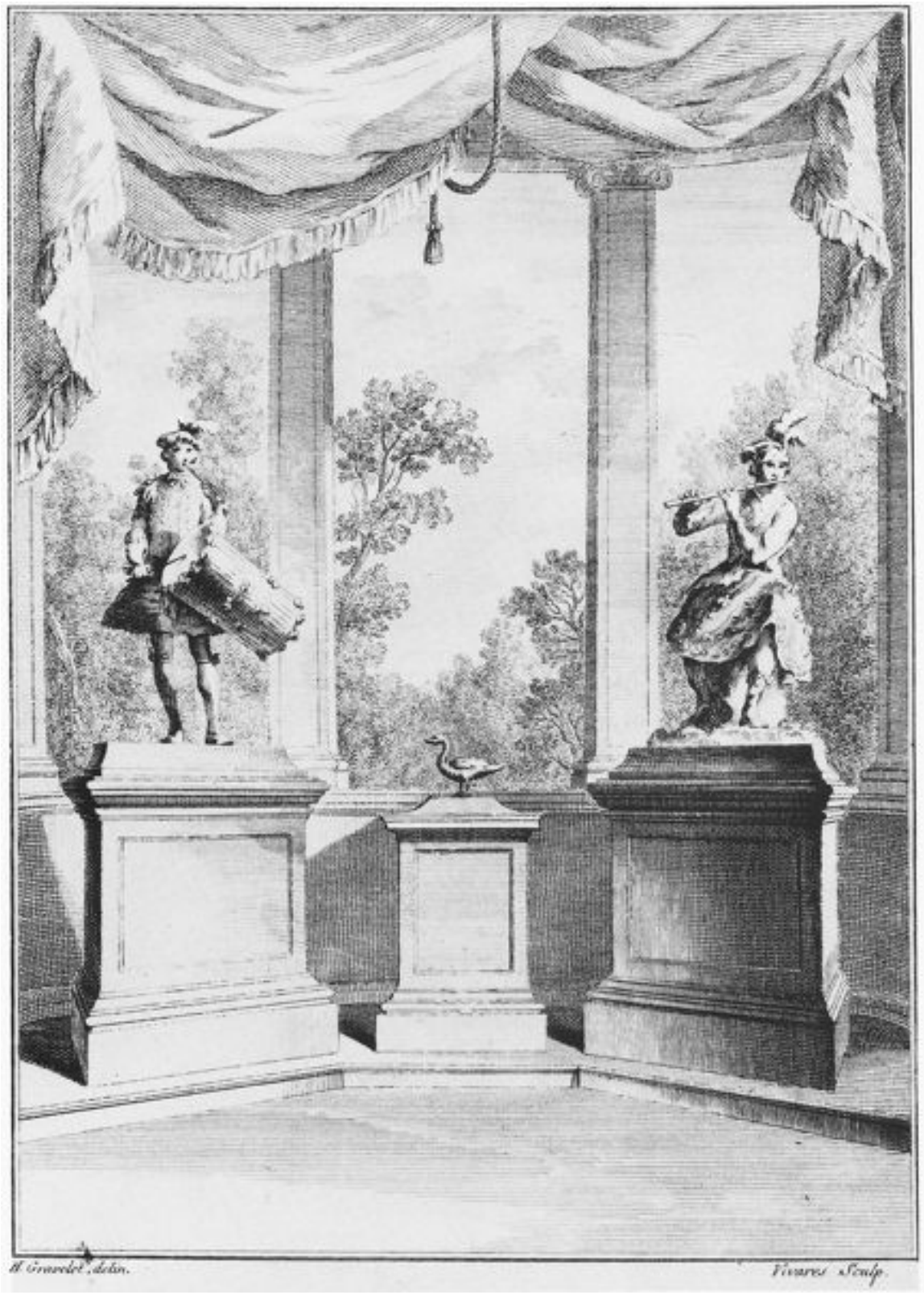
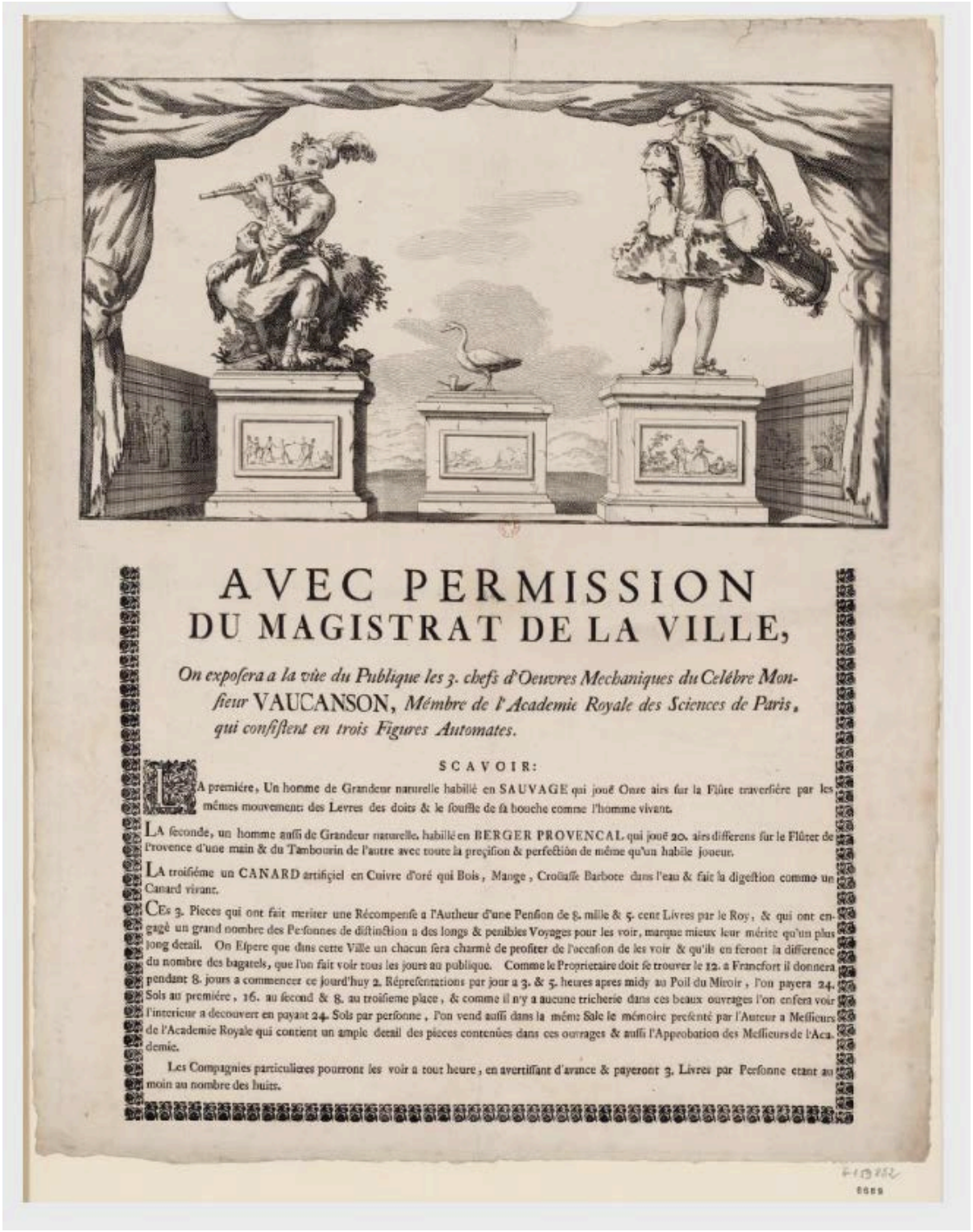


Figure 1. “The Flutist, the Piper, and the Duck” from Vaucanson’s memoire, *Mécanisme du fluteur automate*, 1738; Special Collections, Stanford Libraries, in Riskin, 121.



AVEC PERMISSION
DU MAGISTRAT DE LA VILLE,

On exposera a la vûe du Publique les 3. chefs d'Oeuvres Mechaniques du Celébre Monsieur VAUCANSON, *Mémbre de l'Academie Royale des Sciences de Paris, qui consistent en trois Figures Automates.*

SCAVOIR:

LA premiére, Un homme de Grandeur naturelle habillé en SAUVAGE qui joué Onze airs sur la Flûte traversiére par les mémes mouvement des Levres des doits & le souffle de sa bouche comme l'homme vivant.

LA seconde, un homme aussi de Grandeur naturelle, habillé en BERGER PROVENCAL qui joué 20. airs differens sur le Flûter de Provence d'une main & du Tambourin de l'autre avec toute la preçision & perfection de même qu'un habile joueur.

LA troisiéme un CANARD artificiel en Cuivre d'oré qui Bois, Mange, Croüasse Barbote dans l'eau & fait la digestion comme un Canard vivant.

CEs 3. Pieces qui ont fait meriter une Récompense a l'Autheur d'une Pension de 8. mille & 5. cent Livres par le Roy, & qui ont engagé un grand nombre des Personnes de distinction a des longs & penibles Voyages pour les voir, marque mieux leur mérite qu'un plus long detail. On Espere que dans cette Ville un chacun sera charmé de profiter de l'occasion de les voir & qu'ils en feront la difference du nombre des bagatels, que l'on fait voir tous les jours au publique. Comme le Proprietaire doit se trouver le 12. a Francfort il donnera pendant 8. jours a commencer ce jourd'huy 2. Répresentations par jour a 3. & 5. heures apres midy au Poil du Miroir, l'on payera 24. Sols au premiére, 16. au second & 8. au troisieme place, & comme il n'y a aucune tricherie dans ces beaux ouvrages l'on enfera voir l'interieur a decouvert en payant 24. Sols par personne, l'on vend aussi dans la même Sale le mémoire presenté par l'Auteur a Messieurs de l'Academie Royale qui contient un ample detail des pieces contenûes dans ces ouvrages & aussi l'Approbation des Messieurs de l'Academie.

Les Compagnies particulieres pourront les voir a tout heure, en avertissant d'avance & payeront 3. Livres par Personne etant au moin au nombre des huits.

Figure 2. Advertisement on the occasion of the presentation of Vaucanson's automata, 1749-1750. Bibliothèque nationale de France. Département Estampes et Photographie, RESERVE QB-201 (100)-FOL. https://gallica.bnf.fr/ark:/12148/btv1b8409201z/f1.

Importantly, Rameau's *méchanique des droigts* also approached freedom of the body to play music via the employment of machines. If we imagine Rameau's manual as an earlier manifestation of Vaucanson's musical androids, retaining the anatomizing spirit of Naudé's definition, we can more easily understand Rameau's harpsichord manual as an intermediate step toward the "faun," all of which share a conception of autonomy and freedom of parts to execute human activity, whether in speech, harpsichord, or flute. The *méchanique* was to "renew in the fingers the movement with which nature has endowed and for increasing their freedom."[8] These detailed instructions to the freedom and independence of motion feature throughout his opening instruction to his *méchanique*, but they also graft onto Naudé's earlier criteria for the independence and anatomization of motion in androids. Rameau's *méchanique* represents a critical turn toward activating human imagination, suggesting that interfacing with the harpsichord created opportunities to discover the independent parts of the performer's body. In short, though a machine, the harpsichord was also an instrument of autonomy that propagated liberty and imagination ("*la liberté*" and "*la promtitude de notre imagination*" in Rameau's words), which were part of a nexus of Enlightenment ideals. In her study of "carnal musicology," Elisabeth Le Guin also sees the liberatory potential, or "hopefulness," in the mechanization of motion and systematization of the body in eighteenth-century treatises and manuals for playing music.[9] "Mechanistic embodiment," she writes

> was an expression of a belief that bodies—those most opaque, most universal manifestations of humanness—could finally be explained in all their marvelousness.

[8] "*renouveller dans les doigts le mouvement dont la nature les a douez et pour en augmenter la liberté*," Jean Philippe Rameau, *Pièces de Clavessin avec une Méthode pour la Méchanique des Doigts où l'on Enseigne les Moyens de se Procurer une Parfaite Éxecution sur cet Instrument* (Paris: Charles-Etienne Hochereau and Boivin, 1724), Digitized facsimile. Bibliothèque nationale de France. Département Musique, D-8403 (1). https://catalogue.bnf.fr/ark:/12148/cb397912501. For English and German translations, see ibid., Erwin Jacobi, ed., (Kassel: Bärenreiter, 1959), 16.

[9] Elisabeth Le Guin, *Boccherini's Body: An Essay in Carnal Musicology* (Berkeley and Los Angeles: University of California Press), 150.

> Thus illness would be conquered; thus dancers and instrumentalists would be able to achieve perfect expressivity, merely by recourse to movements that felt right; thus the most cherished human communications would at long last become infallible.[10]

Contrary to our present apprehensions about machine labor, mechanization could free bodies from mystery through systemization of the body and disciplining of skills. Mechanization offered clarity, form, and new levels of discovery of "natural" expression since systematization opened up potentialities thus far obscured or, if known, executed with greater ease and efficiency.[11] The harpsichord was just such an instrument of method that could allow for this systemization and discipline and thus open up new realms of expressive possibilities.

Some may argue that Rameau's instructions are merely for producing the correct and easiest tone from the instrument, having little to do with the larger notions of autonomy, freedom, liberty, and discovery that were "the spirit of the moment."[12] I argue that reading the *méchanique* as Rameau's involvement in the philosophical and scientific discussions of eighteenth-century France reveals how the Enlightenment ideals of discovery through technology and liberty of the mind were "baked into" his pedagogy and use of instruments. Jonathan Sterne writes in the *Audible Past* that makers of early sound recording technology did not just dazzle for utility and entertainment, but also "encapsulated a whole set of beliefs about the age and place in which they lived. Sound-reproduction technologies represented the promise of science, rationality, and industry and the power of the white man to co-opt and supersede domains of life

[10] Ibid.

[11] Ibid., 148-149.

[12] Though there is no distinct word for liberty and freedom (just *la liberté*), I distinguish liberty from freedom in the following way. Liberty denotes a limited and situated freedom within a system of social parameters. One thing I've thought of is expanding the discussion on how the metaphor of handedness works: independence of bodily motion, particularly the hands, free themselves from the head (the regime) which seems to have some promise given Enlightenment emphasis on individual liberties but also the aspiration for free, unadulterated observations of the way the world works.

that were previously considered to be magical."[13] That can also be true of eighteenth-century technologies. That is to say, technologies *proceed* from ideas already in circulation. The harpsichord and its pedagogy are similar: they represented the promises of the sciences, rationality, and mechanical arts, all uniquely able to procure access to vast expanses of knowledge.

Handedness

Like Naudé, Rameau wrote anatomically of both the mechanics and the "suppleness of the fingers at their roots" ("*la soupless des doigts à leur racine"*). In addition, Rameau stresses how each element of the hand and arm—elbows, forearm, wrists, hands, and fingers—should stay independent and free in order to play the harpsichord well.

> Every finger must have its own movement, independent of the others: in other words, even when the hand has to be moved to a certain part of the keyboard, it is still necessary that the finger then used should drop onto the key by its own movement.[14]

To my knowledge, no one who has studied Rameau's writings or his music has historicized his use of the word *méchanique* to describe his "technique" or "manual." It is not a word that appears today with regard to music. There are nine unique definitions given in the 1694 *Dictionnaire de l'Académie française* for the term, with many dedicated to the sciences and mathematics (e.g., "Cette partie des Mathematiques qui à pour objet les machines"). But these are followed closely in the same entry by its adjectival form:

> Méchanique, adj., of all genres. Said of Arts which principally need the work of the hand(s). One divides the Arts into the liberal Arts and the mechanical Arts. Carpentry,

[13] Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke University Press, 2003), 9.

[14] "*Il faut que chaque doigt ait sou mouvement particulier & independent de out autre: de sorte que quand méme on est oblige de transporter la main à un certain endroit du clavier, il faut encore que le doigt dont on se sert pour lors, tombe sur la touche par son seul mouvement.*" In Rameau, *Pièces de Clavessin avec une Méthode pour la Méchanique des Doigts,* Jacobi ed., 17.

> locksmithing are mechanical arts. Also signifies a "sordid" means. A job very mechanical. This is very mechanical for a gentleman. They live in a mechanical way. It is low.[15]

Rameau's name for his manual, *la méchanique des doigts*, is thus almost redundant since the noun *méchanique* already means "of the hands." But Rameau's usage points to the more precise articulatory processes of the fingers. In using a term that was both grounded in the sciences and in the technical arts, Rameau introduced both his *méchanique des doigts* into instrumental learning and mechanical manipulation into the realm of the liberal art of music-making and composing.

At the same time, caution should be observed in placing trust in this dichotomy between the liberal and the mechanical arts and how we use the division to categorize instruments. Penelope Gouk has written extensively about the use of instruments as "the key link between the world of musical, magical, and 'scientific' practice, [which] also mediate between social and cognitive levels of experience."[16] Also rejecting the binary is musicologist Rebecca Cypess, who writes that "[musical] instruments were links between 'liberal' and 'mechanical' thought."[17] Haskins and Silverman meditate on this problem of whether instruments are scientific or not. They write that a serious

> problem with studying the unfamiliar in science is that we dissolve the disciplinary boundaries of our subject. We have no objective criterion by which we can say whether an instrument or idea is 'scientific' (among others). This is not altogether bad. By

[15] "Méchanique, adj. de tout genre. Se dit des Arts qui ont principalement besoin du travail de la main. On divise les Arts en Arts liberaux & en Arts mechaniques. la Menuiserie, la Serrurerie est un Art mechanique. Il signifie aussi, Sordide, mesquin. Un metier bien mechanique. cela est bien mechanique pour un Gentilhomme. ils vivent d' une maniere mechanique. Il est bas," "Mechanique," *Le Dictionnaire de l'Académie française*, tome 2 (1694), translation mine, *Dictionnaires d'Autrefois: Public Access Collection* (University of Chicago: The ARTFL Project), https://artflsrv03.uchicago.edu/philologic4/publicdicos/query?report=concordance&head=&q=mechanique&start=0&end=0.

[16] Penelope Gouk, *Music, Science, and Natural Magic in Seventeenth-Century England* (New Haven: Yale University Press, 1999), 21.

[17] Rebecca Cypess, *Curious and Modern Inventions: Instrumental Music as Discovery in Galileo's Italy* (Chicago: University of Chicago Press, 2016), 22.

> dissolving our own disciplinary boundaries, we can then ask the more important historical questions of how the instrument or idea was regarded by its creator and by those who used it, and how it fit *their* disciplinary boundaries (emphasis in original).[18]

The *Dictionarre*'s dichotomy had only some relevance to the mechanical and liberal arts, which not only coexisted but were also entangled. My interest here is to show how musical instruments offered new realms of discovery and stimulated debates compositionally, performatively, and intellectually.

Rameau has been studied as a figure deep in conversation regarding the liberal arts with Voltaire, Castel, Montesquieu, and Rousseau. In a large sense, his music has been regarded through the lens of his compositional decisions and his theories of harmony and drama. But because Rameau calls his manual and harpsichord book a *méchanique*, Rameau places himself and the harpsichord somewhere between the liberal and mechanical arts. On one hand, his compositions and theories of music fall squarely in the liberal arts. On the other, his *méchanique* allows us to look at gesture, handedness, and other aspects of the mechanical arts as a legitimate opening into the question of how instruments are used as a means of discovery, particularly with regard to the harpsichord. Moreover, the *méchanique* was typical of his overall theoretical approach in that the harpsichord becomes another means of discovering knowledge and truths about nature.

In fact, the notion that musical instruments were like other technical instruments hearkens back a century earlier when the music-making body was not conceived as altogether "natural"; the mouth as a unit constituted a lyre, with the teeth the plectrum, and the tongue the activating hand. As Cypess writes, the seventeenth-century Giambattista Marino's *Dicerie sacre* (1614) compared the mouth to a "printing press, a key, a bell, a bridle, a rudder, a pen, and paintbrush,"

[18] Thomas L. Hankins and Robert J. Silverman, *Instruments and the Imagination* (Princeton: Princeton University Press, 1995), 72.

finally settling on the lyre as "the machinery of musical instruments becomes the new constituency of the natural voice."[19] Moreover, Cypess argues that "early modern philosophers and inventors also began to see new possibilities in instruments themselves," studying instruments, such as clocks, telescopes, prisms, and barometers as metaphors and practices for the "disciplining of knowledge, ascribing a new level of importance to the development of physical memory—a habitus, or "disposition of the hand" (*dispositione di mano*).[20] They no longer saw instruments as technology employed to perform repetitive tasks and procedures already in circulation, but rather "conceived of instruments… as a starting point in the open-ended exploration that led to the development of new knowledge."[21] Within my argument, this means that consideration of musical instruments could reveal knowledge of the human body and many of its workings, including how, ironically, it can achieve autonomy through employing instruments and machines. Cypess's discussion is particularly relevant because she demonstrates "the ways in which instrumental music was used as a vehicle of exploration, invention, and the formation of knowledge."[22]

Ironically, the harpsichord becomes an instrument that facilitates bodily autonomy and a path to *liberté*. In fact, freedom seems to be the primary concern. The specific bodily demands of the keyboard are unlike other instruments in that it does not offer as many postural options to the player: you must sit in a rigid position, suspend your elbows in a particular fashion and elevation,

[19] Cypess, *Curious and Modern Inventions*, 13-14. John Dowland also plays with this idea in his song "Unquiet Thoughts," from his *First Book of Songs and Ayres* (1597): "Unquiet thoughts your civil slaughter stint, | and wrap your wrongs within a pensive heart: | and you my tongue that makes my mouth a mint, | and stamps my thoughts to coin them words by art." My thanks to Elizabeth Upton for the reference.

[20] Ibid., 14.

[21] Ibid.

[22] Ibid., 15.

and place your fingers to touch the keys at just the right angle and pressure. You must also look composed. Other instruments, such as the violin, allow for greater range of motion turning either to move forward toward closer view of music or to take in panoramic view. The violin can be played standing or sitting, and the body from waist-up is generally free to rotate, sway, and stay in constant motion depending on the comfort level of the performer. That is to say, where the keyboard is stationary and carefully, pedantically positioned, other instruments are less restrictive concerning the placement of the player's body. Even the instrument itself is a semi-permanent fixture and was used as much as a piece of furniture and a display item than as an instrument to be played. You must accommodate the instrument's size and placement; it directs your movement around a room rather than it yielding to you. Indeed, in contrast with other instruments that might seem to bend easily to your demands, the demands on the body imposed by the keyboard seem to outweigh what it might return. Even so, Rameau writes that constant, targeted practice can free the body from unconscious and fossilized habits of motion. To stress this point, he uses the example of walking. It is taken for granted, Rameau writes, as not so much a natural but a learned behavior:

> The little exercise we give to the movement of the fingers necessary for playing the harpsichord does not enable their freedom of movement to become developed: moreover our particular habits cause the fingers to develop movements so opposed to those required for the harpsichord as to represent a constant setback to this freedom.[23]

Perhaps, then, it is the conflict with the machine—the harpsichord—that liberates the body. Rameau writes that there is a barrier in achieving freedom of execution by the harpsichord itself: there is "the added difficulty of trying to depress the keys [that] might be capable of

[23] "*Le peu d'exercice que nous faisons au contraire, du mouvement necessaire aux doigts pour toucher le Clavessin, ne permet pas que leur liberté se developpe: d'ailleurs nos habitude particulieres font contracter aux doigts des mouvemens si conctraires à celai qu'exige le Clavessin, que cette liberté en est sans cesse traverse,"* Rameau, *Pièces de Clavessin avec une Méthode pour la Méchanique des Doigts*, Jacobi, ed., 16.

destroying the perfection of their [the fingers'] movement. One must therefore carefully ensure that the resistance of the keys does not adversely affect the movements of the fingers."[24] In this way, the instrument itself becomes one of self-discovery and the freeing of what Rameau called thoughtless "bad habits" of mind and body, which may track as an Enlightenment virtue against automaton-like ignorance. Rameau writes: "all the steps which ought to be taken to acquire suppleness" will also unify execution with "that alertness of imagination."[25] In the following I will offer an analysis of Rameau's *pièce* "*Les trois mains*," looking and listening for mechanical, gestural "handedness" often ignored by musicologists. My analysis includes noticing the resistant machine as well as how the articulatory liberation and imagination maintains the integrity of Naudé's sense of the "android": a human assemblage of individual and separate parts that performs exclusively human actions.

"Les Trois Mains" is a character piece that appears in *Nouvelle Suites de Pièces de Clavecin* (1727) as the fourth, central item of a seven movement suite; it follows the prototypical allemande, courante, and sarabande and is followed by two more character pieces and a gavotte and six doubles.[26] The challenge of "The Three Hands," a courtly fandango in triple meter, is to create an auditory illusion of a single harpsichordist playing with three hands, an effect accomplished through absurd hand crossings. If maintaining independence while interfacing with the machine is what separates humans from machines, then the player of "Les Trois Mains" achieves freedom from the machine, repeatedly, through duplication, augmentation, and splitting

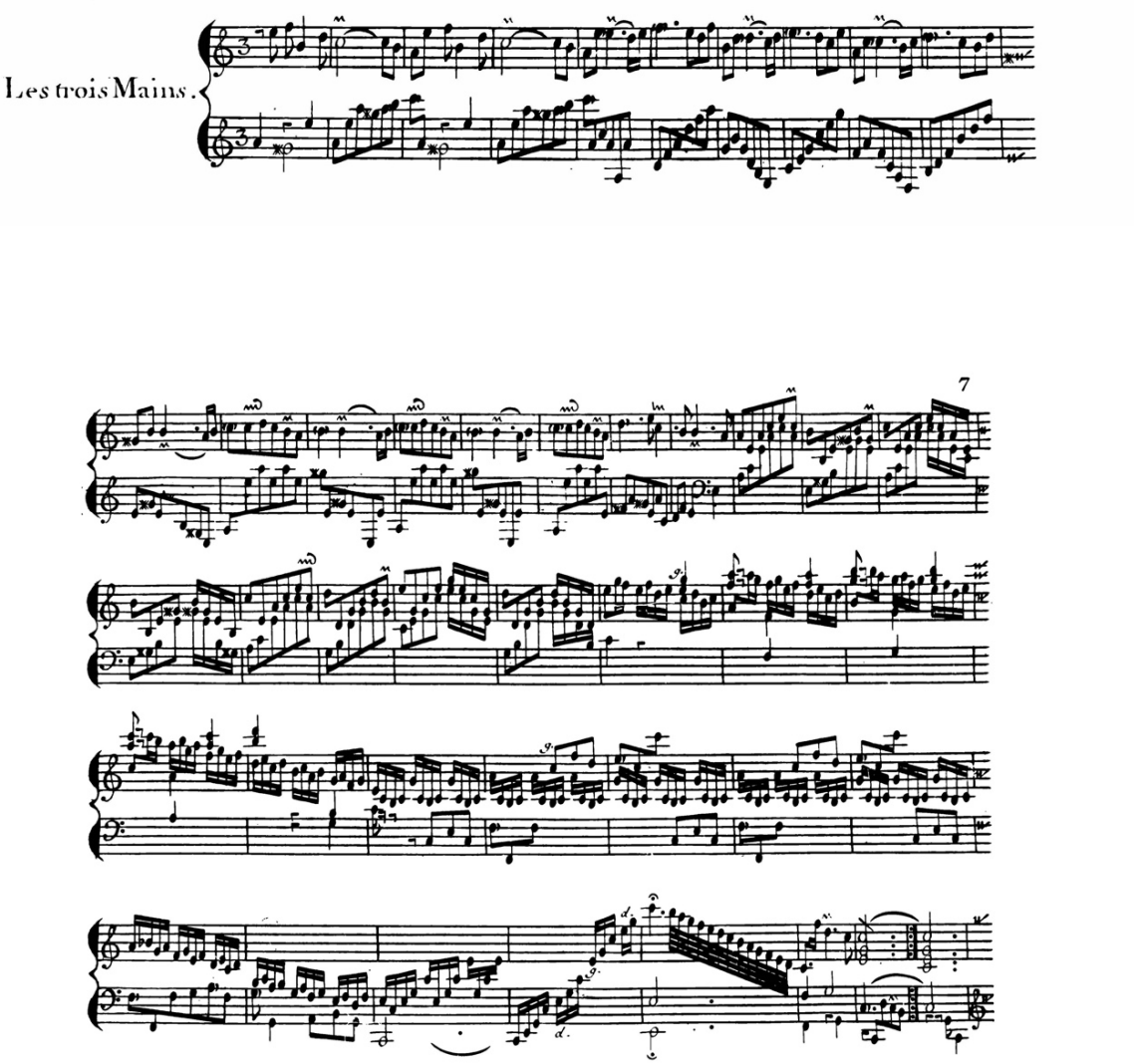
[24] "*celle qu'on auroit encore à leur faire enfoncer les touches, seroit capable de détruire la perfection qui doit se trouver dans leur mouvement. Il faut donc bien prendre garde que la resistance des touches ne s'oppose au mouvement des doigts*," ibid., 18.

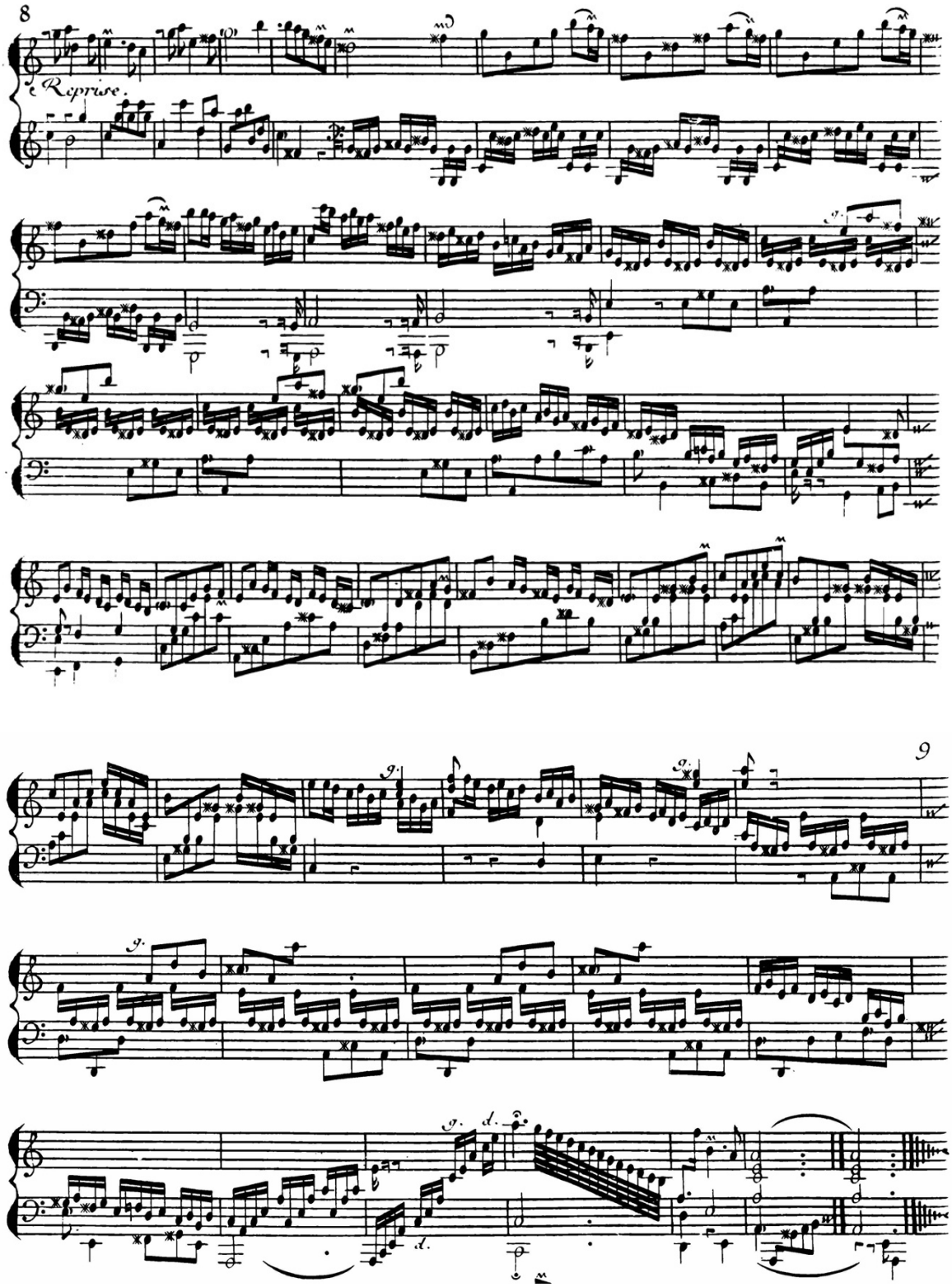
[25] "*toutes les mesures qu'il faudroit prendre pour l'acquerir* […] *la promptitude de notre imagination*," ibid., 16.

[26] Rameau, *Nouvelles Suites de Pieces de Clavecin… avec des Remarques sur les Différens genres de Musique*, (Paris: Boivin and Le Clerc, 1727), 6-9, digitized facsimile, https://imslp.org/wiki/Special:ReverseLookup/319351.

of the hands into three. Most of these effects are achieved by hand crossings. The left-hand crosses over the right twenty-three times, indicated with “g” (for *gauche* or left hand) or by notation in the bottom stave. But other effects, such as harmonic sequences, the passing of “roaming” motives from one hand to another, ornamentations that confuse the ear, and gestures of the hand-crossings all combine to triplicate the hands (Example 1).

Example 1. Rameau’s “Les Trois Mains,” from *Nouvelle Suites de Pièces de Clavecin*, 1727.




8
Reprise.
9

A fandango is an apt choice of genre since fandangos were vigorous, competitive dances for two (and in this case, perhaps three) but which also incorporated *palmas* (Spanish, hand clapping) for accompaniment. Managing three appendages of yourself where there was once only two, calling and responding, complimenting and disagreeing all require both control and independence of the select body parts to operate the dance freely. In this sense, the harpsichord is a machine that allows for a keyboardist not only to appear to grow a new appendage but also to liberate themself from the machine that opposes freedom and imposes automaticity. The keyboardist then is able to use the instrument to put on display their ability to divide their body up into an assemblage of independent parts performing human actions. In conventional harpsichord technique, the fingers are normally completely "glued" to the harpsichord keyboard, unable to move above a certain height away from the keys so as not to sever the contact with the plectra and string. But in "Les Trois Mains," Rameau forces the player frequently to pull their hands away, resisting the keyboard's gravitational pull. Moreover, when the players hands do regain contact with the instrument, they become a different voice or hand and assume a new identity. The entire piece is an exercise in resisting the machine and gaining greater autonomy.

Hearing the unmeasured prélude

Rameau also used the harpsichord's sound as a means to argue for his theories on harmony. The tuning schemas that he constructed for the keyboard are still in use in some early music performance circles, and they demonstrate Rameau's attempts to prove the fundamental truth of harmony that still governs common practice harmonic composition and education. Though it is often taught that Rameau's theory of harmony was tertian and chordal and that the melody derived from harmony, his theories also insist that there is a fundamental bass that stabilizes

those tertian harmonies regardless of what pitch is actually sounding. Thus, inversions of chords in various registers all retain their integrity no matter the vertical alignment or positioning of the pitches. This was a fundamental truth that revolutionized the conception of what harmony was. And even though it was about sounding behavior of music, thought another way, Rameau was arguing for the tacit retention of harmonic identity, operating much like the relationship of meter to rhythm. Thus, meter is an abstract conception of the organization of time across an entire enclosed piece of music, whereas the rhythm is the actual realization of that metrical organization. The rhythm can agree or depart from the meter, and yet the metrical identity of the measure is preserved unless for deliberate compositional effect. Similarly, harmonic realization for Rameau was what manifest on the surfaces but was governed by the harmonic frameworks of the piece, undergirding and often tacit to that realization.

One interesting genre that I would like to explore is the French unmeasured prélude. This small but robust genre (with only about fifty known works) was favored by French composers of the harpsichord beginning in the mid-seventeenth century, particularly by Louis Couperin, Jean-Henry d'Anglebert, Jacques Champion de Chambonnières, Jean-François Dandrieu, Nicolas Antoine Lebègue, Louis Marchand, Élisabeth Jacquet de la Guerre, Gaspard Le Roux, François Couperin, and later, Rameau. The harpsichord suite often opened with an unmeasured prélude, which, by definition, did not have metrical markings. They sometimes lacked rhythmic values for some pitches altogether. While the ordering of the pitches was generally indicated, these were loose, with pitches often stacked or clustered together, leaving it for the performer to choose how to articulate them. Sustaining pitches was indicated with long slurs and elisions. Moreover, composers included few ornaments (or *aggrément*); performers must simply "know" how to realize within the parameters of good taste and conventions. Taken together, these features

indicate that the unmeasured prélude rests in the realm of harmonic ideas with minimal obstructions of rhythmic and metrical or even melodic frameworks to adhere to. The ideational challenge posed by the unmeasured prélude resides in its asking the harpsichordist to hold together a loose assemblage of pitches and bring them together into coherence, and to control them under a harmonic framework. Of about fifty works, both single and multi-movement or sectional préludes (sometimes with indications of "mouvement" or "suitte" to enclose sections), all vary in their notational specificity with later préludes increasing in notating pitch lengths at diminutions of the whole and half note values. That is to say, diminutions do not serve as melodic fragments or passages. Even so, these diminutions often work to elide harmonic sequences or stand as written out ornaments that are of more structural design. In all variants of the prélude, the range of the performer is on display. The challenge for the performer is to employ strategies that create coherency, using counterpoint, cadences, alternate tunings, ornaments, and different temporalities. The absence of a prescriptive model but rather a loose assemblage of techniques creates space for freedom.

Unmeasured préludes were not like dance forms. They often implied duple meter, the most unaccented of meters and thus offered more freedom to explore harmonic shifts. These préludes were also related to the toccata (meaning to "touch" or "try out" the keyboard) and other prélude forms that were really more about moving through harmonic regions than focused on melodic or motivic coherency. The unmeasured préludes resist predictability in two ways: first controlling the toolkit of strategies available to the performer to employ at any given time so as to determine performance outcomes; second, denying future-oriented procedures with its absence of cadential stress, counterpoint, and expectations of melodic and harmonic sequences.

The préludes ground listeners and performers in suspended "nowness," which interrupts expectations for specific outcomes.

In the *ancién regime*, the unmeasured prélude and the suspension of time was, as Susan McClary writes, a means of trapping and aesthetically anesthetizing Louis XIV's subjects under his absolutist control. "Regulation" of time, or what the French called *raison* in music, "embodied timeless truths; it allowed one to luxuriate in an idyllic cocoon, a paradise on earth" that was ultimately nefarious in that it maintained the structures of absolutist distraction and power.[27]

> By contrast, the premises of contemporaneous Italian music enacted ideals of progressive thought: the consistent sacrifice within the music of past and present for the sake of ongoing movement into the future. It is the Italian version of tonality that best approximates the restless habits of questioning, discarding, and projecting forward on the quest for distant goals that we identify with Enlightenment Reason.[28]

Later, however the unmeasured prélude was repositioned as a means of attaining freedom and the "violent collapse of a way of being."[29] This may explain the intense resistance of the Italian style of opera when d'Alembert satirized *la Guerre des bouffons*:

> All liberties are interrelated and are equally dangerous. Freedom in music entails freedom to feel, freedom to feel means freedom to act, and freedom to act means the ruin of states. So let us keep French opera as it is if we wish to preserve the kingdom and let us put a brake on singers if we do not want to have liberty in speaking to follow soon afterwards.[30]

Of course, d'Alembert was in favor of freedom and liberty, just as much as his partner, Diderot. D'Alembert's satire caricatured loyalists to Lully and the old regime of aesthetic and state

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[27] Susan McClary, *Desire and Pleasure in Seventeenth-Century Music* (Berkeley and Los Angeles: University of California Press, 2012), 256.

[28] Ibid.

[29] Ibid.

[30] Ibid.

dominance. These same Lullyists reacted with vitriol against the free harmonic and melodic forms in Rameau's operas, the first composer to be called "baroque" and monstrous. Diderot described Rameau in *Rameau's Nephew* (posth., ca. 1805), reflecting to himself when speaking of Jean-Philippe:

> He is the nephew of the famous musician who delivered us from the plainsong of Lully that we had intoned for over a century, and who wrote so much visionary gibberish and apocalyptic truth about the theory of music—writings that neither he nor anyone else ever understood. We have from him a number of operas in which one finds harmony, snatches of song, disconnected ideas, clatter, flights, triumphal processions, spears, apotheoses, murmurings, endless victories, and dance tunes that will last for all time.[31]

Of course, Diderot did not mean that change was wrong, even if uncomfortable. Though Rameau at this point had had his infamous falling out with the *academiciens*, in the same text, Diderot explains to Rameau's nephew that

> men of genius are usually odd, or—as the saying goes, 'great wits are sure to madness near allied'; but that doesn't change the truth that ages without genius are despised. Men will continue to honor the nations where genius thrived. Sooner or later they put up statues to them and call them benefactors of the race… I believe that although a lie may serve for a while, it is harmful in the long run; and, contrariwise, truth necessarily is best in the long run, even though it may do harm at the moment. From which I incline to think that the man of genius who denounces a common error or who establishes a general truth always deserves our veneration. Such a man may fall a victim to prejudice or existing law; but there are two kinds of laws—those based on equity, which are universally true, and those based on whim, which owe their force on to blindness and local necessity.[32]

That is all to say that Diderot had faith in releasing the grip of absolutist monarchy ("local" lies and "blindness") over truth, and that "ages without" independence of mind are "despised" because they are not truly free. It is precisely this level of freedom in Rameau's treatment in the

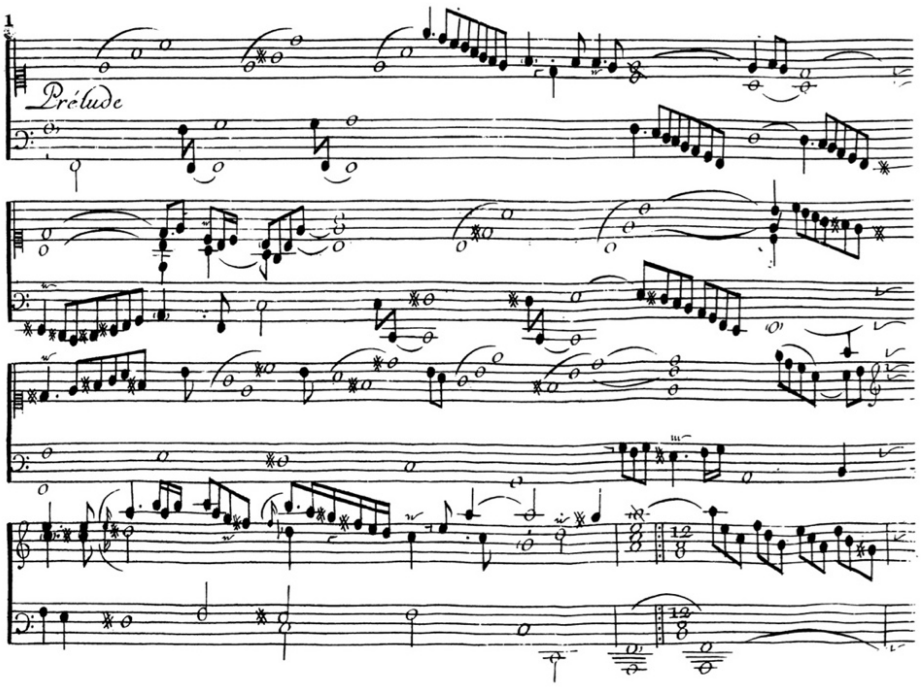
[31] Denis Diderot, *Rameau's Nephew* (MS, 1761-1762, revised 1773-1774; published in German by Johann Wolfgang von Goethe, 1805; published in French by Georges Monval, 1891), translated by Jacques Barzun and Ralph H. Bowen, *Rameau's Nephew and Other Works* (Indianapolis and Cambridge: Hackett Publishing Company, Inc., 1956, 2001 reprint), 10.

[32] Ibid., 13.

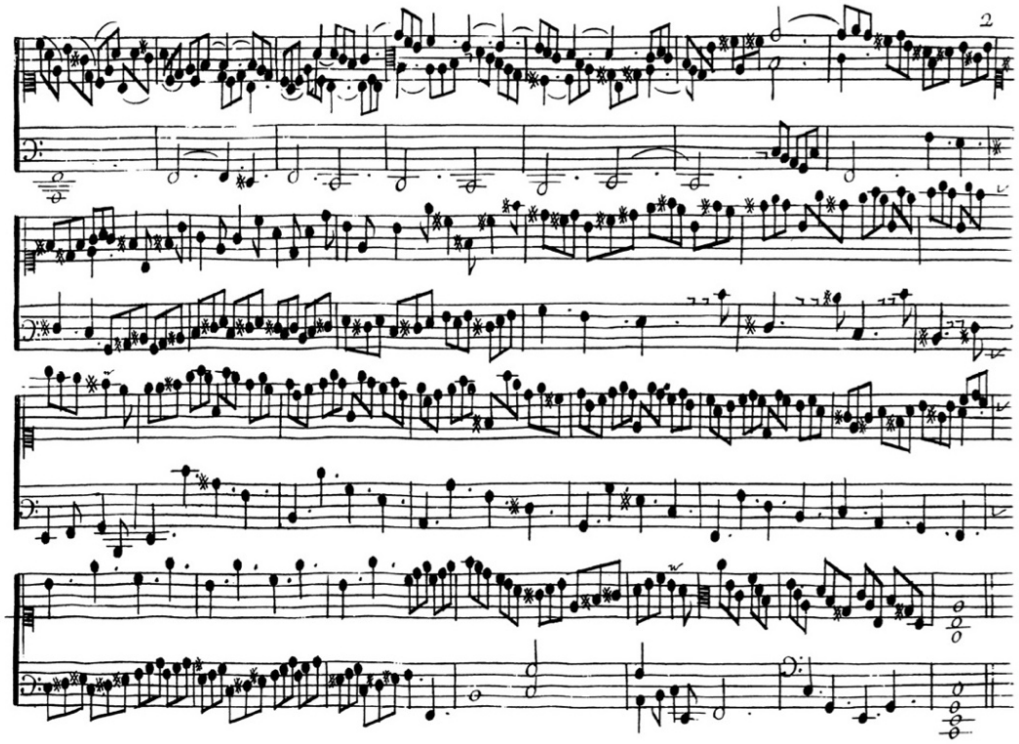
unmeasured prélude and the opportunities it offers the performer that exercises that independence.

Rameau published only one prélude in Paris in 1706 in his *Premier Livre de Pièces de Clavecin*, perhaps the last codified unmeasured prélude in the French tradition (Example 2).[33] More tightly packed than préludes of an early generation, Rameau's unmeasured prélude fits itself neatly in four staves on one printed page, with a quick, dance-like "mouvement" immediately following. This is in contrast to d'Anglebert's sprawling hanging stanzas, the shortest of which still requires three printed pages.

Example 2. Rameau, Opening Prélude to *Premier Livre de Pièces de Clavecin,* 1706.

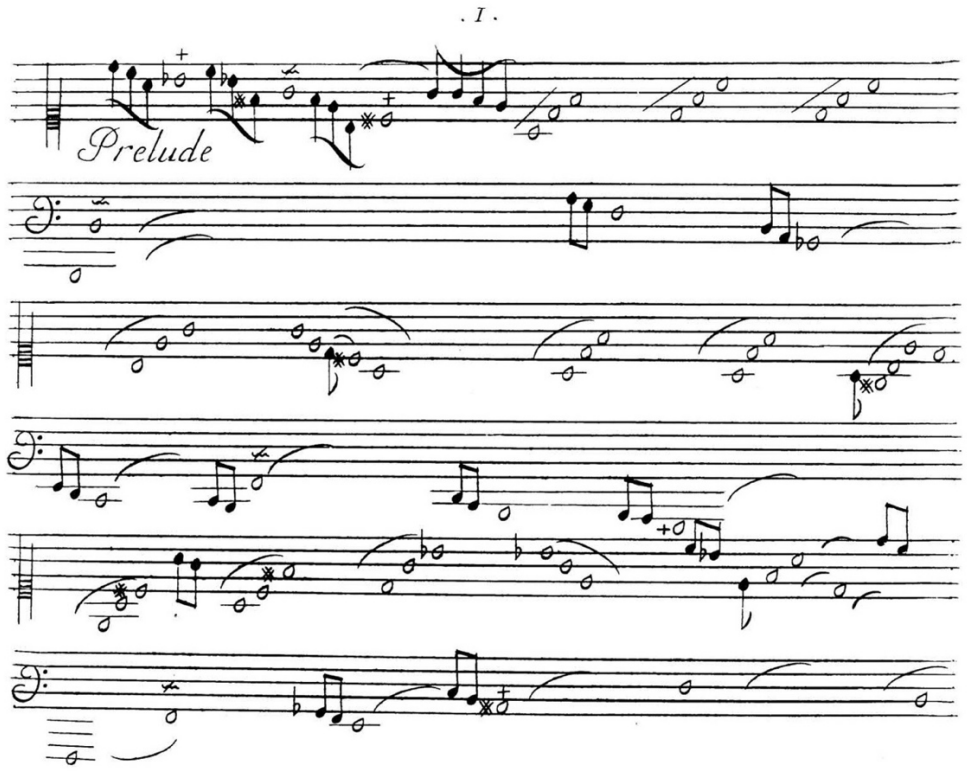


[33] Only a year before, Gaspard Le Roux had published four préludes in his *Pièces de Clavessin* in Paris, but there were no further publications of new unmeasured préludes after Rameau's *Premier Livre*. Élisabeth Jacquet de la Guerre published a second book of *Pièces de Clavecin qui peuvent se jouer sur le violon* in 1707, but it contained no préludes; Rameau, *Premier Livre de Pièces de Clavecin* (Paris: Foucau(l)t, 1706), digitized facsimile, Bibliothèque nationale de France, Département Musique, RES VM7-677, https://catalogue.bnf.fr/ark:/12148/cb148242648.



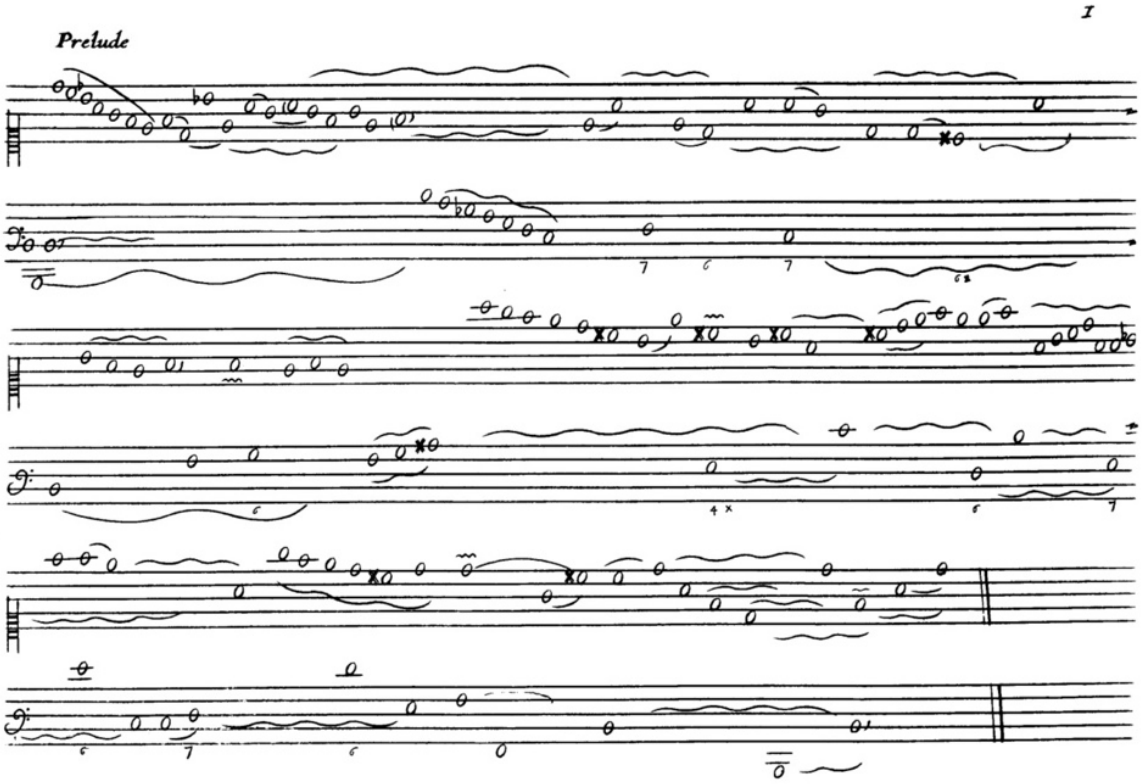
The clarity of the notation may be a result of more refined typesetting of ornaments, the binding of staves (treble and bass), and new practices of aligning stacked pitches and figures in the early eighteenth century. The difference can easily be spotted in d'Anglebert's 1689 préludes or the préludes in Élisabeth Jacquet de la Guerre's *Premiere Livre* in 1687 (Example 3).

Example 3. Opening to Jacquet de la Guerre's first Prélude, *Premier Livre*, 1687.



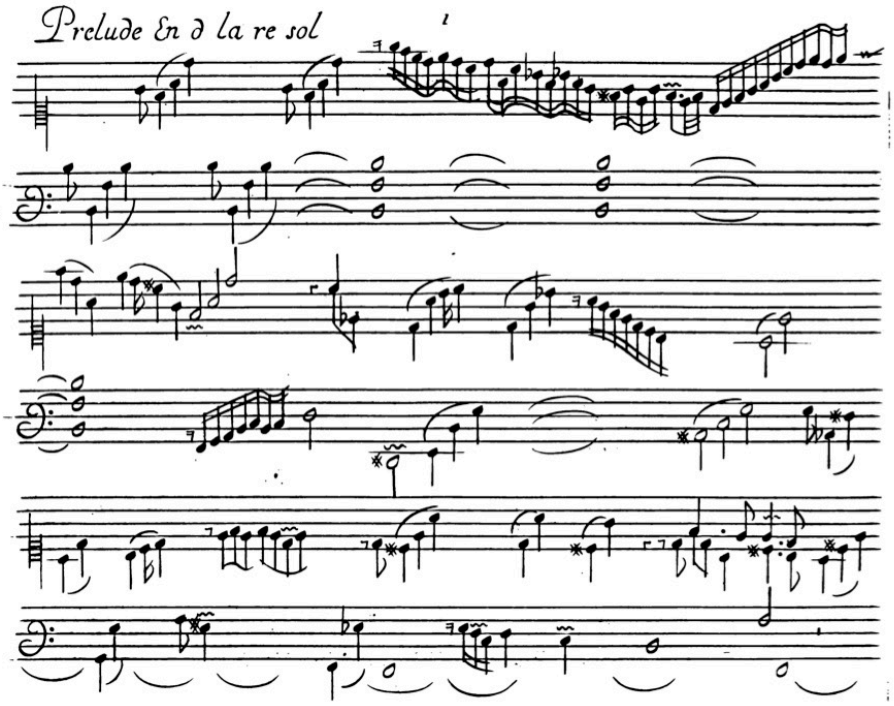
Curiously, for a prélude printed in such a tight space and with heavy diminutions, Rameau's prélude has more "empty" sonic patches than the profuse and highly decorated préludes by Louis Couperin, the short préludes of Gaspard Le Roux (Example 4), or the longer, multi-sectional préludes by de la Guerre.

Example 4. An example of an unmeasured prelude's deceptively empty notation but performatively dense writing in Gaspar Le Roux's Prélude No. 1, *Pièces de Clavessin*, 1705.

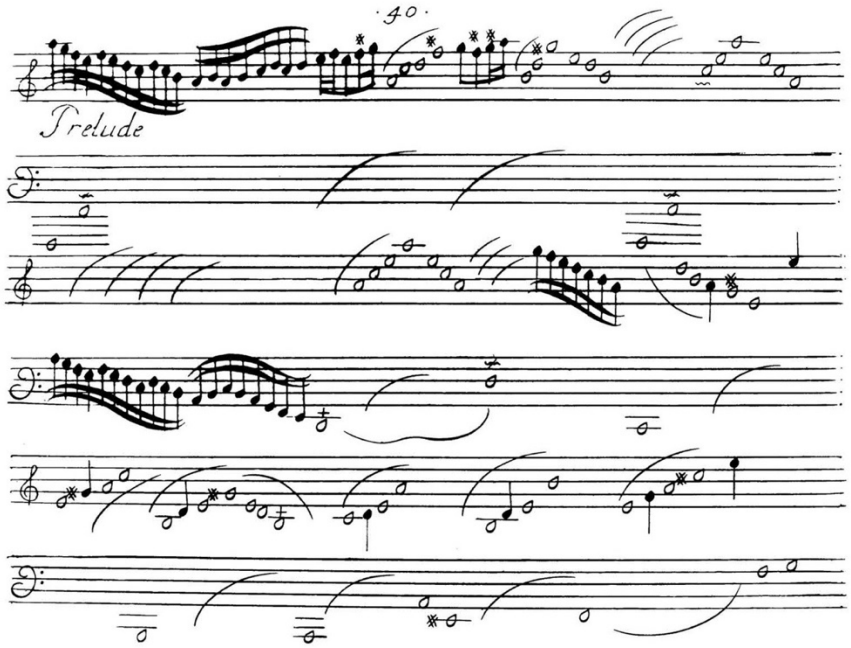


Couperin, Le Roux, Lebègue, and de la Guerre often borrowed from the Italian toccata genre, in which sound space was filled with running scalar figures just as the harpsichord's sustain of held pitches tapered off. These brief running passages usually bound together two chordal nodes (Examples 5 and 6).

Example 5. Opening of Nicolas Lebègue's Prélude No. 1, *Pièces de Clavessin*, 1677.



Example 6. First page of the last prélude of Jacquet de la Guerre, showing the influence of the toccata. *Premier Livre*, 1687.



Rameau's prélude has many of the common features of the genre. He uses frequent arpeggiation (or *style brisé*) for almost all pitches. Lacking durational value, these arpeggiations lift increasingly to gain harmonic traction upward (but importantly, they do not move forward nor are linear in fashion). He also employs attacks on the same pitch and octave leaps, especially in the bass to accentuate the present moment and to stall momentum forward. The cadential figures in the bass can surprise or distract the listener from needing to hear a release of tension. To demonstrate the "white space" between chordal splintering or a stretching out by arpeggiation, the opening meditates too long on a single mordent (the only ornament permitted to begin a piece at the time) then moves immediately to an octave drop. After the first arpeggiation that grows out of the first pitch, the bass note is again sounded with a drop to its lower octave, and it climbs only one whole step, maintaining the same pattern of bass note and octave drop. Unlike the swirling eddies of préludes of the previous century, the chordal motion is sluggish, even stubborn as it moves ahead. After three iterations, the pattern breaks down and requires a scalar passage downward in the treble, which is immediately echoed in the bass, to break down the suspension. While these figures disperse the energy of the opening three chordal articulations, they also only descend toward the center of gravity: the bass.

Leaving aside linear progression for a moment, the prélude places strong emphasis on the bass as primary foundation for the realization of pitches in the upper registers. It is not surprising that there is a fixation on the repeated and naked bass notes in the prélude as at this point in Rameau's career as a music theorist, he was only beginning to argue for his lifelong project, the *corps sonore*: the notion that all harmony and even melody derives from a single bass note: the fundamental bass. This pattern of bass note and octave leap downward occurs eight times in the bass. What we might expect to be a musical piece, even if free-form, becomes a harmonic

argument for Rameau that opens his *premier livre*. Again, the keyboard performer's responsibility here is to manage the articulations of the harmonic environment with various techniques: temporal and rhythmic placement (rather than the careful positioning that Rameau's print suggests) and the realization of the ornaments. Even though ornaments are notated in all unmeasured préludes, the approach, speed of acceleration, and closure of the ornaments and their function within their immediate sonic environment are largely left to the performer's discretion. I have sung and played ornaments on instruments; I contend that any performer's approach to execution would be akin to a unique accent in speech, including prosody, vowel quality, and pitch accentuation. In the same way, the unique ornamentation performed by different singers and instrumentalists was immediately recognizable and part of the performers' appeal. For example, Senesino, the great Italian castrato (d. 1758), was said to have a most attractive "shake" (meaning *trillo*).

While Rameau provides the overall harmonic framework and a number of linking textures, the keyboardist is left alone to create coherence. McClary's reading of the unmeasured prélude is that the genre overall reproduces monarchical control by way of absolutist principles by trapping the performer and listener in the "now" so as to distract from the political machinations of the monarch. Instead of an entrapped cognitive regime and strategies of aesthetic distraction, I propose a more liberatory mode of playing that offers tiny moments of agency for the harpsichordist. Even in discursive regimes of power and total domination there is also a kind of freedom within restraint in which to navigate freely. Michel De Certeau, in response to Michel Foucault's dismal vision of absolutist power and dominance, argued in *The Practice of Everyday Life* (1984) that actors can retain some agency within trapped, looping, and

grid-like structures that are not of the person's individual design. De Certeau asks, how do we "secure independence with respect to circumstances"?[34]

In an early section in *The Practice of Everyday Life*, on "Usage and Consumption," de Certeau uses descriptive microhistories to investigate how individuals use products strategically for their own temporary needs. He argues that critiques of consumership have not gone far enough: "the analysis of the images broadcast by television (representation) and other time spent watching television (behavior) should be complemented by a study of what the culture consumer 'makes' or 'does' during this time and with these images."[35] Studying these projections, products, and spaces "tells us nothing about what [they] are for [their] users."[36]

Here, de Certeau is more interested in "use" than "consumption." That is to say, he is more focused on the active user rather than the application of product by a passive consumer. Users of products are not passive receivers at all since they are active, engaged, and in the business of making decisions about the immediate use of products. He calls this "reappropriation" a secondary production, another "making," a quotidian "poiesis."[37] The poetics of the everyday consumer are devious, dispersed, scattered, momentary, and almost invisible (sometimes inaudible) "because [they do] not manifest themselves through its own products, but rather through its ways of using products imposed by a dominant economic order."[38] De Certeau describes a mode of living and operating within a grid of dominance and power that individual

[34] Michel de Certeau, *The Practice of Everyday Life*, trans. Steven F. Rendall (Berkeley: University of California Press, 1984), xix.

[35] Ibid., xii.

[36] Ibid., xiii.

[37] Ibid., xii, xv.

[38] Ibid., xii-xiii.

actors did not compose or enforce. In his conception of agency within such a regime of power, de Certeau explains how individual actors can subvert and move within it by using the strategies of power against and away from their intended purposes. He describes a kind of savvy navigation of power between colonizer and the colonized:

> even when they accepted their subjection[,] the Indians often used the laws, practices, and representation that were imposed on them by force or by fascination to ends other than those of their conquerors; they made something else out of them; they subverted them from within—not by rejecting them or by transforming them… but by many different ways of using them in service of rules, customs or convictions foreign to the colonization which they could not escape… They diverted it without leaving it.[39]

In other words, de Certeau asserts that there are modalities within regimes of oppression in which individual actors can find freedom by "using" products and strategies to their own aims often without detection from the producers of those regimes. De Certeau calls these individual, ephemeral acts of agency "tactics."[40] These tactics are opportunistic, clandestine, and improvisatory moments of assimilation that cannot be planned. Tactics are ultimately occasions by consumers that resist passivity.[41] "The tactics of consumption," writes de Certeau, "the ingenious ways in which the weak make use of the strong, thus lend a political dimension to everyday life."[42] He goes on to describe specific tactics as acts of enunciation within language. Enunciatory tactics often emerge as momentary, occasional acts of play. Related to wit, enunciatory tactics of users subvert the order of grammatical systems, using a "verbal economy and condensation, double meanings and misinterpretations, displacements and alliterations,

[39] Ibid., 32.

[40] Quoting Sunny von Billow in ibid., 37. Strategies and tactics are concepts that are likely borrowed from military theory. See Brian Upton, *The Aesthetic of Play* (Cambridge: MIT Press, 2015).

[41] De Certeau, *The Practice of Everyday Life*, 37.

[42] Ibid., xvii.

multiple uses of the same material."[43] Importantly, opportunistic enunciatory tactics can create their own momentary meanings and syntaxes: they create styles or "ways of speaking."[44]

Alternately he uses "strategies" for those linear trajectories imposed by a dominant order. Strategies make up a plan, a policy, are inert and localizable in contrast to "tactics" that are fleeting, scattered (because opportunistic and inventive) and always in motion. Manipulating these strategies becomes a tactical practice because the user must be able to recognize and exploit an opportunity and then disown it so as to remain unrecognized. But there is built into this philosophy an ethics of pleasure and enjoyment, of working within but remaining uncommitted, of finding better or more expedient use for materials and time than what is dictated, of discovering flexibility, of having "know-how" (*savoir-faire*), and of making do.[45]

What does a framework of "practices of everyday life" offer to an interpretation of the unmeasured prélude? It works in two ways: while the unmeasured prélude may have very well reproduced the distracting, suspension-effects of absolutist monarchy, and while harmony was always predetermined in the fundamental bass, the performer has freedom of choice[46] to move around with imagination and articulation through those designs. In this way, regimes of government resemble regimes of harmony. De Certeau offers two metaphors to describe this freedom: the first is taking shortcuts in a city designed into a rigid grid structure. Taking one's own walking path, cutting corners, alleyways, and keeping out of sight is both being a part of the structure and taking agency when navigating it ("Walking in the City"). His other metaphor is one of traveling in a train car, to a destination that passengers did not choose in cars that travel

[43] Ibid., 39.

[44] Ibid., xx.

[45] Ibid., xii, 28, 65.

[46] For a fuller definition of freedom and choice "within a system of constraints," see Upton, *The Aesthetic of Play*.

but also trap their passengers ("Railway Navigation and Incarceration"). De Certeau uses this metaphor to reply to Foucault's panopticon and incarceration, a structure in which an imprisoned subject cannot escape surveillance. De Certeau replies that while the incarcerated cannot escape physically, they can escape mentally and imaginatively, even spiritually, by closing their eyes and reciting creative prayers and conjuring alternate realities. The unmeasured prélude is structured in such a way that it asks the performer to confront being imprisoned by time and by harmony, yet also offers freedom to take shortcuts, to imagine alternative paths at different paces, and to use imaginative faculties to invoke different realizations within that restrictive regime of order.

This framework of the user operating within foundations of power or orders of syntax and grammar to create opportunities for new meanings and occasions of *unintention*, is particularly helpful in understanding how the unmeasured prélude could take a predetermined regime of harmonic syntax and order of time to find occasions of freedom for the user—in this case the harpsichordist—within an absolutist paradigm. Overseeing the reproduction of absolutist imagery is a kind of pan-aurality (as opposed to the panopticon). Lully was the paragon of this centralized dominance in music production with the development of his militaristic, unified, and highly controlled position of power with his *baton* (a large stick, the predecessor of the conductor's baton in a modern orchestra) that kept time and order, and his centralized position of surveillance. The performance of grid-like, musical texts became a kind of prison, entrapping music within a regime of absolutist discipline, such as in Lully's *les violons du roy* who performed in synchronous, militarist rows. The printed score of the unmeasured prélude, too, becomes an "urban text," encoded with those disciplinary and incarceration strategies that the harpsichordist must traverse.

Instead of merely reproducing these structures, as McClary seems to suggest, the harpsichordist in this case can appropriate the graphic world of the score. De Certeau argues that the appropriative moment occurs in the enunciation ("speech act") of the "graphic representations" or topographies of power: in this case, a monarchical, absolutist musical text.[47] "Walking" at any pace, "wandering, or 'window shopping'" are pedestrian acts of acoustic enunciation that "cannot be counted because each unit has a qualitative character: a style of tactile apprehension and kinesthetic appropriation. Their swarming mass is an innumerable collection of singularities."[48] De Certeau goes even further in arguing that the hand and touch can also become sites of appropriation of written texts: the painter's brushstroke and the forms of the finished painting.[49] Overall, these are "improvisatory" and "inventive" tactics to "[affirm], [transgress], [respect]," and "try out" on precomposed "maps" of grammar and syntax. "These enunciatory operations are of unlimited diversity. They therefore cannot be reduced to their graphic trail."[50] They include "turns of phrase," "stylistic figures," and "composing [their own occasional] path."[51] They amount to "gestures."

The problematics of enunciation and its realizations in gestures, styles, and occasional transgressions and inventions within a harmonic map of order can graft onto the unmeasured préludes. Since tactics of users cannot be graphically charted across a score, the user thus chooses to find moments, ephemeral occasions to "use" the techniques of the instrument (the harpsichord) and the regime (an absolutist imagined world) in temporary, isolated incidences.

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[47] De Certeau, *The Practice of Everyday Life*, 97.

[48] Ibid.

[49] Ibid., 98.

[50] Ibid., 99.

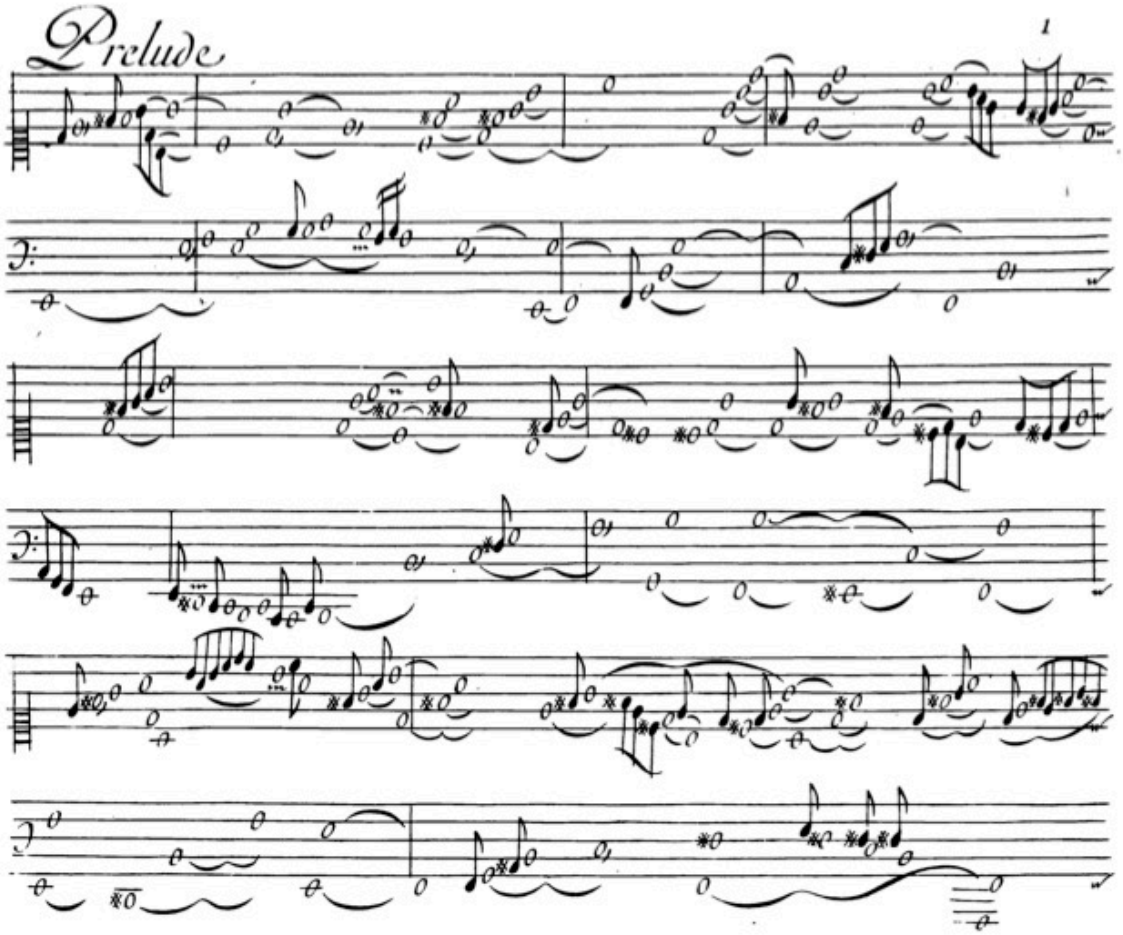
[51] Ibid., 100.

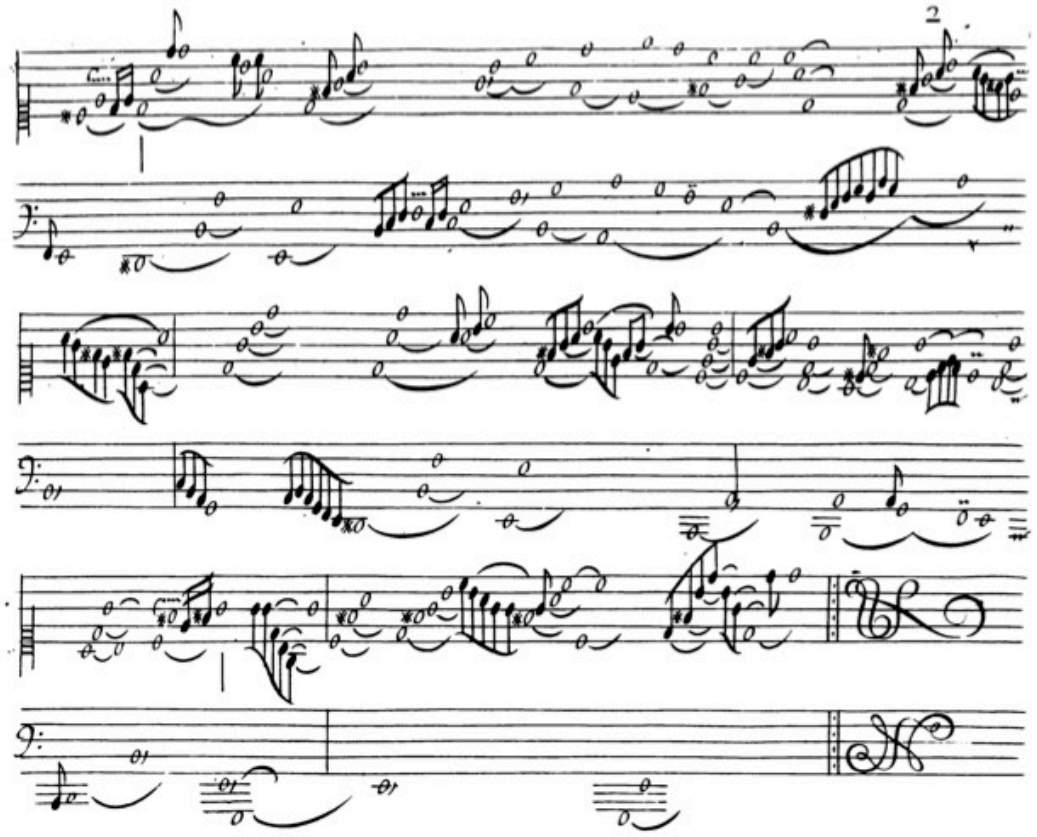
Thus, the distinct "nowness" of the unmeasured prélude can be read as not only a distraction or entrapment of the player within the control of the machine and of monarchical rule, but an enclosed realm of opportunities for individual tactics, like islands of agency in isolation. The clustering and choice of ornaments, the speed of the articulations of the chordal arpeggios, and the stillness and lingering on specific moments are all enunciatory, elaborating an uninscribed composition in its own right, sewn together and yet unpredicted by the controlling harmony and melody of French harpsichord music. Gestures are important in the decorative analysis of the préludes. Just as de Certeau describes the hiding or erasure of the gestures of the painter's hand that are realized in the fixity of the finished painting, so then do the decorative gestures of the harpsichordist's provide a partial escape from restraint as they fashion the final realization of a prélude in performance.

Returning back to Rameau's unmeasured prélude: how do we make sense of the final cadence? An E^7 chord with a 4-3 suspension into the dominant of Am, the cadence finally concludes the unmeasured prélude and moves into the 12/8 gigue (what is often called the "mouvement"). The cadential pattern smacks of a finality more typical of common-practice composition than it does of pre-Rameau era harmony. Such cadential security is especially odd to find in the unmeasured prélude genre. Rameau's strong cadence departs from the stagnation and "nowness" of earlier preludes, which, by design, did not have clear resolutions. And while earlier préludes resisted the progressive notions of forward motion as a metaphor for trapping subjects in the timeless grip of absolutist control, Rameau's "last gasp" of the unmeasured prélude genre resists this confinement by creating a harmonic crisis that must be resolved and repaired. By way of comparison, I offer a decorative analysis of the luxurious unmeasured

prélude by d'Anglebert that contrasts with the harmonic frames of the Rameau: his Prélude No. 1 in G major from his first book of *Pièces de Clavecin* (Example 7).

Example 7. Jean-Henry d'Anglebert, "Prélude 1 in G Major," *Pièces de Clavecin*, 1689.





Written in a period of increasing French political isolation in the 1680s, d'Anglebert's prélude reproduces an isolationism throughout, constantly thwarting encroaching forces. The rising flourishes set up impenetrable barriers that rise out of a naked, foundational bass. Throughout, the upward arpeggiation in *style brisé* (broken style) create layer upon layer of fencing as if to shut off, confine, and stall the harmonic and rhythmic momentum. The upward flourishes, which extend across a considerable range of the keyboard beyond three octaves, come at the listener so frequently that they might also sound like a barrage of tones that appear as impenetrable walls of sound across all registers yet are securely grounded in the harpsichord's powerful tenor register.

The density of vertical activity reorients the listener to the "nowness" rather than to the resolutions, namely through means of the misalignment of pitch and ornamental coordination

between lower and upper voices. The purposeful misalignment and early/late articulations of the bass and ornaments on key tones challenge the listener's sense of coordination and coherence, as it halts the traction of the prélude from moving onward. Only reluctantly are clusters resolved by spilling over into an unprepared bass tone, usually ornamented and thus unsettled. The overall effect is not a linear motion toward conclusion, but a series of knots of activity that make it impossible for the listener to project into the harmonic future of the prélude, including what outcomes or resolutions await. When I play préludes with these effects, I have the feeling of balancing two impossible things out of position as free French music lacks the strict coordination of German counterpoint. Rather, the misalignment is considered graceful and ironically pleasing: in other words, baroque. This is not to say that French keyboard music is not rulebound: on the contrary, graceful misalignment was a learned technique, just as stylish improvisation requires practice. The difference, I believe, is in priority being placed on the management of style *first*, rather than, as in contrapuntal music, on the strict regulation of alignment and reciprocity of independent lines, understood as the ultimate intellectual challenge. The unmeasured prélude prioritizes verticality rather than the linear motion of independent lines and their harmonic consequences; the aesthetic effects of the prélude create such crisis-packed moments that the listener cannot help but draw their attention to the urgency of the "now," and so must abandon and suspend any desires for a specific outcome.

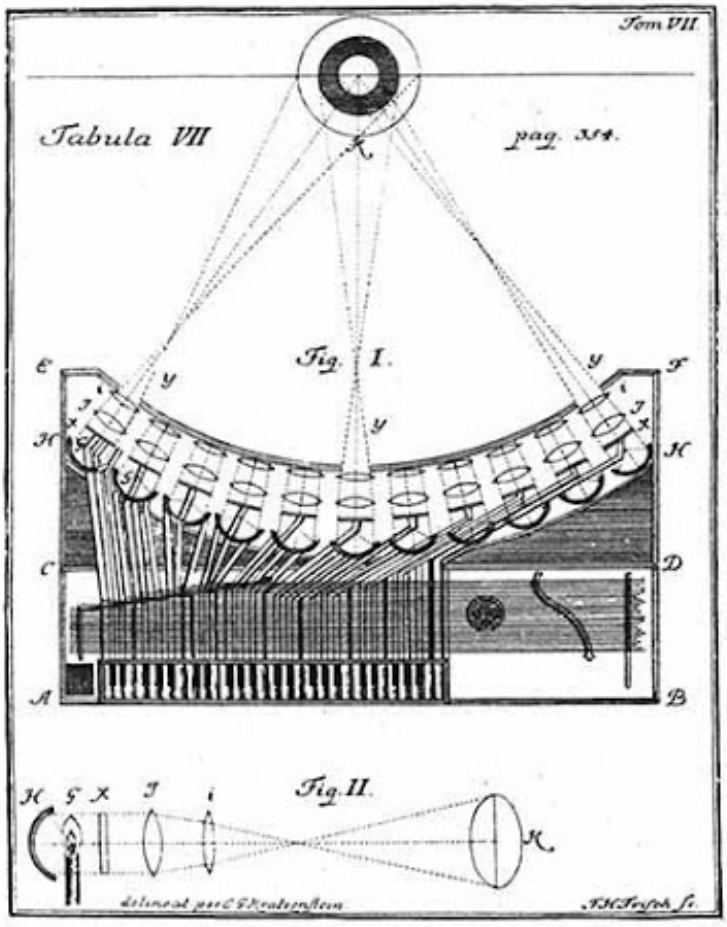
Nowness is further reinforced in the lack of strong harmonic resolutions accented by the repeated tones throughout, often not on the "tonic" (in this case G), but on a pedal tone or at the apex of a chordal flourish. The sense that we have gone nowhere in d'Anglebert's first prélude occurs at the very end, when the 5th (D) is the final tone articulated twice, rather than a strong resolution that would characterize Germanic or even Counter Reformation contrapuntal cadential

patterns (typically from the second scale degree descending to the tonic in the treble). There is no such pitch resolution that aligns with horizontal harmonic motion in d'Anglebert, but rather repeated resistance to it, even at the level of pitch. The repletion of tones throughout, both in bass and tenor, impose a fixity of the mental limits of the prélude. The final repeated tone at the end of the prélude offers unsatisfying punctuation; it is indeed the end of the piece but also gives a sense that we went no further than the place where we began. D'Anglebert's prélude reproduces an imagined world of a secure, enclosed France, impervious to intrusions but also with an orientation to internal decorations of such intensity that the listener becomes so frustrated and enamored that they give up on cognitive, progressive clarity, submitting to its aesthetic distractions and suspensions.

The unmeasured prélude in d'Angelebert's realization becomes a reproduction of absolutist monarchical visions. By contrast, Rameau finds ways of taking advantage of momentary, occasional expressions of individual users to exert agency in unforeseeable ways. In short, performance of the unmeasured prélude is of and submits to its authority, but can also subvert it by finding opportunities for freedom within a structural machinery that imposes itself on the player.The performer had a range of tools available to them at any given time, and while the dance forms may have been the primary function of the internal movements of a keyboard suite, the *prélude* at the front of the suite was where the harpsichordist could demonstrate their entire palette and range of techniques and rhetorical choices. This makes sense as the unmeasured prélude has in its ancestry the toccata, "to touch" in Italian meaning "to try out" the keyboard. The keyboard here, especially in the prélude, was a tool with which to experiment, hands-on.

The Eyes and Inaudibility

For others who turned toward the harpsichord as experimental technology, the instrument was a means to different ends. I am reminded of instruments that cannot be heard because they never existed in the strict musical sense. The most famous example was Louis-Bertrand Castel's "Ocular Harpsichord" (Figure 9). [52]



Die erste Konstruktionszeichnung eines Farbenklaviers,
aus: Joh. G. Krüger, De novo musices, quo oculi delectantur, genere, in:
Miscellanea Berolinensia ad incrementum scientiarum 7, 1743, Tafel 7

Figure 3. True to form, Castel did not illustrate or leave figures of his ocular harpsichord. This is Krüger's attempt to render the ocular harpsichord visually in his "De novo musices quo oculi delectantur, genere," 1743, 354. Special Collections, University of Washington Library, neg. no. 14219.

[52] Hankins and Silverman call the ocular harpsichord the "Instrument that Wasn't," *Instruments and the Imagination*, 72.

The *clavecin oculaire* was an intricate device envisioned by Castel to play colors rather than sounds. Castel theorized that while sounds could create harmonies of musical integrity and beauty, colors could also "create beautiful harmonies of the eye" thereby (re)creating the analogy of sound and color, an analogy popularized by Newton's experiments with light and color.[53] By reading Castel through the eyes of others, I hope to recreate the confluence of energies and ideas around the harpsichord. His ocular harpsichord was controversial but supported by his then colleague at Clermont, Rameau who urged him to make its initial public announcement in 1725, only a year after he published his *méchanique*.[54] Castel resisted, but that did not stop the ocular harpsichord from both challenging Newtonian optics and also (perhaps even more so) opening up new physical responses to the natural world, in this case sound and light.

For the next decade, the ocular harpsichord caught the ire and respect of such musicians and philosophes as Telemann, Jean-Jacques Rousseau, and Diderot. Because it rejected Newton's experimental method, Voltaire attacked it in a 1738 "Letter to Rameau."[55] For Voltaire, Castel's style of scholasticism was simply old hat and was not in concert with the "spirit of the century."[56] Rousseau pointed in 1781 to the ocular harpsichord in his *Essai sur l'origine des langues*. For Rousseau, separating out the arts based on physics over innate aesthetic experience was the paragon of absurdity.[57] For Rousseau, organizing color and light without consideration of the aesthetic reception of exterior content (light and sound in this case)

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[53] Ibid., 74.

[54] Ibid., 74.

[55] Ibid., 76.

[56] Ibid.

[57] Deidre Loughridge citing Jean-Jacques Rousseau, *Essai sur l'origine des langues* (1781), 61 in "Who Measured the Wind an Made the Fingers Move," "Colloquy: Rousseau 2013," *Journal of the American Musicological Association* 66, No. 1 (Spring 2013): 273.

was the wrong way to go about it. This is also why Rousseau rejected Rameau's supremacy of harmony. Melody, according to Rousseau, could not be derived from harmony since melody was temporal (of the ear) and harmony remained in the spacial domain because "it turned sounds into simultaneities" where simultaneous occurrences were in the domain of vision.[58] The ocular harpsichord made the same mistake: "it made a temporal art (music) out of a spacial medium (sound)."[59] The reference occurs in Chapter 16 of Rousseau's *Essai* where he also uses Vaucanson's android flute-player to launch an attack on the "false analogy between colors and sounds."[60] In Rousseau's view, the android also failed because it only visually imitated the movement of a faun playing a flute: it was a corruption of both sight and sound.

Though Diderot, in principle, supported Castel's particular style of analogy/scholastic line of inquiry (informed by the way he understood the formation of the senses from his studies of deaf-mute speech), he, too, seemed to succumb to the same temptations by asking him to construct it, for material "demonstration" of his principles.[61] Castel did make ineffective, half-hearted attempts at constructing the harpsichord but only in prototype: the first in 1730 (which was so rudimentary that it only raised colored slips at the depression of corresponding keys) and another in 1734 that may have employed lamps.[62] Though the first harpsichord was only an early attempt, it caused such a stir in Paris that Castel had to close his home to visitors where it was on display. In the following years, a student of his was said to have made a more advanced version

[58] Ibid.

[59] Ibid.

[60] Ibid., 272.

[61] Hankins and Silverman, *Instruments and the Imagination*, 76.

[62] Ibid., 77.

that was available for viewing in London but, admittedly, was never played.[63] Later, Castel himself accepted funding from the Comte Maillebois and the Duke of Huescar for more development, but nothing came of it and no instrument was produced.[64]

The only thing getting in the way of building the harpsichord was Castel: he did not lack for assistance in its construction, nor funding, nor intellectual support. Rather, it was he who halted the production and development. Castel, in fact, recognized the importance of lived experiences with sound, light, and encounters with machines. He was very much interested and involved in the physical world. Indeed, even from a practical standpoint, Castel saw benefits in creating his ocular harpsichord so that those with hearing impairments could enjoy music. Still, he could only demonstrate that pitch and color were intricately linked through principles of geometry and logic, which could be proven only via reason alone and not by observation of phenomena. Thus, he aligned himself more with geometry as a scholastic method of *confirmation* over the Newtonian experimental method of new *discovery*. In his initial announcement of the idea (at the urging of Rameau), Castel defiantly wrote, "I am a mathematician, a philosopher… and I have no desire to make myself into a bricklayer in order to create examples of architecture."[65] Such a statement was a philosophical one rather than artisanal or experimental. Testing the theory, as Newton and Voltaire might have done, was simply beside the point because the *clavecin oculaire* was always only a rational model and not a material demonstration: an instrument that made arguments and not sound or light.[66] At stake here was more than just the mechanisms of seeing and hearing: it was a struggle between the

[63] Ibid.

[64] Ibid.

[65] Ibid., 77.

[66] Ibid.

older, scholastic way of thinking broadly, capturing "everything" rather than the "new" means of argument using specific evidence and a constant flow of *specific* data, rather than models, from which to make irrefutable arguments.

No amount of handwringing over plans, acquiring of funding and materials, the sanding down of wood, or the spinning of metal strings could prove his theory on the indisputable relationship between light and sound: only mathematics and reason could do that. Indeed, he complained to his patron Montesquieu that even his supporters were missing the point: music is ideational and not sensational.[67] As we shall see, this accords with Rameau's theory of the *corps sonore* in which pitches sound at the pluck of the string at mathematical proportions that are sometimes inaudible. We cannot literally "make sense" of sounds; only the mind can do that.[68] Castel wrote that unlike Newton's physics, "[I] base my physics not on arbitrary hypothesis or particular and personal experience" but on historical fact and ideas already known to be true.[69] The ocular harpsichord in proto-type seemed unnatural, and it never truly functioned. In that sense alone, Castel succeeded in maintaining his harpsichord within the realm of ideas. The ocular harpsichord was many things: mathematical, scholastic, rhetorical, philosophical, commercial, historical, and aesthetic. What it was not was sound or light.

In the ongoing debate about the ocular harpsichord, Castel called Newton's optics baseless and whimsical, "facts of the moment, [not] facts of humanity rather than the facts of one man."[70] There are other more technical critiques that Castel pitched at Newton's optics specifically and his methods generally, but in essence, according to Castel, Newton and his

[67] Ibid.

[68] Ibid., 78.

[69] Ibid.

[70] Ibid., 79.

followers worshipped phenomenology (at times called "monstrosities"). By definition, monstrosities and ephemeral phenomena spoke nothing to more staid and stalwart universality. Hankins and Silverman write that Castel's rhetoric represented "attitude[s] toward instruments that preceded what we call the Scientific Revolution."[71] The value of experimentation was only to confirm universal experiences and "reason naturally preceded experiment, so that the necessity of an experimental test could be regarded only as a sign of defeat," an admission of failure.[72] Experiment was a last-ditch effort, not where you started an investigation.

Castel did not win the argument, losing to Newtonian experimentation. In a turn of fate, the ocular harpsichord, which Castel intended to demonstrate the universal parallels of light and sound, became what it feared most: a monstrosity of history. Yet, it is because of its very oddity that the ocular harpsichord becomes relevant in asking how instruments can be understood at different angles, splitting apart depending on the shape and slant of your prism, so to speak. Moreover, it is critical that Castel turned to the harpsichord for making arguments about the nature of discovery.

Rameau's support and enthusiasm for Castel's ocular harpsichord was not out of selfish interest in harpsichords and keyboards even as the most prominent composer in the genre at the time. Rather, it had more to do with Rameau's philosophical and scientific commitments, shared with Castel. His belief, much like other Cartesians, that music was governed by rationalist mechanics, still had a strong base in France around the time that Castel was pushing his geometrically derived harpsichord.[73] Charles Dill has detailed how Rameau's Cartesianisms bled

[71] Ibid.

[72] Ibid.

[73] Thomas Christensen, "Eighteenth-Century Science and the '*Corps Sonore*:' The Scientific Background to Rameau's 'Principle of Harmony'," *Journal of Music Theory* 31, no. 1 (Spring 1987): 23.

into his conception of how music affects audiences—or, rather, how audiences receive music.[74] But Rameau's enduring investment in rationalism extended beyond *musica prattica* and the effects of performance. No theory was as important to him as the *corps sonore*, a life-long campaign that tried to prove scientifically, not musically, the existence of an entire range of pitches that sounded (sometimes inaudibly) in mathematical proportions at the vibration of a string. As Thomas Christensen writes, Rameau always maintained that "every vibrating string thus contains in itself the germ of all music."[75] His theories on the *corps sonore*, which began as early as the publication of his *Traité de l'harmonie* (1722) and then expanded in his *Nouveau système de musique théorique* (1726) were based on abstract geometrical principles that sometimes failed in empirical studies (at best an impasse for a composer and at worst an embarrassment). But his take on geometrically derived principles of acoustics created a close bond with Castel.

In 1722 Castel wrote up a distillation of the harmonic series in support of the *basse fondamentale* in the *Journal de Trévoux*: "in physics, nature gives us the same system which M. Rameau has discovered in numbers."[76] It is no doubt a shared commitment to geometrical, scholastic methods that built an alliance between the two and also brought Rameau into d'Alembert's circle. D'Alembert, though, was less interested in Rameau's atomistic theory of "harmonic generation" than in the abstract consequences of his geometric approach to acoustics. It may surprise some that d'Alembert expressed so much support for the *corps sonore* since,

[74] See Charles Dill, "Rameau's Cartesian Wonder," *Eighteenth-Century Music* 14, no. 1 (Cambridge: Cambridge University Press, 2017): 31-52.

[75] Christensen, "Eighteenth-Century Science," 41.

[76] Ibid., 25.

unlike Diderot who supported both Rameau and Castel, d'Alembert was not musically trained.[77] As it happens, the vibrating string was widely accepted as "a nebulous no-man's-land between physics and mathematics" and could be approached from a number of perspectives.[78]

Rameau, d'Alembert, Leonhard Euler, and Bernoulli all took interest in the *corps sonore* for different reasons. With his harmonic theories, Rameau earned the respect of d'Alembert, claimed legitimacy of his standing as a philosophe, and was able to publish his *Démonstration du principe de l'harmonie* in 1750 with the *Académie royale des sciences*'s approval (though Rameau changed the name before publication at the public objection of d'Alembert). But it was d'Alembert and Rameau who both asserted (or equivocated in Rameau's case) that the "geometer need not, indeed, ought not to be overly concerned with accommodating all empirical evidence."[79] Christensen explains again: "Once d'Alembert had intellectually separated his mathematics from empirical phenomena, he could easily accept Rameau's description of the *corps sonore* as accurate."[80] This might explain Castel's stalwart opposition to the building and demonstration of his ocular harpsichord. It was not just idiosyncratic stubbornness or an avoidance of being proven wrong, but rather a commitment and bias toward mathematical (in this case, geometric) values of being verifiable outside of observed phenomena. A universal principle of geometry, color and light, and acoustics, could be true without a demonstration, since all studied phenomena are limited by the unlimited variables present in observation. To build the ocular harpsichord would be to concede that empirical experiment was *necessary*.

[77] Ibid., 32.

[78] Ibid., 33.

[79] Ibid., 36.

[80] Ibid., 37.

My aim in the second act of this chapter has been to choreograph the various interactions that Rameau had with significant parties—Castel, Diderot, d'Alembert, Rousseau, and the looming presence of Newton—to understand how their positions on music, acoustics, and instruments, whether by universal principles confirmed by experiment or by experiment to discover principles, all involved the harpsichord as a means of discovery. Rameau's primary assertion in the *corps sonore* and the fundamental bass was to prove not just a descriptive theory of composing harmony but also the scientific nature of harmony in totality. And it was his belief that music was first among the sciences since it engaged the senses more completely than vision alone. From that arose the assertion that Pythagoras discovered the proportions of strings first because they heightened his senses of hearing, sight, and touch. From that seed of the triad, arithmetic and algebra were born, followed closely by geometry, of which Castel was a proud champion. Rameau writes:

> Is not geometry based on arithmetic, and arithmetic upon proportions? Scarcely has a sonorous body sounded [*corps sonore résonne*], when the ear is struck by a delightful proportion. Soon after, we discover there the proportions upon [sic] which alone all of geometry is based.[81]

Besides trying to earn membership to the Académie, Rameau was ultimately trying to justify the place and importance of music studies in the most privileged disciplines. That he had to submit his ideas to mathematicians, some of whom were not musically trained, must have been difficult for Rameau, who was the foremost music theorist and composer of his time. It is not so much that the mathematicians were not enthusiasts of acoustics and music theory. In fact, Diderot and d'Alembert seemed to see the great potential of music theory and its consequences for mathematics. But herein lies the problem again: Rameau was able to gain some shred of

[81] Rameau, *Suite de la Réponse* [to d'Alembert], *Mercure de France* (July 1761), quoted in J. W. Bernard, "The Principle and the Elements: Rameau's Controversy with d'Alembert," *Journal of Music Theory* 24, no. 1 (Spring 1980): 41.

legitimacy for his music theory only by way of a more prestigious discipline, mathematics. It seems unfortunate to me that Rameau had so many stops and starts with the advancing of his ideas in letters and debates and, one can imagine, in his conversations. In fact, it is also inconsistent for Rameau, because his keyboard music is so carefully and thoughtfully composed. Still, Rameau was adamant that music could open access to new vistas of experience through hearing, seeing, touch, time, and spatial awareness.

The *corps sonore* was the kind of idea that you could not take back. In a famous challenge to Rameau's harmonic theories, d'Alembert asked, "How could it be that the humble singer could be completely ignorant of harmony but still compose a tune on the spot?" The answer, according to Rameau, was easy. Even the simple tune-smith who has never studied harmony was participating in the harmonic system. Rameau's idea of the *corps sonore* is one you cannot unhear. That every sound, every pitch holds the key to discovering other vistas of knowledge and experience was a large idea indeed.

* * *

Just as my fingers on these keys
Make music, so the selfsame sounds
On my spirit make a music, too.
Music is feeling, then, not sound.

"Peter Quince at the Clavier," Wallace Stevens

The harpsichord in eighteenth-century French intellectual, artisanal, and musical circles became a nexus for arguments over the nature of discovery, of establishing truth, the promises of systematization, and a way to discipline the body. At stake with metaphors of the harpsichord were the lasting credibility of scholasticism and empiricism, commitments to geometry and

music theory, allegiances to academies, and the clarity of how the body moves independently, both inward and outward.

In the next chapter, we will see a similar effort for completeness in pursuit of knowledge, even with a lack of observable data. Such was the approach of the naturalist and writer Georges-Louis Leclerc, the Comte du Buffon, whose breezy literary style of natural history meditated on the intelligence and civility of animal life. While Buffon never wrote about the harpsichord, his writing reflected conditions that allowed for the grafting of the natural onto the artificial, the primitive onto the civilized. Thus we see the harpsichord in the eighteenth-century salon as a visual and aural demonstration of man's command over nature with paintings of birds and monkeys on the harpsichord from Africa and the Americas and bird-song harpsichord *pièces*. If the harpsichord helped mathematicians, composers, and performers embrace "embodied mechanization," it also helped them confront their own animality. Poets, naturalists, and artists struggled to categorize monkey behavior and bird song because they rested uncomfortably between human and animal. In "Keyboard Play as Affection," the harpsichord again will become a site to contest the human-animal divide.

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CHAPTER THREE

Keyboard Play as Affection

> "Dominance may be cruel and exploitative, with no hint of affection in it. What it produces is the victim. On the other hand, dominance may be combined with affection, and what it produces is the pet."
>
> —Yi-Fu Tuan

Mounted on the walls of my childhood living room were the heads of two Montana mule deer. A taxidermized pheasant and partridge kept them company nearby. The skins of a Michigan bobcat and black bear were also on display as well as paintings of waterfowl and other hunting game. Occupying the bookshelves was the complete *Encyclopedia Britannica* from which I composed most of my grade school history reports, such as one on Ferdinand Magellan's sixteenth-century voyage around the world. The space also held our family piano, a massive ornate furniture piece that my siblings and I shared. As a family, we studied, hung dead animals, and held recitals for neighbors and relatives in this room. Ideas circulated in these spaces of decay and life through print, animal skins, paintings, and musical instruments about human relationships to nature, travel, craftsmanship, and sound.

As a hunter and a musician growing up in Northern Michigan, I was familiar with and could perform the practices that engaged with these objects, the institutions that brought them into being, and the collections that gave them meaning. But I was less aware of the ideas that support those practices. In this chapter, I want to spend time on the ideas supporting one of those machines in that room, the keyboard. As Jonathan Sterne writes about his own studies of sound-

recording technologies, "many of the practices, ideas, and constructs" that undergird technology "precedes the machines themselves."[1]

In order to understand musical instruments as ideas, we must begin at their sources. For keyboard instruments, it starts at an odd place with birds and monkeys in the imagination. In this chapter, I examine selections from Louis-Jean-Marie Daubenton (1716-1800) and Georges-Louis Leclerc, the Comte de Buffon's (d. 1788) *Histoire Naturelle des Oiseaux* (1770-1783) as a concurrent enterprise to the exotic animal and pet trades in France. Buffon's own observations and findings were informed by the flooding in of live and dead animals from the New World, Caribbean, and the African continent. While Buffon's criteria for identification of each bird are as one might expect—colors of plumage, differences in sexes, diet, and so on—he also gives surprising weight to the musicality of birds and their ability to speak.[2] Moreover, his notion of "improvement" of bird species (via breeding and education) was a metaphor for how humans transcended their animality and became civilized and superior.[3] With a species hierarchy at stake, the human-bird divide was troublesome, even worrying, and were articulated in detail for the *Histoire*'s lay-readership. Improvement, according to Buffon, was the distinguished and "noble mark of our pré-eminence, which constitutes our empire over the animated world."[4]

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[1] Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke University Press, 2003), 1.

[2] Louise E. Robbins for her argument that Buffon "frequently pointed out that vast gulf between animals and humans," *Elephant Slaves and Pampered Parrots: Exotic Animals in Eighteenth-Century Paris* (Baltimore and London: The Johns Hopkins University Press, 2002), 152.

[3] For instance, in describing the parrot, Buffon (and his translator) writes, "had the voice of the Parrot been bestowed on the ape the human race would have been struck dumb with astonishment, and the philosopher could hardly have been able to demonstrate that the ape was still a brute." Leclerc, Georges-Louis, *The Natural History of Birds. From the French of the Count de Buffon. Illustrated with engravings; and a preface, notes, and additions, by the translator. In nine volumes. ...* Vol. 6 (London: A. Strahan, T. Cadell, and J. Murray, 1793), 64, *Eighteenth Century Collections Online*, https://link.gale.com/apps/doc/CW0109599965/ECCO?u=uclosangeles&sid=ECCO&xid=ba22d91c.

[4] Ibid., 64-65.

Next, I discuss how animals, with a focus on birds and monkeys, in the private sphere for the home existed concurrently with natural history.[5] The equal access to exotic animals for purchase as pets democratized knowledge about the world and both informed and was fueled by literary and visually minded consumership. I then focus on Christophe Huet's bird and monkey genre paintings (*singerie*) on harpsichords' surfaces that forced the contested human-animal divides. Much like Buffon's nine volume *Histoire Naturelle des Oiseaux*, the birds and other *naturalia* paintings both aestheticized natural knowledge as visual art, transporting it into the home, and gave the performer a sense of control of and domination over animals and nature generally.

Harpsichord manuals also sought for "improvement" over nature and aestheticized animal life for both entertainment and control. In this way, the harpsichord becomes not only a demonstration of affectionate domination but also something of a servant of involuntary labor, a pet and a slave body. Finally, my examinations of Rameau's manual for harpsichord will try to understand how the harpsichord could coalesce findings from natural history and paintings (however whimsical and inaccurate) to create a potent body that demonstrates how nature is "improved" and put to work.

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Into the eighteenth century, literature on exotic animals filled books, fables, and poetry placing new demands for entertainment inflected with social and political morals.[6] As Louise Robbins

[5] Some birds were indeed in the same rooms as musical instruments, such as the hoopoe, "This character bears some analogy to the two voices of the tame Hoopoe mentioned above. That bird seemed fond of music; whenever its mistress played on the harpsichord or the mandolin, it kept as near the instruments as possible during the whole time." Ibid., 389.

[6] Robbins, *Elephant Slaves and Pampered Parrots,* 157.

writes in *Elephant Slaves and Pampered Parrots: Exotic Animals in Eighteenth-Century Paris* (2002), zoomorphoses increasingly transformed human protagonists for readers of popular writing (amateur naturalists who were neither scholars nor *académiciens*).[7] She explains that theologically bent writing continued arguments from the sixteenth and seventeenth centuries for the existence of God and his divine order of nature and man, though these mostly concerned insects, whereas writers later overwhelmingly used monkeys and birds as a strategy to highlight the mechanistic theories of humans and animals.[8] Some of these meditated on whether animals had a soul (in the Cartesian dualist tradition). The prevailing conclusion was that human society, for its development of cognition and the schism between mind and body, dominates over the animal kingdom.[9]

Natural history field guides and those writing in genres related to in-home collecting were also popular, especially in the growing expansion of menageries or in-home bird and animal collections. Some include Henri-Louis Duhamel de Monceau's three volume *Traité général de pêches* (1769) and Mathurin Jacques Brisson's *Ornithologie ou, Méthode contenant la division des oiseaux* (1760), with hand-colored engravings by François-Nicolas Martinet (d. 1800), both updating works by Belon, Rondelet, Ray, and Willughby.[10] Henri-Gabriel Duchesne and Pierre-Joseph Macquer's single volume *Manuel du naturaliste* (1771) provided a "how to" on starting one's own cabinet of natural history.[11] One of the most interesting in the genre is by Valmont de Bomare's (d. 1807) who published his *Dictionnaire raisonné universel d'histoire*

[7] Ibid.

[8] Ibid., 157-158, 163-164.

[9] Ibid.

[10] Ibid., 166.

[11] Ibid.

naturelle in five volumes in 1764, later adding a sixth volume in 1767/8 and expanded the set to nine in 1776.[12]

The Comte de Buffon and Daubenton's *Histoire naturelle des oiseaux* (translated into English as *The Natural History of Birds* in 1792 and 1793) was the *example par excellence* of a genre of writing that was secular, interpretive, and anthropocentric. Its "lessons" and "observations […] expanded the entire world," even though it neglected entire species and largely inherited the work of Brisson and Martinet while drawing on Rèaumur's collection of bird skins used as models for illustrations.[13] These literary genres show the wide variety of writing about animals and plant life and the various motivations of their readership. They also show the circulation, reflexivity, and dialogues between genres, coexisting in the same literary ecosystem as field guides and manuals for personal collection.

At the same time, exotic pet culture rested at the cross-section of developing divisions between gender, wealth, the democratization of knowledge about nature, and power in eighteenth-century France. Key to social exchanges in eighteenth-century Paris, pet birds were prized not just for their rich coloring or visual display, reflecting the material wealth of their owners, but also because owners could train their voices to sing or to speak human languages. Robbins details a thriving Parisian culture of bird ownership and gift giving. The market for indigenous and exotic birds as pets depended on a sophisticated network of corporatized delivery and transport, an established Oiseleurs' Guild, an industry of cage manufacturing and food production, and periodicals that catered to amateur bird enthusiasts. At times, the high market value that songbirds achieved could astound. For instance, a singing-speaking parakeet went for

[12] De Bomare's royal commission was also launched in the 1750s, helping him start his teaching career in natural history in Paris in 1756, ibid., 166-168.

[13] Ibid., 169-179.

720 livres in the *Affiches de Paris* (1778).[14] Brought into the fold of Parisian class hierarchies, birds could ascend above the station of some humans.

Birds from abroad and several species of monkeys were common in eighteenth-century France as house pets and status objects. Up until recently, pets have not been studied as markers of status, wealth, and learning as enthusiastically as fashion, food, furniture, and music. Even when historians study exotic animals and plants, the nobility and their elaborate menageries tend to dominate the literature. But increasingly in the eighteenth-century, exotic pets, particularly monkeys and parrots, became more common even among the labor class. Robbins argues that the increasing number of articles (about 150) about parrots and monkeys for sale and lost-and-found advertisements in the widely-read *Affiches* between 1778 and the 1790s, shows just how common pet birds had become across the class spectrum.[15]

Canaries were particularly popular for their prettiness and songishness (they began import from the Canary Islands to France in the early seventeenth century), the ease of breeding them, the availability of cages, which were highly regulated by guilds, and their smaller size relative to larger birds.[16] Yet the parrot was perhaps the most sought after, particularly the macaw or gray parrot, even though they could not be bred domestically. Robbins writes that "parrots added affection, humor, and flair to a household. Part of the fun, of course, was teaching them to talk."[17] Popular as well were manuals for playing games and teaching birds, including

[14] "Table 5.1. Representative Asking Prices for Birds and Monkeys, from Affiches de Paris," Robbins, *Pampered Parrots*, 128.

[15] Ibid., 126.

[16] Ibid., 113, 124, 132-140.

[17] Ibid., 129.

using blankets to cover their cages and mirrors.[18] New World, capuchin monkeys (often called the "organ-grinder monkey") and African monkeys were most prevalent.[19] They were generally more expensive than parrots, around 96-720 livres as advertised in the *Affiches*.[20]

Ownership and trade of exotic animals might reflect the diffusion of wealth from nobility to *nouveau riche* to skilled worker in eighteenth-century France. Simple wealth overcame the inheritance structures of the nobility as access to consumer goods increased.[21] Stories of the "lost parrots" of tradesmen, such as carpenters and artisans, appeared occasionally in Paris's *Affiches*.[22] Over time, exotic pets began to lose their luxury status as the influx of birds and monkeys into Europe grew. One letter from a monkey enthusiast (or *pithécophile*) in the *Journal de Paris*, requested advice on how to train his monkey from biting itself.[23] The *Journal* also published another "advice column" about a woman who was able to perform mouth-to-mouth CPR to her parrot.[24] In addition to advertisements, lost-and-found, and advice columns, birds and monkeys also began appearing in children's stories that no longer created a magical aura around exotic animals as in previous centuries, when they often severed as religious metonymy. Rather, public writing spoke to everyday life with them, and, at times, the heavy maintenance required.[25]

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[18] Ibid., 129, n. 2.

[19] Ibid., 130.

[20] Ibid.

[21] Ibid., 140.

[22] Ibid., 136, n. 42.

[23] Ibid., 136.

[24] Ibid., n. 44.

[25] According to Robbins, studies of exotic animals in the home could also reveal class conflicts: there was a common practice (or fear) from pet owners that servants would often take birds and sell them, then replace them with cheaper, inferior breeds, then wring their necks, lying that it was an accident, 138-139. The warning appears in the *Journal de Paris* by a "Darée" and was an urgent message about the conflict between "one half of Paris against

One insight into the moral landscape of eighteenth-century France worth stressing is that the increase in pet ownership, commerce, and trade across economic class and education became part of the democratization of natural knowledge about the world. As the distribution of goods, manners, and language of the upper class equalized across class boundaries, the previous divisions between *nouveau riche* and the educated class became increasingly frail, and in some cases, undetectable.[26] This would, in essence, explain why the *Histoire Naturelle des Oiseaux* was so popular for an amateur naturalist audience. It cannot be overstated how significant Daubenton and Buffon's *Histoire* was. It "surpassed the abbé Pluche's well-known *Le spectacle de la nature* as well as Diderot and d'Alembert's *Encyclopédie*."[27] The size of the collection, sheer number of visual presentations, and the efforts to create attractive, fanciful descriptions and stories all constructed (or amended) ideas about the natural world generally and avian life specifically for those who would never leave the European continent, much less the borders of their own country. Three thousand copies were bought up of the first three volumes and sold out in six weeks, though there were smaller versions of the work being published by natural historians eager to ape Buffon's success.[28]

The success of the nine volume *Histoire Naturelle des Oiseaux* speaks to Buffon's planning and industriousness. Buffon was a professional writer savvy at mobilizing various talents within his sphere of friends, who also had contacts that could tap into the exotic animal

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the other; that is, masters toward their servants, or honest people against their knaves," 139, n. 49. Still, exotic pets were grouped together with other luxury items and consumer goods, such as textiles and clothing, furniture, hair and wigs, breeds of dogs, and coffee, 141. I would add musical instruments to this list as they also demonstrated the prestige of involvement with global trade.

[26] Ibid., 148.

[27] Kathryn Rife Bastin, "Humanity in Play: Man Meets Monkey in *Ancien Régime* France," Ph.D. diss., (Indiana University, 2016), 176.

[28] Ibid., 175.

and pet markets. Poems and anecdotes about birds invited readers without a classical education in anatomy, physiology, and Linnaean taxonomy.[29] Buffon, for instance, not only used his travels abroad and first-hand accounts from contacts outside Europe, but also borrowed from domestic anecdotes and observations by pet owners in France, and, as mentioned earlier, inherited much of his knowledge from Rèaumur and Brisson, which decentralized expertise and widened the audience and sphere of experience of natural history.[30] Thus, local contacts and collections were as important and reliable to the descriptions as those from far away.[31] For instance, Buffon borrowed from letters written by amateur naturalists who never left France, and he published amateur observations and readings of the first several volumes of his *Histoire* in his later volumes.[32] Amateur naturalists, who were probably also pet owners—as was Buffon himself, who kept a domesticated and exotic menagerie that he may have inherited from Réaumur, saw themselves as new participants in the project to record and dominate life on the planet. Not merely self-indulgent, Buffon appropriately pitched his anecdotes and stories to his audience, which also explains why Buffon defended his writing, rejecting the accusation that his writing was mere drivel. In fact, Buffon was so aware of his own choice for a writerly style, that after he was admitted to the *Académie française* in 1753 rather than the *Académie des Sciences*, he wrote a "Discourse on Style" that also became a hit.[33]

The moral literary approach of the *Histoire* complemented the visuality as a means of its accessible educational program. Joanna Stalnaker has argued, in *The Unfinished Enlightenment:*

[29] Robbins, *Pampered Parrots*, 148.

[30] Ibid., 149.

[31] Ibid.

[32] Ibid., 150.

[33] Ibid., 173 n. 56.

Description in the Age of the Encyclopedia (2010), that the *Histoire* favors literary description (a kind of Enlightenment "descriptive poetry") over anatomical correctness, one reason why such modern collections as the *Pléiade* continue to excise such anatomical descriptions.[34] This emphasis on literary, poetic, and narrative writing in the *Histoire*, brings it into proximity to the liberal arts: the *oiseleurs* and monkey traders rather than the medicinal sciences. Thus, paintings and visual culture, poetry and literature, furniture making, and musical instruments are equally aligned with the *Histoire*. Buffon's books reflected a serious attention to visual detail and beauty. For his nine volumes of books, Buffon collaborated with Martinet along with some eighty artists to illustrate more than one thousand bird species—an expensive undertaking, and there were reported attempts to disseminate a cheaper version of the later volumes more widely. [35] But the illustrations were not merely ornamental. Indeed, an English translator of Buffon's works (1792) points to the importance of aesthetics to the books' project of education:

> To expatiate on the advantages arising from an acquaintance with Natural History might be deemed unnecessary. It affords an elegant and rational species of entertainment; and as it requires no previous course of study, it seems admirably fitted to captivate the minds of youth, and to fix their attention. It dispels many early prejudices, raises and warms their opening fancy, enlarges the circle of their ideas and leads by easy and flowery steps to the pursuit of abstruser [sic] sciences.[36]

Given the artistic appeal and usefulness of Buffon's ornithologies, it is likely that they found themselves in the same homes as collectors of live, exotic animals who both wanted to educate and entertain with the latest in natural history.

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[34] Joanna Stalnaker, *The Unfinished Enlightenment: Description in the Age of the Encyclopedia* (Ithaca: Cornell University Press, 2001), 7.

[35] Leclerc, *The Natural History of Birds,* Vol. 1 (London: A. Strahan, T. Cadell, and J. Murray, 1793), v-vi, *Eighteenth Century Collections Online*, https://link.gale.com/apps/doc/CW0109028249/ECCO?u=uclosangeles&sid=ECCO&xid=79697fb5.

[36] Ibid., vii.

In fact, Buffon was said to have not seen more than half of the birds and animals he wrote about in his *Histoire*. He relied on travelers abroad to send back "correspondences" and could not verify nor standardize their documentation.[37] Much of the writing was not completed by Buffon because he fell ill, relying on friends, particularly M. de Montbeillard, to complete the articles, who "followed closely his illustrious associate [so] that the Public could not perceive any change."[38] Not until the final four volumes (volumes 6-9), did the other authors identify themselves. Buffon's main audience could tolerate a certain level of inaccuracy in both content and authorship. The English translator(s) said as much in the "Preface by the Translator":

> With a masterly pencil, dipt in rich and glowing colours, he traced the animated picture. His elegant and spirited diction adors [sic] whatever subject he treats; his various and extensive learning at once pleases and instructs. His graceful turn of sentiments engages our affections; the sublimity of his descriptions commands our admiration and if the exhuberance of his fancy has sometimes laid him open to censure, we are disposed to overlook his errors for the brilliancy of his composition.[39]

By "we are disposed" the translator(s) meant "you should be disposed." Buffon recognized places where he fell short in his literary descriptions. In his detail of the bengal, he submits to the superiority of visual representation to identify and classify.

> In cases such as the present, where the principal object is to convey ideas of the richness and variety of the plumage, we ought to quit the pen for the pencil; at least, we must imitate the painter in describing not only the forms and lineaments, but in representing the sportive fluctuation of tints, their changing succession and combination, and above all in expressing action, motion, and life.[40]

[37] Ibid., iv-v.

[38] Ibid., v.

[39] Ibid., iii-iv.

[40] Ibid., 81-82.

According to Stalnaker, Buffon believed that naked descriptions "deadened the readers' senses," and lacked life; so his aim for more painterly, sensuous writing might have been a strategy to defend himself against accusations about obvious inaccuracies.[41]

Selections of Martinet's hand-colored engravings of birds he created for the *Histoire* show consistencies with Buffon's literary and posing strategies in that they displaced their subjects from their natural contexts and exchanged accuracy for aesthetic pleasure.[42] About 40-50% of the engravings are waterfowl, perhaps due to the fact that waterfowl congregate in larger numbers in predictable locations and are easier to observe than smaller birds. The ducks and other larger birds are illustrated on the ground (Plates 1-2), usually resting or standing on a simple patch of grass on a rock with no background. None but a handful are depicted in a fantastical, human environment. When they are, it is consistent with their thematic names or histories, such as "les grand martinets" (Plate 3), which are perched on classical architecture, or "les pardrix de mer" (Plate 4), which show ships sailing in the background.

Smaller birds of flight are generally drawn on a single branch with little or no foliage: a few have bugs and grass or wheat lightly decorating them, such as in the nightingale and the "mouette" (Plates 5-6). The greatest detail in Martinet is not so much in the richness in colors, but in detail of the plumage, particularly the tail feathers. This fine *disegno* draws the eye toward the specific details of the bird itself. When a bird is not indigenous to Europe it is marked by location. Several birds have banners or scrolls with their names on them for garnish or have a full annotation included, such as "La Jaseur" (Plate 7). Songbirds are included, but only the obvious ones: the nightingale and the coocoo (Plate 8).

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[41] Stalnaker, *The Unfinished Enlightenment*, 64.

[42] François-Nicolas Martinet, *Histoire des oiseaux peints dans tous leurs aspects apparents et sensibles* (Paris, 1773-1792), https://doi.org/10.5962/bhl.title.61476.

In comparison to the simian engravings in Buffon's other tomes of natural history, which can be startlingly human in body posture, dress, and activity, Martinet's birds look wooden with almost no motion, either depicted or implied. They could very well have been drawn and painted from a bird skin model. Again, the overall value here is in the beauty of the depiction and not the literal "accuracy." The detail on the feathers, their direction, the textures of the legs, and the filigree of head plumage draws focus on the pleasure of reading and the prettiness of nature. Thus, certain features are accentuated at the expense of others, such as the patterns on the feathers, the grace of the plumage, and the color coordination between sexes, at the expense of others.

This "posing impulse" forces the bird into particular positions. Birds do not stand still; their heads, for one, are in constant motion. They also oscillate between flight and ground easily. So it is striking that the engravings capture a hyper-reality of detail but an otherwise untruthfulness in the stillness, almost lifelessness, of the bird species. All of Martinet's birds are on the ground or perched. They are, in other words, accessible. The notion of hundreds of motionless birds lumped together gives the reader a sense of having mastery and time-stopped access over a collection. The artificial isolation, against a washed-out background, allows for the birds to be transported away from the exotic into the home. They are to be gazed at and in a sense captured by the viewer.

The descriptions of birds also forced readers into ontological encounters between humans and animals. The notion that birds and humans were somehow related warranted focused attention in the *Histoire*, and dozens of articles mentioned their ability to learn languages and to sing as a strategy to force virtual connections between human reader and natural animal. Natural historians and *oiseleurs* generally divided birds into speaking and singing birds. Birds possessed

a kind of "understanding" and the capacity for empathy and "sympathizing."[43] When a bird did not receive its gift for dancing or speaking, it showed the same kind of disappointment as its human owner.[44] Such was its ability to learn that Buffon called some birds "feathered pupils" able to maintain attention in their "schooling" and "lessons."[45] Whether from Africa, the New World, or domesticated in France, language education for birds was "considered as a very serious affair."[46]

Among the songbirds, the canary stands out. In Volume 4, the canary finch easily surpasses all songbirds since it could learn to speak and sing and was, thus, most suitable for the home, a natural complement in an unnatural environment: [47]

> If the Nightingale be the songster of the grove, the Canary Finch is the musician of the chamber. The melody of the former is derived from Nature alone, that of the latter is directed and improved by our instructions. With a weaker voice, with less extent of modulation, with less variety of notes, the Canary Finch has a finer ear, greater facility of imitation, and a more retentive memory; and, as the characters of animals depend principally on the quality of their perceptions, this delicate bird, alive to every impression, becomes also more social, more gentle; forms acquaintance, and even shews attachments. Its caresses are amiable, its little pets are innocent, and its anger neither hurts nor offends. Its habits too approach nearer to our own.[48]

The canary finch has all the attributes of a sophisticated songster: it has a good ear, it can modulate, imitate, and has a strong sense of temporal projection ("memory"). The other human qualities that Buffon projects onto the canary finch are also striking. It shows affection, it makes

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[43] Leclerc, *The Natural History of Birds*, Vol. 1, 321-322.

[44] Ibid.

[45] Ibid., 320.

[46] Ibid., 320-321.

[47] Ibid., 125.

[48] Leclerc, *The Natural History of Birds,* Vol. 4 (London: A. Strahan, T. Cadell, and J. Murray, 1793), 1-2, *Eighteenth Century Collections Online*, https://link.gale.com/apps/doc/CW0109362253/ECCO?u=uclosangeles&sid=ECCO&xid=cff3c02e.

friends, it has human comportment. The superiority of the finch is further enhanced by its teachability, particularly in regard to adopting the music "of our taste":

> Its education is attended also with greater success; it readily lays aside the melody of its native airs to adopt the harmony of our voices and instruments; it eagerly follows the notes, and improves and heightens their delicacy. The Nightingale, proud of its independent warble, seems desirous to preserve its purity; at least, he slights our music, and can hardly be brought to learn a few songs. The Canary Finch prattles or whistles; but the Nightingale despises what he deems the perversion of his talents, and perpetually recurs to the rich beauties of Nature. [The Nightingale's] ever-varied song can never be altered by man; that of the Canary Finch is more pliant, and can be modelled by our taste. The one therefore contributes more than the other to the comforts of society; the Canary Finch sings at all times, recreates our spirits in the gloomiest weather, and even adds to our happiness; it amuses all young people, and is the delight of the recluse; it relieves the languors of the cloister, and infuses cheerfulness into innocent and captive minds; and its little loves, which are manifest when it breeds, have a thousand and a thousand times awakened the tenderness of feeling hearts. It is as useful, as the Vulture is pernicious.[49]

The voice of the bird does immense work here. Buffon argued that the value of the canary finch was not only for pleasure but also for its services and usefulness to sociability, all of which are contained in the voice. A natural healer, the bird's song cleanses the air in the home and by extension makes a useful contribution to "the comforts of society." The ability to behave like a human is in the performance of music as well as its ability to learn to speak human languages "with considerable fluency," as was the case with the small linette (Figure 1).

> Some have also succeeded in teaching it to speak different languages, that is to whistle some Italian, French, and English words, &c. and sometimes even to pronounce these with considerable fluency. Many persons have from curiosity gone from London to Kensington merely to hear an apothecary's Linnet, which articulated the words *pretty boy*... This fact, together with many others, appears to me to establish the opinion of the Honourable Daines Barrington, that birds have no innate song; and that the warble peculiar to the different species, and its varieties, have nearly the same origin with the languages and the dialects of various nations.[50]

[49] Ibid., 2-3.

[50] Ibid., 52-53.

Of course, parroting an adjective and noun hardly demonstrates fluency. Still, Buffon avers that bird societies resembled human ones: they have a national origin, a language (and perhaps a dialect), and have education. They are good and attendant "pupils." It seems clear that owning birds asked owners to confront their humanity with a contact point between human and animal resting on the bird's vocal prowess.

Figure 1. Engraving of a linnet accompanying the English translation of Buffon's *Histoire*, Vol. 4., 1793.

The consistent references to musicality in Buffon shows the contested ownership and divisions of song and speech between humans and animals. Musicologist Holly Watkins's recent book, *Musical Vitalities: Ventures in Biotic Aesthetics in Music* (2019), argues that "music stands at the crossroads where human and nonhuman sound making meet."[51] Her project has been to understand the divisions between human and non-human that music generates, by exploring and meditating on the philosophical and shifting corporeal identities of involuntary reaction (animal) and cognitive response (human) to music. Human music can easily delve into the nonhuman by "overdeveloping the technical side of music… [which] threatens to lead back to the animal realm."[52] She quotes Johann George Sulzer (d. 1779) who worried that

[51] Holly Watkins, *Musical Vitalities: Ventures in Biotic Aesthetics in Music* (Chicago: University of Chicago Press, 2018), 112.

[52] Ibid., 117.

"virtuosic compositions demanding great physical skill… too often come off 'like a horse running in full gallop'."[53]

The imitative precision of some birdsong removes it from the human into the realm of the mechanical. But the mechanical, imitative abilities of birds do not explain their encroachments into features normally residing within the domain of human song, particularly creativity. Like humans, birds are capable of not just imitation but "invention."[54] Björn Merker has shown that some birds mature their songs in various and surprising ways. Some merely learn to imitate the songs of adult birds in a process that can be compared to "the transmission of cultural ritual."[55] Others are capable of original and flexible inventions. The marsh warbler can collect and redirect the sounds of over 100 bird species into their repertories while other birds' vocal maturation is "open ended."[56] This conflict continues on in bio-psychology research, which has shown that "phono-coding" or "recombinant vocalizations" in some bird species is related to the aesthetic enjoyment of birdsong. Singing in birds has shown to release endorphins and opioids in the brain.[57] So what is unique about human song when birds also sing for pleasure and to alleviate boredom?[58]

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[53] Ibid.; Fears of unbridled virtuosity and mechanical automatization were articulated time and again in the admirations for the mockingbird and its super-human mechanical skill in Buffon at borrowing, near perfectly, the calls of other birds. See Leclerc, *The Natural History of Birds,* Vol. 3 (London: A. Strahan, T. Cadell, and J. Murray, 1793), *Eighteenth Century Collections Online*, https://link.gale.com/apps/doc/CW0109873333/ECCO?u=uclosangeles&sid=ECCO&xid=b0977214.

[54] Watkins, *Musical Vitalities*, 127.

[55] Ibid., 127 n. 77.

[56] Ibid., 127.

[57] Ibid., 128.

[58] Ibid., 126-128.

The responses we have to extra-species music (described by Buffon in the case of birds that were able to whistle in tune to learned songs) can be troubling. Buffon gives an unusual amount of space to an introductory article on parrots, describing and arguing how social structures of humans (and not just language) are the reason for man's dominion over nature. "Improvement" thus includes everything from a sense of historical consciousness and learning to nurturing from mothers. Everything else is mere imitation.[59] Buffon does entertain the notion that, under the right conditions, birds could reach the cultural and social sophistication of humans, but stipulates that that would require a society-wide effort of assimilation. In so doing, Buffon introduces a species-biased assimilation tactic that creates a hierarchy of species with humans at the top and others below being underdeveloped, though potentially "improved."

The Enlightenment projects of creating species hierarchies are not surprising since others have argued that Enlightenment intellectualism was largely responsible for creating racial hierarchies that are still with us.[60] Buffon's long entry on the "Canary Finch" conveys a sense of the same species hierarchy tactics. It is a lengthy forty pages, and the very first entry in the fourth volume, occupying a prominent place in the collection. While there is space given to descriptions of song, habitat, and appearance, most of the entry covers the successful taming and breeding of the canary in domestic spaces. Control over the destinies of these birds was one way of not only taking command over the species but also taking control over the forces of nature by systematizing its primary process: reproduction. At some point, Buffon's language meditates on the causes of bird personalities and character, even moral uprightness. For Buffon, the character

[59] Leclerc, *The Natural History of Birds*, Vol. 6, 65-68.

[60] Ibram X. Kendi, *How to Be an Antiracist* (New York: One World, Random House, 2019).

and dispositions of birdlife became fixed within physiological criteria. For instance, Buffon writes:

> [I]n the quadrupeds, as in man and in the small birds, the difference of the moral qualities often disturbs the correspondence of the physical properties. If anything could prove that the character of the individual is an original impression of nature which education can never alter it is an instance in the Canaries.[61]

Character, moral fiber, and receptivity to education are fixed to physical traits, and shows how intertwined natural history and the classification of animal life is with the classifications of races in the mid-eighteenth century. Buffon continues by quoting Jean-Claude Hervieux de Chanteloup's (d. 1747), whose *A New Treatise of Canary Birds* (1709) describes the violence and disturbing qualities of ill-bred canaries:

> [They] differ from each other in their tempers; some males are always sad, and, as it were, absorbed in reveries, generally bloated, and sing but seldom, in a mournful tone… [They] require an immense time to learn, are imperfectly acquainted with what they are taught, and easily forget… There are other canaries which are so wicked, that they kill the female… Others are of a disposition so barbarous, that they break the eggs and eat them; or if these have escaped their ferocity, they lay hold of the callow brood by the bill, drag them into the cage and murder them. Some are so wild and independent, that they… can neither be governed nor treated like the rest… Others are excessively indolent.[62]

These passages are rich in Enlightenment notions of social order: criminality, governance, learning and resistance, barbarousness and violence. By contrast, Buffon writes of "our favourite Canaries, which are ever joyous, and ever chanting; so tame and so lovely; are excellent husbands, and affectionate fathers."[63]

The birth of structural and biological racism in the Enlightenment was not lost on Buffon and his translators. After describing the myriad diseases, afflictions, and improper temperaments

[61] Leclerc, *The Natural History of Birds*, Vol. 4, 21.

[62] Ibid., 21-23.

[63] Ibid., 23-24.

of domestic canaries (everything from distemper to epilepsy) and how to avoid them, he blames much of their physical suffering to their social circumstances; specifically, freedom and slavery.

> What miseries in the train of slavery! Would these birds, if they enjoyed their native freedom, be asthmatic, scabby, and epileptical? Would they be afflicted by inflammations, abscesses, and shankers? And the most melancholy of disorders, what is produced by the craving of unsatisfied lust, is it not common to all beings reduced to captivity?[64]

The establishment of a superior race found its mirror in the cultivation and control over animals, of training them, teaching them, and dominating them. "There is no master without the slave," goes the famous paraphrase of Hegel's master-slave dialectic.

This conflict between superiority and liberty was never resolved in Buffon's *Histoire* itself. But Kathryn Rife Bastin followed a similar line in her study of monkeys and the colonized body in Buffon's tomes on simians:

> The engravings [of the new world monkeys] favor resemblance: they function to substantiate likeness and ultimately lessen difference. Thus the viewer infers that primates are, in fact, mirrors for the human—disturbing mirror images in the chain of being, uncivilized reflections of gradation of what it means to be human and what it means to be animal.[65]

While there are fewer disturbing indicators by way of image and engraving for birdlife in Buffon's tomes, the emphasis on civility and repressing the beast emerge nonetheless. Civility is, among other things, being a good father, a learned citizen, and a good singer. Mastery in the case of the canary is through breeding, through taming behavior, through teaching and the recitation of song, and through restricting physical freedom in cages.

Other bird manuals gave instruction on raising, teaching, and restricting canaries in the home. Though first published in 1709, Hervieux de Chanteloup's *A New Treatise of Canary*

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[64] Ibid., 40.

[65] Rife Bastin, "Humanity in Play," 223.

Birds was translated into English in 1718.[66] The short treatise was continually published in French through the 1780s; meaning that Hervieux's manual on canaries remained contemporaneous with a long list of more academic ornithologies on bird species, such as Brisson's *Ornithologie* (1760) and de Monceau's *Traité général de pêches* (1769-1782). Largely instructive, the treatise seeks to correct current misgivings about breeding, feeding, housing, healing, and teaching canaries, which, according to Hervieux are less expensive, more agreeable, smaller, and easier to contain than other exotic birds (Figure 2). His motivation for publishing specifically points to an earlier treatise on canaries that contained inaccuracies or misgivings:

> I am not ignorant, that a Treatise has been writ, of all Birds in general; but the Author of it has allow'd but one Chapter for Canary-Birds; leaving it perhaps to some other, who is better acquainted to say more of them. I shall therefore add, at least 24 Chapters, to that which has been already write on this Subject.[67]

The treatise also published short monophonic airs and preludes in musical notation. There were two in the 1718 translation, a 10-bar prelude and an 8-bar "Marches des Surlobes," both in C major. More monophonic tunes were added in subsequent editions, with up to five in the 1785 French edition. The entire selection may resemble a baroque dance suite in miniature: a prelude and a marche are paired with a new 6-bar prelude and an 8-bar gavotte (Example 1). These are then followed by eight shorter tunes, including another prelude and its autre, marche, canarie, gavotte, menuet, fanfare, and tambourin (Example 2).[68] All tunes are in C major, "which all men

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[66] Jean-Claude Hervieux de Chanteloup, *A New Treatise of Canary Birds: Containing the manner of Breeding and Coupling them, that they may have Beautiful Young Ones. With Curious Remarks relating to the Signs and Causes of their Distempers, and the Method of Curing Them*, English translation, 1718 (London: Bernard Linton, Benjamin Barker, and Charles King, 1718), digitized facsimile, https://books.google.ca/books?id=oFpgAAAAcAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.

[67] Ibid., n.p.

[68] Ibid., *Nouveau Traité des Serins de Canarie, contenant La Manière de les Connoître et de les élever; leurs Inclinations, leurs Maladies, et les Remedies qa'il faut observer pour les Guèrir. Nouvelle édition, à laquelle on a joint Le Traité du Rossingonl et des Petits Oiseaux de* Volière (Paris: Chez Fournier, Libraire, rue du Hurepoix, près

know is made for Birds" and some are in binary forms. Each has light ornamentation but all are intervallic and scalar and do not reach beyond an intervallic 9th. (This is so as not to stress out the young canary's throat, apparently.)

According to Hervieux, the canary bird is far easier to teach than the nightingale as well as easier to raise with few chances of failure and without the need to make special food as was demanded of the nightingale.[69] The canary also sings year-round, unlike other birds. Hervieux recommends that the owner begin the canary's musical training early after separating it from its mother—a fortnight, to be precise.[70] They are to remove it to check to see if it has a strong warble, an indication that it is a cock, and bring it to a separate quiet room in a different cage out of earshot of other birds, particularly wild birds with "Wild Notes."[71]

Figure 2. Arranging layers in a canary cage. (n.p.). Hervieux, *A New Treatise of Canary Birds*, 1718 English translation.

Owners are to cover the cage in a light linen sheet at first and play the tunes on a flageolet, a fipple flute with a sound that resembles the recorder but with a softer, reedier tone, like an aulos, supposedly so that the music is not so loud that the canary tries to match the

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du pont Saint Michel, 1785), digitized facsimile, https://ks4.imslp.net/files/imglnks/usimg/c/cf/IMSLP615105-PMLP988522-hervieux_serin_rest.pdf.

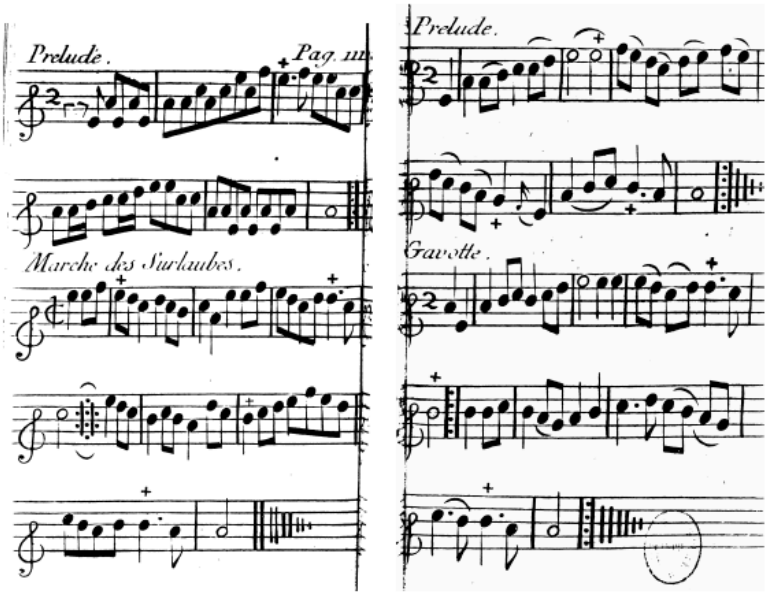
[69] Ibid., *A New Treatise of Canary Birds*, 48.

[70] Ibid., 49.

[71] Ibid., 50.

volume and blows out its voice.[72] The owner is to give lessons five times daily: two in the morning, one midday, and two in the evening.[73] In each lesson they are to play through the tunes continuously without stopping. Care must be given to keep the birds from being distracted and so morning and evening lessons are the most critical.[74] Hervieux also instructs that the bird should not be taught more than two tunes, as it can overtax the memory and confuse the bird if it attempted to commit more to memory.[75]

Example 1. Two preludes, a Marche, and a Gavotte, all in C major for the flageolet from the French edition, 1785. The first prelude and marche appear in the 1718 edition as well.



What is striking about this quaint treatise, is not how similar it is to other manuals on raising, taming, and breeding domestic birds, or how prevalent and popular they were (this one

[72] Ibid.

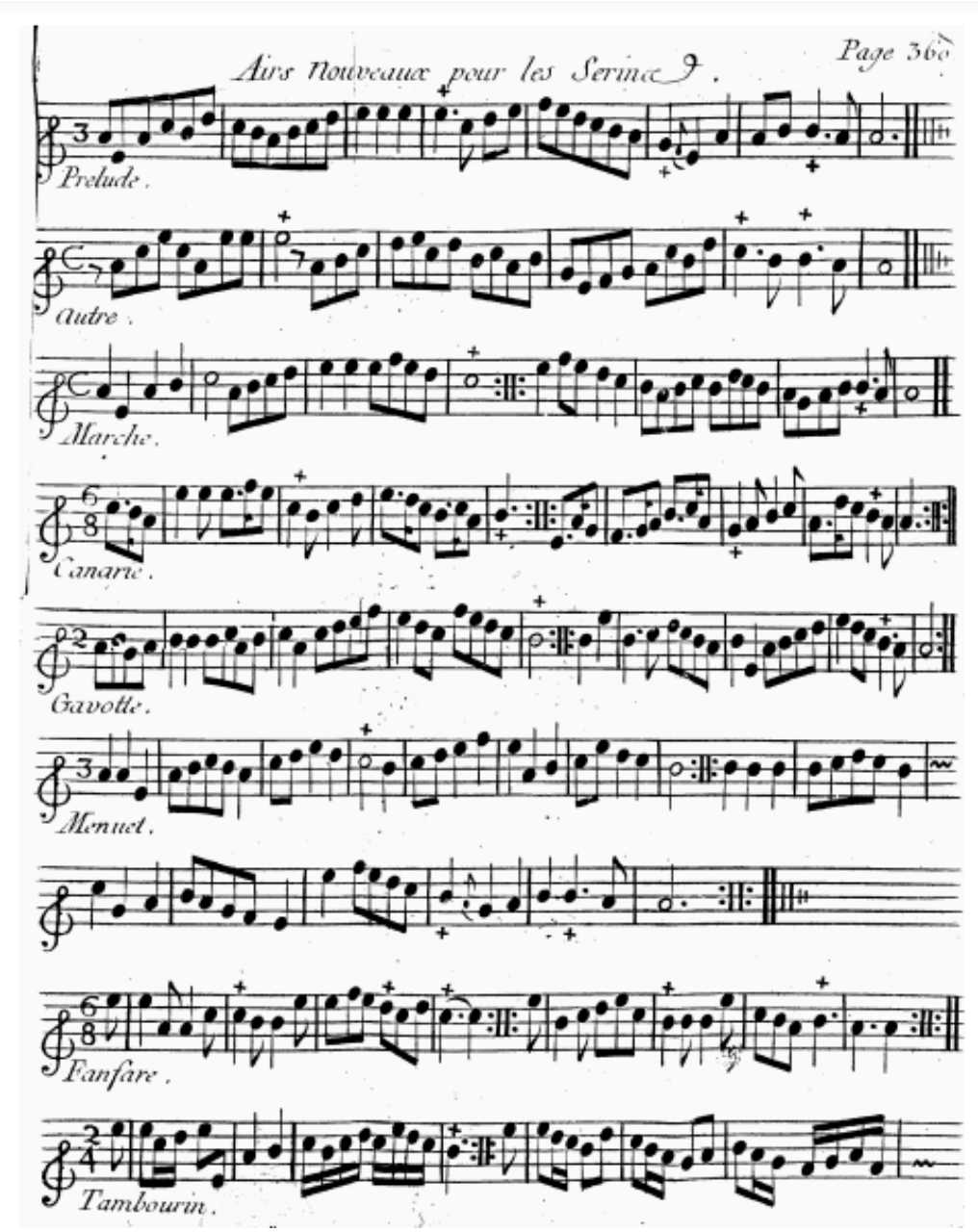
[73] Ibid.

[74] Ibid., 51.

[75] Ibid., 50-51.

alone, in circulation for some seven decades), but how much removing, posing, repositioning, and repetition is involved in disciplining nature to become an artisanal craft.

Example 2. Eight "new" airs for the 1785 edition, resembling a dance suite.



Yi-Fu Tuan has written about power and pets in his book *Dominance and Affection: The Making of Pets* (1984). In it, he writes about power as "consciously felt possession[s] and of the

need to be a master as a conscious need."[76] With that in mind, he explains that the aesthetic manifestation of "power" can be found in poetry, pottery, and landscape paintings that incorporated and imprisoned nature:

> landscape painting is even more clearly a confident act of incorporation. Mountains and rivers—marvels of nature that far dwarf man—are caught by strokes of the brush on canvas or paper. Captive nature is then put in a frame, nailed to the wall of a house, there to be looked at and appreciated or to serve as pleasing background (a touch of wildness) among the ordered events of social life. It cannot be mere coincidence that landscape painting emerged in Renaissance Europe, a time when Europeans took great pride in their cities and in the power over nature.[77]

In the next section, I will examine how Christophe Huet's *singerie* paintings on the Blanchet harpsichord provide insights into the harpsichord as a site for forced encounters with animality.

Harpsichord Painting

Eighteenth-century French harpsichord painting drew from a strong tradition of painting in Antwerp, a major hub of a thriving market in visual art, specializing in still life, gallery, and cabinet paintings. The Flemish harpsichord, with a cabinet painting on the inside lid, a still life painting on its soundboard, and filigree around its perimeter, would inscribe this as "the triumph" of Flemish painting. In fact, many harpsichords were easily dismantled and used as wall panel paintings, especially if the room decorations were coordinated with wallpaper, furniture, and lighting. Moreover, French harpsichords were related to and functioned as ostentatious pieces of furniture. The body was often supported by ornamental carpentry in the fashion of modern furniture design. Guild rules in Paris required that instrument makers contract painters and

[76] Yi-Fu Tuan, *Dominance and Affection: The Making of Pets* (New Haven: Yale University Press, 1984), 3.

[77] Chinese landscape paintings have a different history, of course; ibid., 4.

craftsmen outside their shops for non-musically functioning detail.[78] Chair and table-makers likely crafted the furniture designs, especially the legs. Howard Schott explains that Parisian harpsichord makers congregated in the same districts as the cabinet makers (*ébinistes*) and carpenters (*menuisiers*) in Faubourg St. Antoine and Faubourg St. Honoré .[79]

The harpsichord may be a paragon of the staged and posed collection, of forcing, collapsing, and molding nature into a particular position and reanimating it by interfacing with commands on the keyboard. Placed as the focal point in a room, the French harpsichord was as much a piece of visual art that rivaled even the most terrific oil painting as it was a musical instrument. While the simplest harpsichords had a solid color exterior with two gold bands that wrapped around its perimeter, faux-marble, *chinoiserie,* or *singerie* designs were also common though more expensive. Once opened, the underside of the harpsichord lid sometimes revealed a spectacular historical, allegorical, or landscape painting as a setting for gods and muses, or people in nature. While French harpsichord painters often did not leave signatures, elaborate lid and case paintings by prominent artists by John-Antoine Watteau and Christophe Huet have survived, also unsigned.[80] Sometimes the lid paintings had very little to do with music, but illustrated the identity, history, or chimerical aspirations of its owner. Still, they reflected not only personal aspirations but also the desires of international commerce. The political, economic, and religious aspirations of international trade and diplomacy in regions that were not controlled by France were often displayed as decorations on furniture even though their bodies were

[78] Howard Schott, ed., *The Historical Harpsichord*, Vol. 4, *A Monograph Series in Honor of Frank Hubbard* (Hillsdale, NY: Pendragon Press, 1984), 59.

[79] Ibid.

[80] Ibid., 44.

constructed in regions where France already had control over resources. The desire of possession is impressed on the bodies of the already colonized.

Christophe Huet's monkey paintings on François-Étienne Blanchet I's harpsichord (1733) with his *singeries* (exotic monkey motifs) dated to 1758 (Plate 9) force a blurring of boundaries between human and animal.[81] Like all the objects examined in my dissertation, the paintings on the bodies of the instruments and the room the harpsichord occupied cannot be separated. He also decorated walls of other salons, including two in the Château de Chantilly, with the same *singeries* grotesques as the Blanchet harpsichord lid and case.[82] The monkey tropes and *singerie* genre may be read as satire and commentary of the silliness, farce, and triviality of courtly decorum and ceremony. Biped monkeys, usually "new world," are depicted in a variety of contexts, almost always either richly dressed in courtly attire or in contemporaneous, charming country clothing. They play musical instruments and dance alone or in ensemble, flirt and express romantic desire, and mingle with other fauna, namely speaking and singing birds.

Alternatively, the *singerie* paintings on the Blanchet harpsichord do not seem to have the same biting mockery of life in court and country as others in the same genre. The monkeys cover almost every surface of the double manual harpsichord (all but the legs and the "table" on which the instrument rests) (Plates 10-13). Participating in the rococo style, the monkeys are enclosed or often straddle arabesque designs of blue and pink on a white background. Each plays a true and identifiable instrument. The drummer has a drumstick in one hand and plays a double reeded

[81] Up until recently, Christophe Huet (1700-1759) was a painter of somewhat obscure reputation. Most famous for his *singerie*, bird, and arabesque paintings in the Château de Thoiry and Château de Chantilly, the collaboration with François-Étienne Blanchet for the harpsichord was typical for genre painters as the panel decorations on harpsichords were often similar in style, size, and placement as panel paintings in decorated rooms.

[82] Ibid.

instrument in the other (appropriately set outdoors as was the common purpose of oboes and other double reeded instruments). Another solitary monkey musician sits on a rock under a tree playing an eighteenth-century transverse flute. The embouchure is carefully painted with tensed lips and his five fingers on each hand are positioned delicately on the finger holes to play an F-natural. In a small monkey ensemble, another oboist, a four-string violoncello with a tailpin, tuning pegs, and F-holes, and perhaps a four-string *viola da braccio* form a triangle (a trio sonata but without continuo) on a rock with another monkey keeping time with the French baroque *bâton*. Not merely imitating human music, the musicians eye the time-keeper in the center while reading sheet music hanging from a tree. These monkeys are coordinated and musically literate.

Whereas the musician monkeys are courtly and trained, the monkey dancers are dressed in modest country-attire, a woman in a corset, simple petticoat, and bonnet, and a man in an open coat with no neck ruff nor embroidery and no arm cuffs. These monkeys perform a *pas de deux*, a dance for two, but with seemingly correct courtly gestures. The male performs a bow and the woman begins to curtsey. Another solitary monkey, with loose-fitting, uncouth clothing, plays the castanets (Plate 14), perhaps pointing back to the sarabande. A truly global genre, the sarabande was a New World dance played with castanets that mingled Spanish and Arabic influences, which eventually moved back to Spanish courtly life in the sixteenth and seventeenth centuries. By the eighteenth century, the sarabande survived only in instrumental music, and in keyboard literature in particular. While it was no longer danced, the keyboard dance itself still evoked ideas about South America—hence the New World monkeys—and its distinctive untamed, shocking harmonic character and meter.

Again these monkeys are surrounded by floral branches, symmetrical arabesques; framed by wooden columns, they dance around a tree. Despite the fact that these monkeys are

performing country dances as opposed to the more skilled trio sonata, they still execute precise gestures without a sense of clumsiness. Modest elegance seems to be highlighted here without any embarrassment or mockery. Though part of the larger genre of rococo *singerie*, the paintings depart from the mocking sense of the others in the genres, such as Watteau's "Monkey Sculptor" (ca. 1710)—a monkey earnestly chipping at a marble bust but in elaborate, dandy-like attire—in that Huet's depict music making in an unironic paradisiacal world.[83] The notion that they balance courtly life and country modesty is fitting since the harpsichord had two homes, sharing its time between the Hôtel Machault in the fashionable Marais district in Paris and the Château de Thoiry in Thoiry, France, which had an attaching zoo and botanical garden as a bucolic reserve away from urban Paris, set apart much like Versailles. The zoo and botanical gardens take visitors still today.

In each of these depictions there is one important element or instrument missing to complete the ensemble: the harpsichord. The harpsichordist is the missing link, the continuo part for the trio sonatas and solo instruments—the accompaniment that (re)-animates the posed monkey scenes. In this dynamic, entangled organology, the *singerie* images depend on the human animation of the harpsichord as much as the harpsichordist depends on the images to form the ensemble. With monkeys convincingly performing human musical customs, these images may provoke the harpsichordist into an uncomfortable examination of their own simian status with a mechanical instrument mediating between them.

Visualizations of birds also force relationships between human and animal. The Huet harpsichord also carefully displays bird paintings that create different tiers of sound production, from singing to speaking. Many harpsichord decorations also depict songbirds that are not

[83] Marie Christine Anselm, Nicole Garnier-Pelle, and Ann Forray-Carlier, *The Monkeys of Christophe Huet: Singerie in French Decorative Arts* (Los Angeles: J. Paul Getty Museum, 2011), 132.

necessarily identifiable. In this case, the species are distinguishable, ranging from mallard ducks to parrots, from flamingos to purple swamphens (Plate 15). The most central bird is the gray parrot, according to Marie-Christine Anselm who has written the most critical, though brief, commentary on the Huet *singerie*.[84] Much like the monkeys, the birds come as close as they can to human language and music similar to the "pink-faced monkeys [who] disconcertingly portray[ed] the blurry boundary between human and animal."[85] Further still, these monkeys, along with these singing and speaking birds, could mingle with humans in the room, creating a "hall of mirrors" that parallels real theatricals where eighteenth-century drawing rooms transformed into blended theatrical spaces of professional actors and aristocrats.[86]

Alternatively, the presence of birds on the harpsichord could very well refer back to representational tradition of birds as transcendent and celestial. George Lakoff and Mark Johnson's *The Metaphors We Live By* (2003) discusses how metonymy governs the way we live and engage with the world and is not arbitrary. For instance, the metonymy of the dove is grounded

> in Western culture and the conception of the Holy Spirit in Christian theology. There is a reason why the dove is the symbol of the Holy Spirit and not the chicken, the vulture, or the ostrich. The dove is conceived of as beautiful, friendly, gentle, and, above all, peaceful. As a bird of flight, its natural habitat is the sky, which metonymically stands for heaven, the natural habitat of the Holy Spirit. The dove is a bird that flies gracefully, glides silently, and is typically seen coming out of the sky and landing among people.[87]

There is also a long tradition in early English modern poetry where a poet looks to a mechanical, metal songbird for divine inspiration. Indeed, the poet George Wither demonstrated this

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[84] Ibid., 129.

[85] Ibid., 131-132.

[86] Ibid.

[87] George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: University of Chicago Press, 1980), 40.

confluence of divine song and engineering when his poet in a "Proem" longed "to imitate that fatalle note, | which is effused from the silver throte | Of that faire Bird."[88] Wendy Beth Hyman writes that "whatever the genre (lyric, epic, romance, drama), when little automated birds appear, they do with this curiously combined sense of something that straddles technology and divinity, mathematics and magic."[89] Wherever birds are songs are too, and early modern song is always at liminal sites, resting at the meeting grounds of the discernible and the indiscernible. In truth, song is the very thing that merges the two. Song is not only a source of inspiration but the technique (the *technê*) of making.[90] Hence, John Milton in *Paradise Lost* wrote that the divine dove "[brooded] on the vast Abyss," whispered into it and "mad'st it pregnant" (Book 1: 21-22).[91] Thus, the frequent decorations of birds on harpsichords could suggest that the instrument is a meeting ground, a liminal site, and a mechanism that helps human players access both the celestial and terrestrial planes, with birds that transmit and decipher music like little machines down from heaven.

Unmistakable are the stylistic choices shared between harpsichord avifauna paintings and Martinet's hand-colored engravings of birds for the *Histoire.* The visual strategies of isolation and control (erasing the natural background, for instance) of avifauna adhere to both book and soundboard. The typical soundboard painting on both Flemish and French instruments had a

[88] George Wither, "Proem," The Great Assises Holden in Parnassus by Apollo and His assessours (1645), quoted in Wendy Beth Hyman, "'Mathematical experiments of long silver pipes': The Early Modern Figure of the Mechanical Bird," in *The Automaton in English Renaissance Literature*, ed. Wendy Beth Hyman (Farnham: Ashgate, 2011), 145.

[89] Ibid., 149.

[90] Almost literally from Latin as *inspiro, inspirare, inspiravi, inspiratus*, or to blow upon into, breathe into, to instill or implant.

[91] John Milton, *Complete Poems and Major Prose*, ed. Merritt Y. Hughes (Indianapolis and Cambridge: Hackett Publishing Company, Inc., 1957/2003).

generous collection of colorful flora, especially around the keyhole or "rose," populated by food, insects, and birds (Plates 16-17, 21). The bird was by far the most prevalent and important motif. While goldfinches seem to be the most common bird painted, other exotic birds, such as parrots, cockatiels, birds of paradise, and peacocks, sometimes strutted in (Plates 18-19). Typically, these birds perched on a dilapidated log with struggling green shoots foretelling the rebirth of dead wood into a musical instrument (Plate 20). As discussed earlier, Martinet also paints birds on single branches or on stones with washed out backgrounds as if plucked from their environments and flattened for easy transport into the home.

Unlike Flemish soundboard paintings that varied in their orientation from horizontal to vertical, French harpsichords were invariably oriented toward the keyboard to give the performer a sense of command and domination over a field of nature in a box. The proliferation of decorated bird paintings on soundboards, close to the very heart of the instrument, is a strong allegory representing sound and the sense of hearing.[92] Even the strings that hover above the paintings seem to appear as the bars of a bird's cage. Yet, this confrontation between nature and man mediated through machines was not merely contained in flat visual representations, but also embodied in the aural and performative registers of the instrument as well.

In the following sections, I will revisit Rameau's *Pièces de Clavessin avec une Méthode pour la Méchanique des Doigts* (1724) to explore how it becomes its own self-directed book of "improvement" that replicates Buffon's aesthetic didacticism in books of natural history and

[92] These bird paintings responded to other media: bird books. The painters of Joannes Ruckers's and Van Everbroeck's instruments often patterned their designs after contemporaneous ornithological books, such as Collaert's *Avium* (c. 1610). The instruments of French families Taskin and Blanchet did very much the same. An unnamed painter for the Taskin workshop borrowed animal illustrations from engravings in La Fontaine's *Fables* and a parrot engraving from Robert Sayers "the Ladie's Amusement" (c. 1762). Schott, *The Historical Harpsichord*, 125, 160; La Fontaine's *Fables* received special attention as 275 engravings after Jean-Baptise Oudry's cartoons for the Beauvais manufactory were released over the course of four years (1755-1759). These images of fauna appeared on tapestries, chairs, and settees and other objects in French drawing rooms. Anselm et al., 127-128.

Huet's painterly encounters with animality. In particular, I will consider its bird pièce, "Le Rappel des Oiseaux," a genre pièce very much like Huet's animalia paintings on the Blanchet harpsichord, as an act of bringing home and controlling nature as pets. Rameau's harpsichord pièce captures the dynamic entanglement of living and dead. Like Martinet's colored engravings, Rameau's posing of birds in "Le Rappel des Oiseaux" captures the deadness of animal life in collections but does what only music can do: reanimate life through play. Lastly, Rameau and his manual, the *méchanique des doigts*, were also immediately involved with the "collecting mentality" and the composition of natural life.

"Home Improvement" in Rameau's Méchanique

As with Buffon and Martinet, which required no "previous course of study," Rameau's guidance for improving the hand in the *méchanique des droigts* depends on its accessible and aesthetically-minded visual presentation for a non-professional readership. Printed by Charles-Étienne Hochereau (d. 1725) in 1724 in oblong, Rameau's *méchanique* sold for a reasonable 7 livres from François Boivin's (d. 1733) prominent music print shop "À la régle d'or, ruë St. Honoré." The title page lists Louise Roussel as the engraver (before she married prominent violinist and composer Jean-Marie Leclair in 1730). Similar to Martinet's clear *disegno* in illustrating birds and Buffon's accessible, detailed precision of descriptions of bird species, Roussel's notation in Rameau's *Pièces* is orderly, clean, and clear. The table of ornaments and their executions is particularly noteworthy as it fits a large amount of information on one sheet without appearing cluttered (Figure 3). Not merely a key of the publisher and Rameau's idiosyncratic notation, the table guides the student from symbol to action. In the furthest column to the left are the symbols for the ornaments (or *agréments*) next to which are their basic

realizations in a separate column. In the third column are the contextual ornaments; for instance, how the hands should execute a series of symbols within the confines of a melodic pattern. Finally, once the student can execute the *agréments* and their expressions, they can then play the *minuet en rondeau* in the final column, which contains all the primary embellishments in their native environments and unrealized forms. The *minuet* serves not only as practice with quick visual references, but also as an instrument to memorize the ornaments and to naturalize their expressions. This ease of reading from careful engraving continues into the pièces. There is an economy of vertical and horizontal spacing within the bar, the note stems are straight, while the slurs and beaming are shapely and taper; the ornaments are always obvious.[93] In short, Rameau's book not only is a pleasure to look at but also attempts to impart confidence in readers as they work toward their improvement.

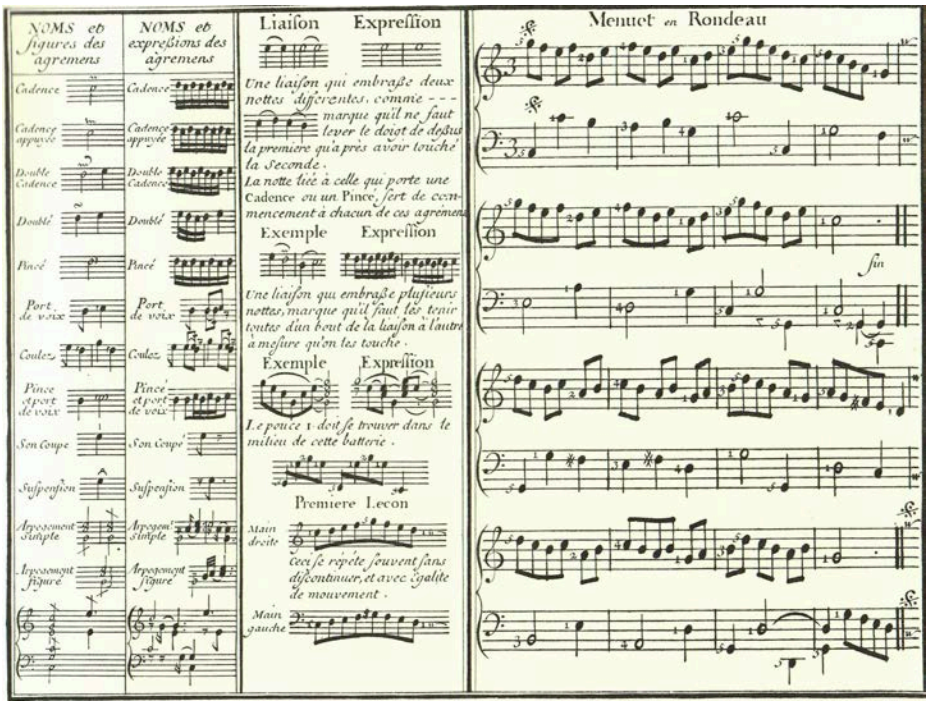

Figure 3. Table of Ornaments from Rameau's *Méchanique des Doigts*, 1724.

[93] By contrast, the engravings in François Couperin's *Pièces* often look crowded and the bars appear to shrink and expand in order to accommodate the spacial limitations of the page. In addition, the visual spacing between notes and rests are not temporally accurate and require extra work on the performer's part to play them in succession.

Rameau's *méchanique* immediately addresses the intersection of nature and skill, specifically how the innate faculties of the hand can be retaught and improved even in the case of having unfortunate equipment.

> This technique [of Perfection] is nothing more than frequent exercise of a regular movement: the aptitudes for which it calls are natural to everyone…I would even go so far as to say that assiduous and well-conducted work, the necessary attention and a little time will be bound to make up for less favoured fingers.[94]

Just like Buffon, Rameau's book is aimed directly at the domestic space, where one need not hire a master teacher. The book is the teacher, claims the subtitle, of "how to obtain a perfect execution on the instrument."[95] The manual's "do-it-yourself" approach is realized through the lengthy, blow-by-blow instructions of how to sit, position the hand, angle the elbows, and in its instruction regarding the various weight of the fingers on the keys, their proper patterning, and how to execute difficult passages and ornaments. Throughout, Rameau continually applies the adjective "natural" (*naturel[le])* to acceptable and correct technique of the hands. For instance, in his discussion on how to execute the ornaments *tremblemens* and *cadences*, Rameau writes to the reader to "take great care not to rush the end of the trill [*cadence*] in terminating it for it will close naturally once one has grown accustomed to it."[96]

Buffon also saw that education, elegance, and aesthetics could bring the casual reader of natural history knowledge about the greater sciences. For Rameau, aesthetic engagements that

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[94] "Cette méchanique n'est autre chose qu'un exercice frèquent d'un mouvement règulier: les dispositions qu'elle demande sont naturelles à un chacun… car j'ose advancer qu'un travail assidu & bien conduit, que les soins nécessaires & qu'un peu de tems dédomageront immanquablement les doigts les moins favorisés," Jean-Philippe Rameau, *Pièces de Clavessin avec une Méthode pour la Méchanique des doigts, où l'on enseigne les moyens de se procurer une parfaite execution sur cet instrument, et avec une table pour les agréments* (Paris: 1724), ed. Erwin R. Jacobi (Kassel: Bärenreiter, 1959).

[95] "Où l'on enseigne les moyens de se procurer une parfaite execution sur cet instrument," ibid.

[96] "Il faut bien se garder de précipiter la cadence sur la fin, pour la fermer: elle se ferme naturellement lorsqu'un en a une fois acquis l'habitude," ibid.

lead to revelations in the sciences are most evident in Rameau's treatises on harmony, particularly *Traité de l'harmonie réduite à ses principes naturels* (1722). Rameau's theories on harmony were not only the first of their kind in synthesizing several generations of compositional and speculative theory on music, but also gathered together the latest in empiricist thought on acoustics, gravity, and optics. According to music theorist Joel Lester, Rameau developed his musical mechanics in *Génération harmonique* (1737), explaining the tonal attractions of the subdominant and dominant toward the tonic as a kind of gravitational force, a concept heavily colored by Newtonian physics.[97] Rameau's approach to musical performance would articulate an analogous relationship between composition and acoustics, art and nature. He explains, with exceeding detail, that teaching the hand to move naturally is "a particular method of renewing fingers movement imparted to them by Nature."[98] Rameau's perfection of touch ("*la perfection du toucher*") can only be brought on by clarifying the naturalness of the hand. Nature, artifice, and machine will then manifest in a bird-call pièce, where animating the calling of birds demands a human touch and compositional strategies of control.

[97] "Nature" was a potent talisman of Enlightenment thought in all areas. Rameau's relation that much of what had deduced painstakingly from the ratios of a vibrating string actually occurred in Nature cause him to redefine the very basis of harmonic theory, in essence changing it from a Cartesian deductive system to a Newtonian empirical system….Invoking numerous empirical demonstrations and experiments as a proof for the *corps sonore* (patterned self-consciously upon the model of Newtonian optics) Rameau believed his musical theories were on par with the most advanced scientific discovers of the age; Joel Lester, "Rameau and Eighteenth-Century Harmonic Theory," *The Cambridge History of Western Music Theory*, Thomas Christensen, ed., (Cambridge: Cambridge University Press, 2006), 768. For a fuller discussion of Rameau and his approaches to Newton, et al., see Thomas Christensen, *Rameau and Musical Thought in the Enlightenment* (Cambridge: Cambridge University Press, 2004), 123-9, 770-771.

[98] "Une méthode particuliere, pour renouveller dans les doigts le mouvement dont la nature les a douez, & pour en augmenter la liberté," Rameau, *Pièces de Clavessin*, ed. Jacobi.

Bringing birds home

In capturing birdsong in the mechanized action of the harpsichord, Rameau's "Le Rappel" systematizes bird song through harmonic transformations: much like their personalities and temperaments were systematized by cataloguing, collecting, and breeding. Similar to contemporaneous visual strategies that demonstrate control over avifauna, Rameau's pièce also isolates birds from their natural background to discipline and domesticate them. As in Buffon's *Histoire*, these birds are richly dressed. The mechanical calling of birds is expressed in melodic echoes, sequences, and ornamental "vocal" gestures (namely, through the expressive use of the *pincé* ornament) along with bizarrely mechanical repetitions of dissonances and static harmonies. Not named for a single bird species, Rameau's pièce rather captures the general character of bird sounds in nature. At the same time, the pièce adds touches of human artifice with elegant syncopations and a brief foray into more adventurous harmonies that make it pleasurable to play and hear. The pièce, thus, functions sonically to both imitate and domesticate the voice of nature and thereby aestheticize it for mass, casual entertainment.

Rameau's "Le Rappel" attempts to hold together tensions between imitation and disciplining of both bird voice and human hand. An echo pièce, "Le Rappel" opens with the two voices of birds in rigid imitation, generally at the sixth. The imitation of birdsong is unmistakable with the *pincé* figures and the repeated pitches at the top of intervallic leaps of an octave in the left hand and of a fourth in the right. At times, the echoes are broken by moments of the two voices coming together in homophony. Still maintaining its avian character, the *pincés* here might sound like the cacophony of a murder of crows, a squabble of gulls, a pandemonium of parrots. This warbling continues for five measures over the same tonic chord (e minor) until the static harmony deviates to a fully-diminished D-sharp chord at mm. 6 and perches on the

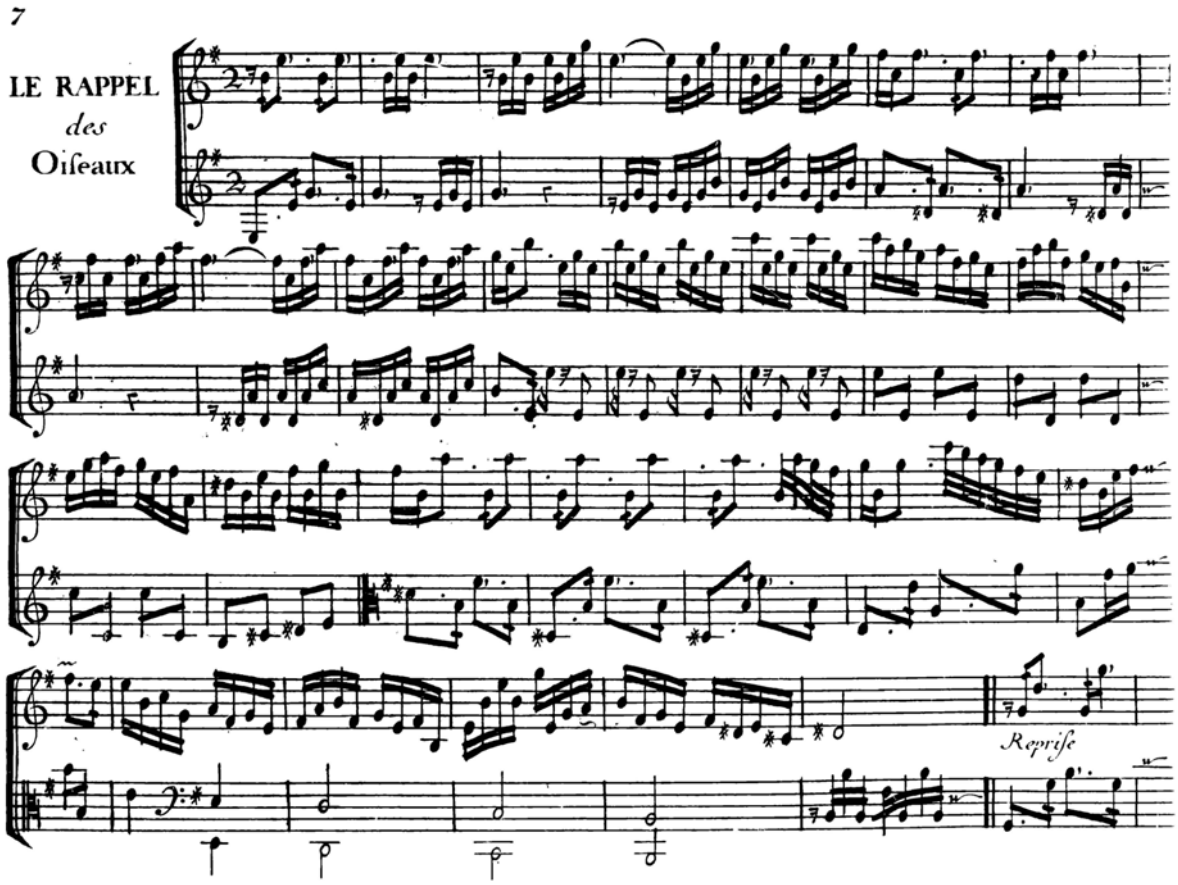
vii°^{7} for five measures. Besides the echo effect and the ornaments, the static harmony gives the birdsong its sense of lacking a progression or development: already unusual for the harmonically adventurous Rameau. Rather, his use of non-goal-directed harmonic motion here represents nature.[99] It is not until the echo ends that a more human maneuver rescues the repetition with a descending harmonic sequence from e minor to C major, then to a minor and b minor (v), and finally lands at B major (V^7). But just before resolving back to e minor, the right hand reintroduces dotted rhythms on ascents of a seventh in the right hand and the *pincé* figures in the left (F#-E) regressing back into the untamed racket of birdcalls.

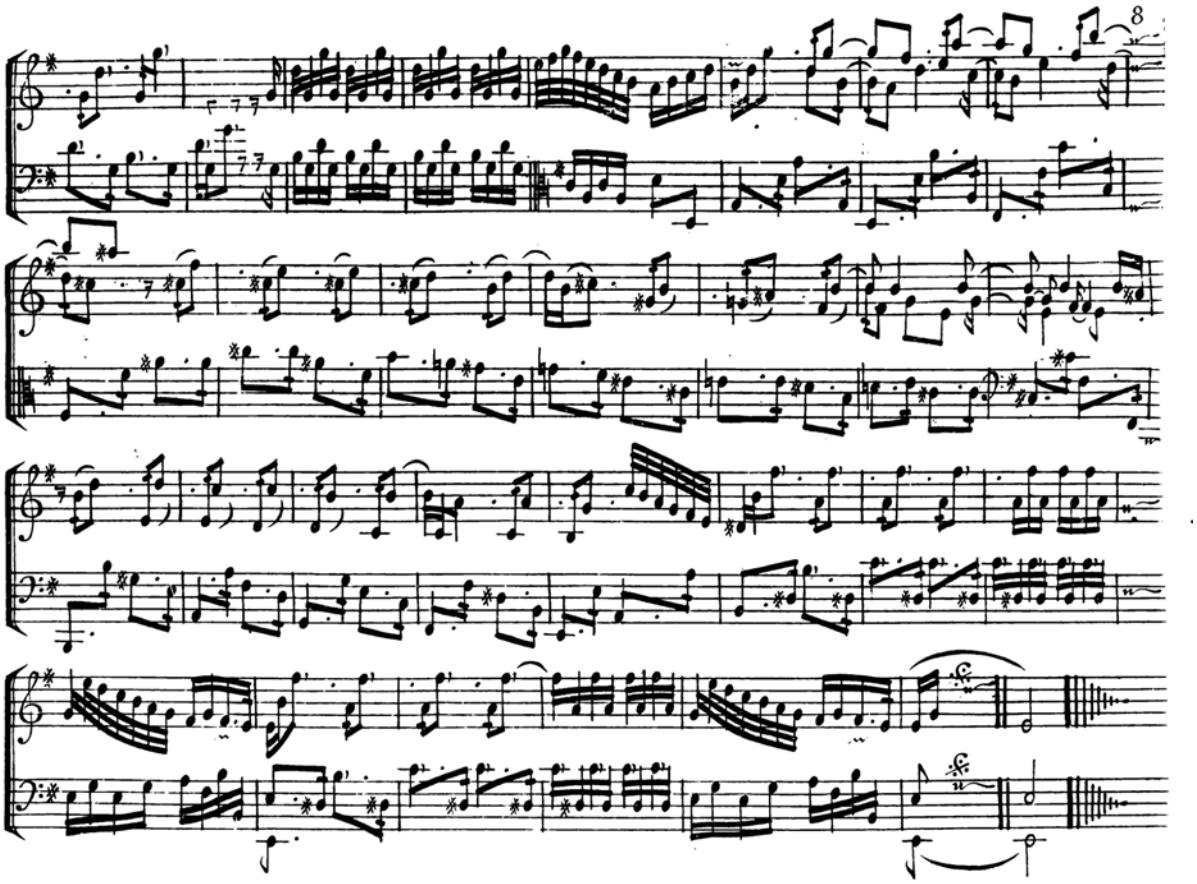
The second half of the binary form modulates predictably to the relative major (G major). However, human music again breaks up the birdcalls by the same echo patterns, here transformed into a skein of gliding suspensions without ornamentation. The imitative patterns hover for a moment over an F-sharp major chord perhaps signaling a descent back to B major. Several measures of suspensions migrate through a progression of fifths (E major, a minor, D^7, G major, C major), which finally land again on F-sharp major, the secondary dominant of B major. At this point the birds calls begin again while coming to rest on the V^7 with intervallic leaps of a sixth in the right hand and *pincés* on the repeated pitch and the leap of a diminished seventh (D-sharp to C) and more pecking *pincés* in the left. These erupt into homophonic texture with the semi-tone *pincé* on C and the following D-sharp clashing with the A-natural above it, repeated four times. This resolves back to the tonic by way of a gallant *glissando*. But the dissonant din is repeated, perhaps to give the effect of the tireless and annoying call of birds. Throughout, one gets the sense that the chattering birds compete with the taming hand of the performer. While we

[99] See Carl Dahlhaus for a broader discussion on how nature is represented in nineteenth-century music as lacking goal direction, particularly in the use of static harmonies or non-goal-directed motion: *Realism in Nineteenth-Century Music*, trans. Mary Whittall (Cambridge: Cambridge University Press, 1985). My thanks to Raymond Knapp for making this connection.

are charmed by the mechanical calls of the wild birds, they must also be domesticated, confined and, as Buffon might say, "educated." The pièce is a technical challenge, and the hands must work to envoice and discipline bird songs.

Example 3. Rameau, "Le Rappel des Oiseaux," from the *Méchanique des Doigts*, 1724.





It is worth comparison, here, of Rameau's bird song pièce to other examples of the species. Across all birdsong genre pièces for harpsichord, the goal was not so much to accurately reproduce the songs of species, but to aestheticize them for entertainment and to contain them in the home; just as Buffon gave much weight to literary qualities of his specious descriptions and Martinet for his delicate, albeit inaccurate, painting for entertainment and enjoyment. François Dandrieu, the *organiste de la Chapèle* of the king, also wrote a trio of bird song genre pièces for harpsichord that closes the second *suitte* in his first harpsichord book of 1724. *Les concerts des Oiseaux* is a triptych of two short binary pièces and one longer pièce with two doubles in diminutions (Examples 4-6). The outer pièces name specific exotic birds: the first, "Le Ramage" is the rosy-faced lovebird (*agapornis roseicollis*) native to southwest Africa and the third is

"L'Hymen," which may be the spectated tyrant (*hymenops perspicillatus*) found across South America, from the family Tryannidae and the only species from the genus *Hymenops*. The lovebird and the tyrant are rather small: the body of the lovebird is generally no longer than 18 cm and has a wing length of 106 mm with a tail of 42-52 mm. The spectated tyrant is even smaller, where birds in the same family of passerines are usually no larger than 29 cm with the largest species reaching 41 cm. Placed between these two pièces is "Les Amours," which could be understood as the lovers or lovebirds (perhaps a shortened version of *les oiseaux d'amour*.)

Strictly speaking, the three pièces are neither technically nor harmonically challenging. Rather they emphasize tropes common in bird genre pièces. These include simple, short melodic motives almost entirely restrained to the right hand, simple accompaniments that articulate every strong beat, few suspensions, repeated intervallic leaps to mimic the dyadic patterns of bird calls, the sharp and short ornaments that imitate the sound of rapid articulations in bird vocality, namely trills and mordents, and the mechanical character of birds in incessant repetition throughout. For instance, in "Le Ramage" (the rosy-faced lovebird), a simple ascending line of alternating intervallic skips of thirds and fourths is accompanied in the left hand with strict eighth note patterns on nearly every beat without polyphonic implications (Examples 4-5). Dandrieu utilizes mechanical mimicry between birds: when the left hand does rhythmically match the right hand's melodic chitter-chatter, it is in strict parallel motion. Dandrieu also captures the sense of preciousness in the small lovebird in brevity and shortness and delicateness in that ascents never exceed an octave and a half; fragility manifests in the lack of strong contrapuntal and harmonic foundations. "Le Ramage" is small, has fine and fragile legs, and cannot fly too high without falling down to rest (there is a final glissando in which the bird lands uneasily on a measure of triple sixteenth notes in both hands in parallel motion, as if beating its

wings). Played on the harpsichord, “Le Ramage” sounds as if it is coming from a mechanical music box where the bird is again captured in another sort of automated machine.

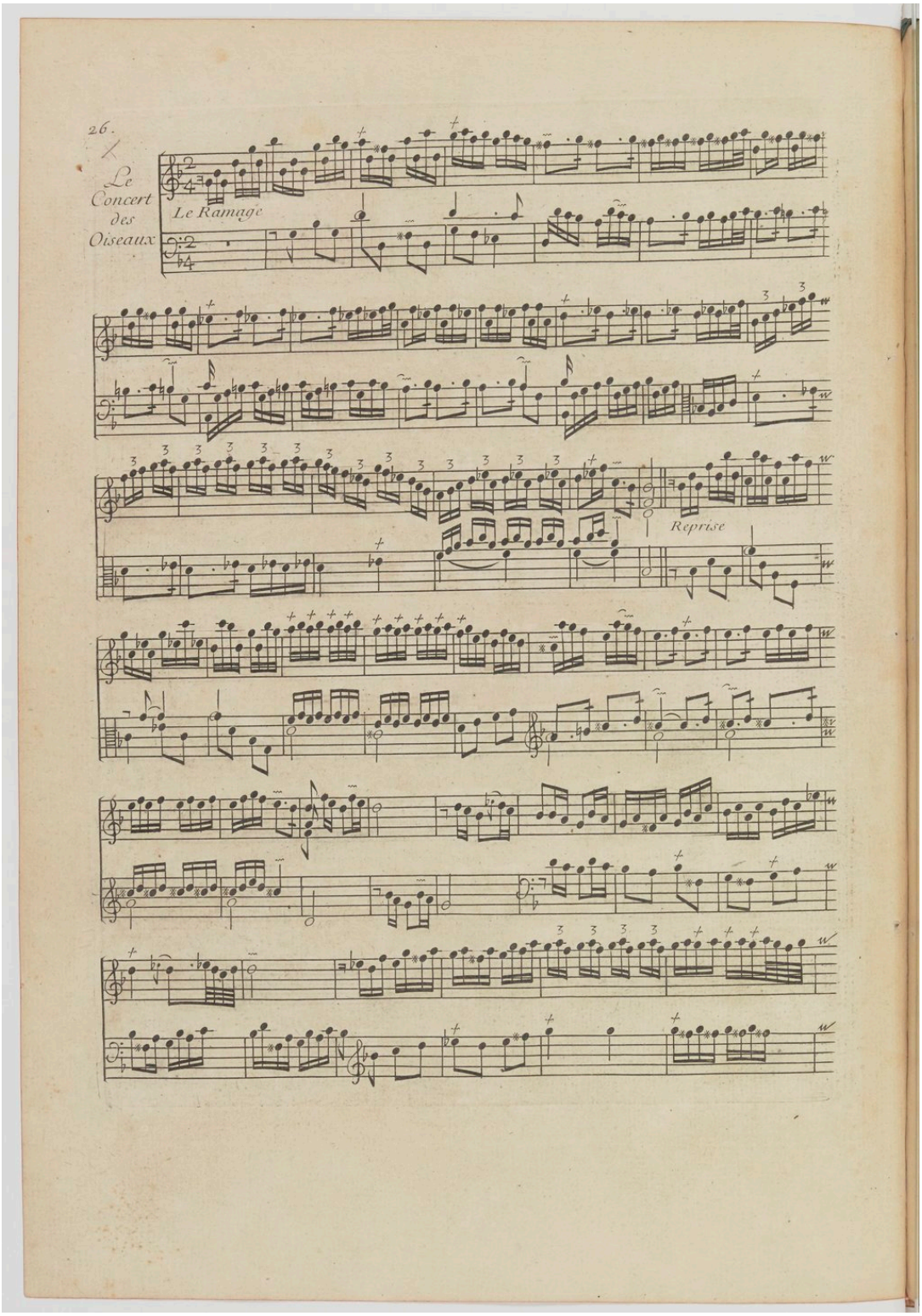
“Les Amours” captures the same preciousness and delicacy of bird genre pièces (Example 5). At only 16 measures, it has incessant dotted rhythmic patterns with few variations. The accompaniment in the left hand also moves in direct, unwavering parallel motion. The two lines move as if in their “natural” condition and undisciplined by advanced rules of studied music composition. Instead, “Les Amours” relies on almost childish innocence with simple rhythmic values and ornaments to catch the sense of two lovebirds working in coordination. The brevity also reflects the smallness, as if the birds are in miniature. In his marking of *tendrement*, Dandrieu seems to capture the pleasantness of observing the simplicity and preciousness of birdlife in the home.

“L’Hymen” takes a more active approach. Marked *légèrement*, the character is still light on the harpsichordist and the senses (Examples 5-6). This pièce is in triple time and brisker implying a dance, perhaps at a wedding. Still, the melodic line is merely a series of repeated semi- and whole-tone steps with the left hand contained in a pattern of parallel motion. There are two *doubles* in diminutions, both only 24 measures. The first is in diminutions of triplet patterns with only blocked chordal accompaniment in the left hand. Sections of the melodic lines are sequences that never leave an entire intervallic magnitude of a fifth and sometimes just a third. The second *double* is also in triple time, but in sixteenth note patterns as a variation of the triplet note patterns of the first *double*. Here, a call and response technique breaks up the blocked chords in the left hand, a common trope in bird song genre pièces. These call and responses generally repeat at the fourth or fifth, perfect intervals that are neither consonant nor dissonant: they are simply “natural.” The melodic patterns, though constant, are in simple sequences that

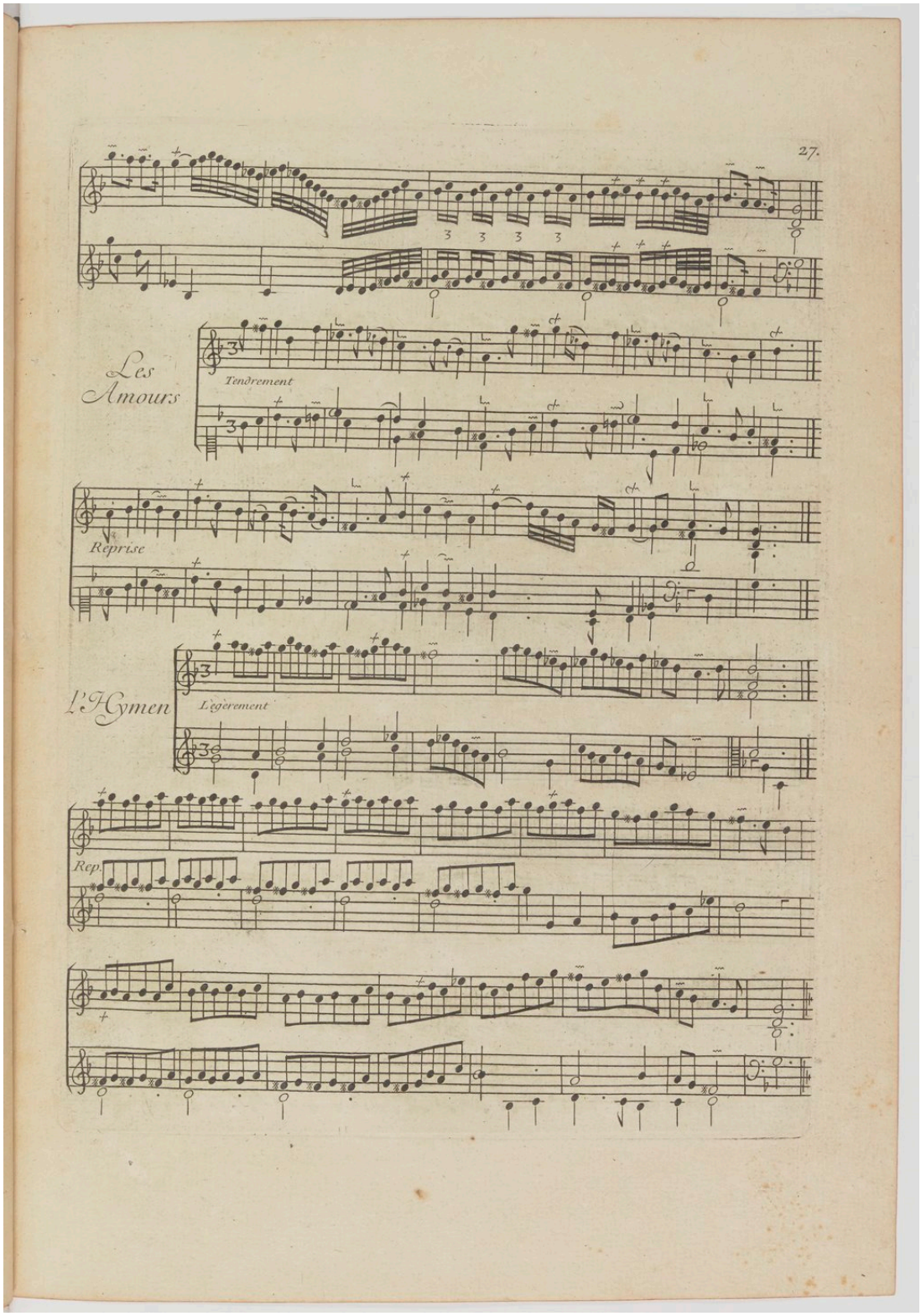
are chunked into 2-3 bar repetitions across the whole of the binary sections. “L’Hymen” ends with another common birdsong trope, repeated accompanying leaps at the third, fourth, fifth, and octave to mimic the repetitive intervallic skips in natural birdsong. Though longer, more dance-like, and celebratory, the binary form is structurally simple with melodic patterns repeated near endlessly creating an allusion of smallness and containment. Though there is some intensification through variation, “L’Hymen” denies opportunities for the bird to develop and take flight.

Because it rested uncomfortably at two boundaries, human-animal and human-machine, birdsong endured as an object of fascination for Enlightenment naturalists as well as for painters and composers. Rameau’s “Le Rappel” features the untamed character of birdcalls that are only improved by skillful compositional techniques and the mechanics of the hands. The hand of the composer cages wild birdsong so that the amateur keyboardist can touch it at home both metaphorically and performatively. In painting, music, and music theory, the harpsichord was a stage for encounters among human, animal, and machine. Rameau’s manual taught the hands how to engage the harpsichord and use it as a means of control over nature.

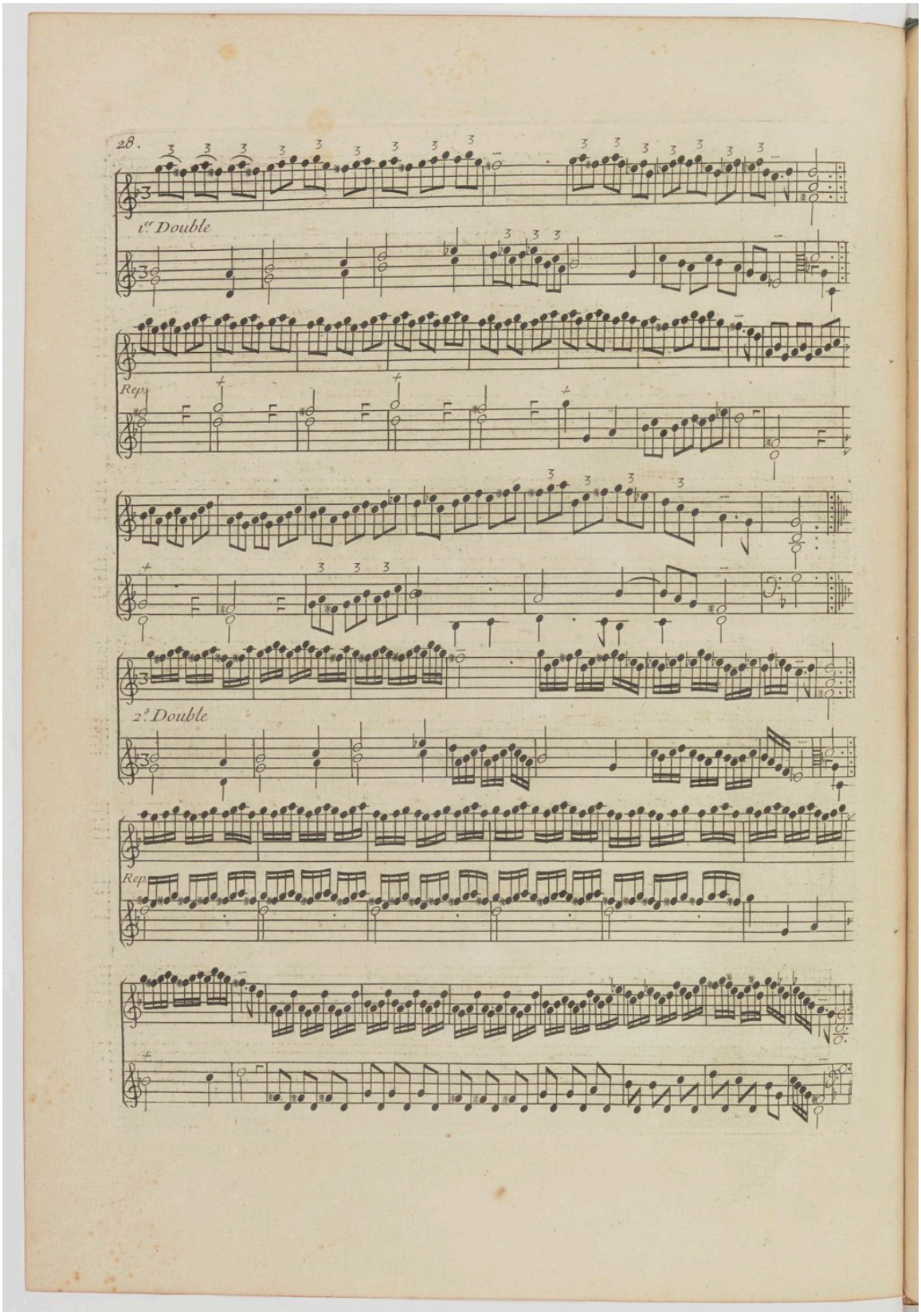
Example 4. Jean-François Dandrieu's "Le Ramage" from "Le Concert des Oiseaux," *Suitte* 2, Premier Livre, 1724.



Example 5. Dandrieu's "Les Amours" and "L'Hymen" from "Le Concert des Oiseaux."



Example 6. “Doubles” from “L’Hymen,” from Dandrieu’s “Le Concert des Oiseaux.”



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The harpsichord was a collision of the best that music, visual art, craftsmanship, and natural knowledge had to offer. In this chapter, I explored the various entanglements in natural history and aesthetics that the eighteenth-century harpsichord finds itself in. With techniques from art history and the history of the book, I focused on bird and monkey genre paintings (*singerie*) on harpsichords' surfaces that both evoked the contested human-animal divide but also telegraphed the harpsichord's free exchanges with music-adjacent objects: illustrated books of natural history, panel paintings, and the exotic animal trade for pets as status objects. Using Ian Hodder's framework of "entanglements," natural historians, painters, and furniture makers depended on things for material wealth but also as key demonstrations of their findings about birds, monkeys, and plants. Perhaps the most important component of Hodder's framework in this chapter is the idea that things depended on other things. Harpsichords depended on strong market desire for paintings, furniture, living and dead animals, and books about natural history to maintain their status as reflections and continuations of environmental culture. I have repositioned the harpsichord as not just a musical instrument as decoration, but also a part of a larger display piece of botanical and animal life that spilled out from pet culture and popular reading. In the case of the harpsichord, the connection to birdsong is not only in the ornate paintings covering the instrument's surfaces, but also in the very means it makes sound. Until the development of plastics, bird quill was used to pluck the strings. As others have argued, early modern and eighteenth-century art were, ultimately, an exercise in the manipulation and perfection of nature.[100]

[100] Macaida and Pimental make this claim in relation to flower still lifes and the experimentations with tulips, "Dead Natures or Still Lifes?"111.

What knowledge could fully sever humans from animals if the separation between humans and animals in visual art and literary natural history remained only tenuous? In the next chapter, “Je vibre, donc je suis,” I show how the harpsichord entered early modern neurological anatomies of the human brain and nerves to show how it was present at keys moments when humanity finally broke away from its animality. These complex anatomies, inflected with political and religious motivations, were later carried into the musical style of sensibility. Famously, Diderot conjured the harpsichord as a model for the resonating human body, strung with fibrous, vibrating nerves, and he articulated that degrees of nervous receptivity had physical repercussions, causing vertigo and madness or a refined intelligence. I demonstrate how harpsichordists embraced these neurocultural findings, particularly Joseph-Nicolas-Pancrace Royer’s use of the rondeaux as a demonstration of how memory and sensations work in the human brain. Overall, the chapter will not only examine musical manifestations of eighteenth-century sensibility but also how the harpsichord advanced eighteenth-century debates on human consciousness, intelligence, and feeling.

Plate 1. “Le Canard Sauvage,” François-Nicolas Martinet, *Histoire des oiseaux peints dans tous leurs aspects apparents et sensibles*, 1773-1792, https://doi.org/10.5962/bhl.title.61476.

Plate 2. “Le Canard Sauvage, Femelle,” ibid.

Plate 3. “Le Grand et Le Petit Martinet,” ibid.

Plate 4. “La Perdix de Mer,” ibid.

Plate 5. “Le Rossingol” (The Nightingale), ibid.

Plate 6. “La Mouette, mâle,” ibid.

Plate 7. “La Jaseur,” ibid.

Plate 8. “Le Coucou,” ibid.

Plate 9. Christophe Huet's *singerie* on F.-É. Blanchet Harpsichord, 1773 (Chateaux de Thoiry), Nicole Garnier-Pelle, et al., *The Monkeys of Christophe Huet*, 124-133.

Plate 10. Huet singerie in a monkey music ensemble on outer lid painting, in Garnier-Pelle, 130.

Plates 11, 12, 13. Huet's singeries on harpsichord side panels, in ibid., 131-3.

Plate 14. Huet's singerie with castanets on harpsichord side panels, in ibid., 131-3.

Plate 15. Huet's birds arabesque on the Blanchet harpsichord's side panels, in ibid., 131-3.

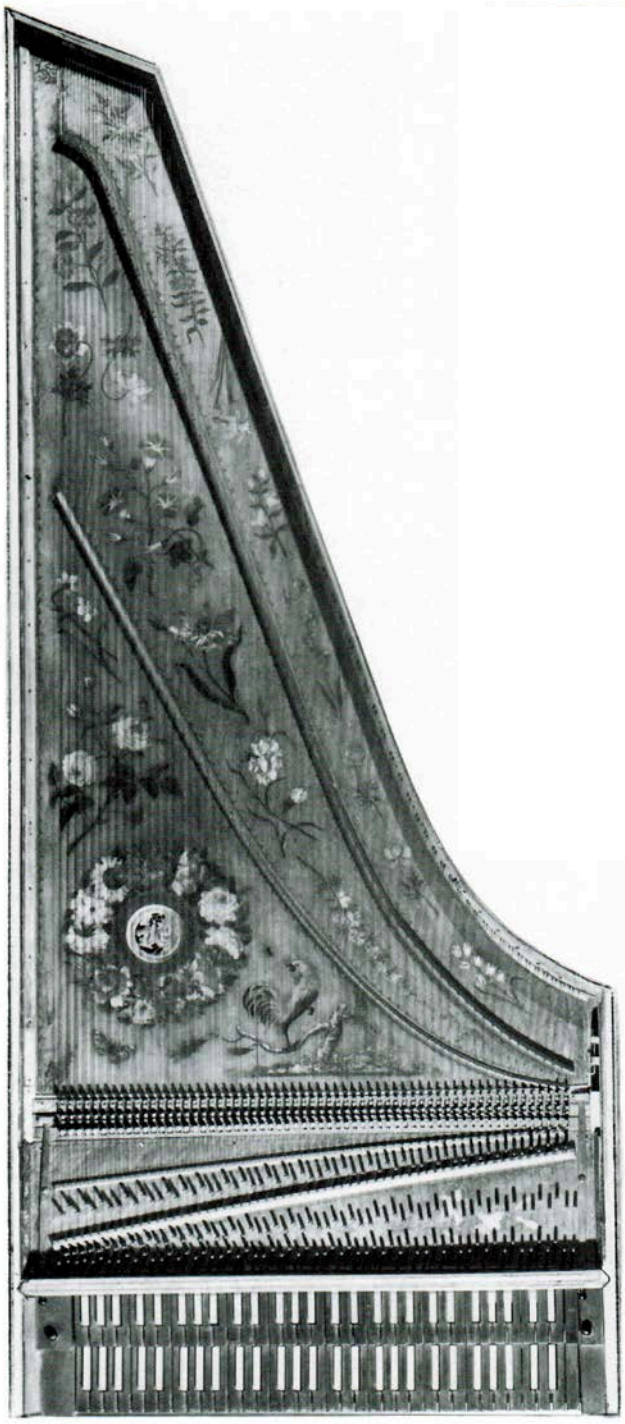

Plate 16. Blanchet soundboard painting, 1730 (Boston, private), in Schott, *The Historical Harpsichord*, Vol. 4, 156.

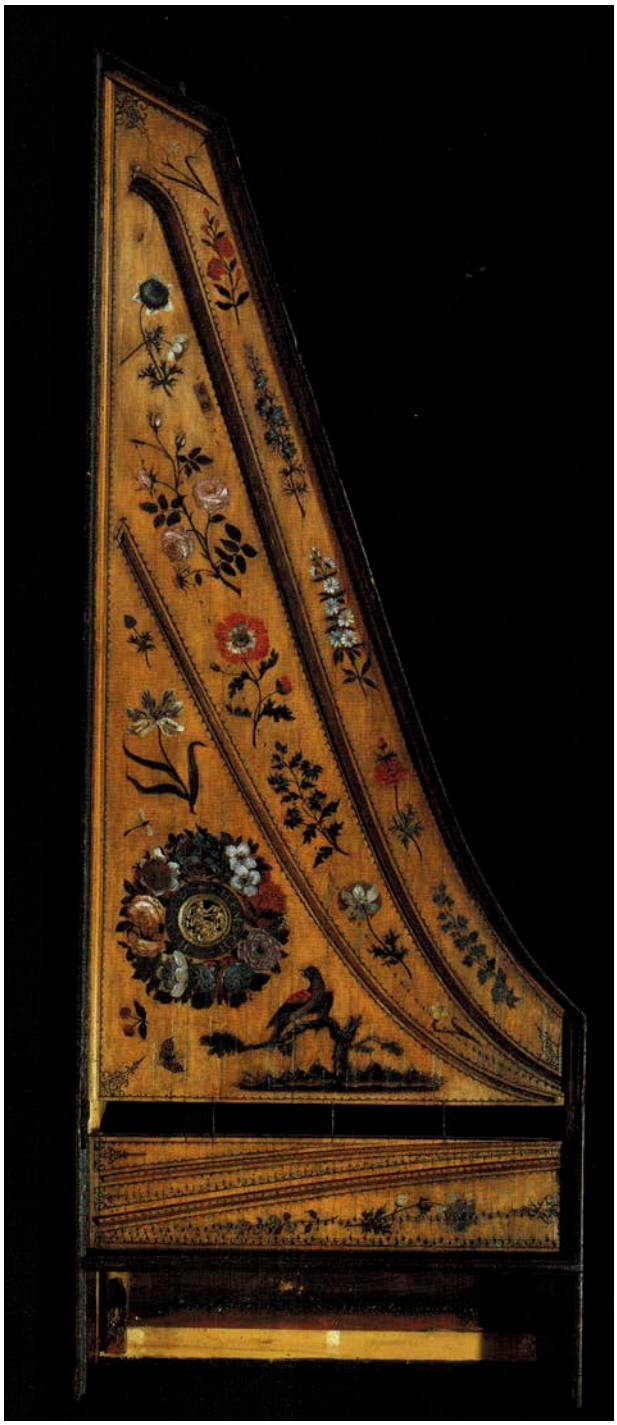

Plate 17. Soundboard painting on Henri Hemsch harpsichord, ca. 1736 (Boston: Museum of Fine Arts), in Kottick, *A History of the Harpsichord*.

Plates 18, 19. Henri Hemsch soundboard painting, 1754 (Munich, BNM), in Schott, 157.

Plate 20. Pascal Taskin soundboard, 1769, in Kottick, *A History of the Harpsichord*.

Plate 21. Rose painting with adjacent bird on Pascal Taskin soundboard, 1769, in ibid.

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CHAPTER FOUR

Je vibre, donc je suis.

Every chapter in this dissertation has begun in a different way, showing different aspects of how instruments, the harpsichord in particular, are metaphors, mimeses of nature, diplomatic gifts, and experimental technology. The harpsichord above all was an organizing tool in which disparate sensations and kinds of information coalesced into a coherent experience. As an organizing device, the harpsichord was both physical and cognitive, and indeed, there was little difference in the eighteenth-century. Perhaps this is another subsidiary claim of my dissertation: that there really is no distinction between cognitive and physical functions, and, thus, why androids and machines who possessed movement but without cognition were so fascinating and also troubling. The story I want to tell in this last chapter concerns how the human was finally severed from animal and machine. My narrative brings us through a sinewy path that tracks early nerve and brain theories, the transmission of these theories through the Enlightenment style of "sensibility" or *sensibilité*, and the purchase the style had with harpsichord music and performance.

The broad consensus in in the eighteenth century was that the brain and body worked together to take in external sensations through nerves and transmit those signals to the brain. The entire nexus of nerve and brain anatomy, philosophy of consciousness and intelligence, and social ideas about the culturally receptive body are what others have called "neuroculture." My contribution is to show how music performance and composition generally, and the harpsichord specifically, are entangled with it. First, we briefly start with Descartes who made claims about human sensation and cognition to argue that much like animal bodies, the human body was

merely a machine, albeit complex. Post-cartesian anatomists disagreed, in particular in localizing human thought in the brain. However, what was common across anatomists, physicians, and philosophers working on brain and nerve theory was the use of musical models to demonstrate human exceptionalism. In particular, English anatomists, such as Thomas Willis, responded to Descartes in his treatises. But the musical models are not the only interesting things about early nerve and brain theory. More than metaphor, music was a means to work out many of the ideas that took the form of "sensibility." When music, came to bear on the topic of what makes humanity exceptional, keyboard instruments were highlighted, with strings entangled like nerves through the various kinds of knowledges collected the world over.

This chapter will begin by distilling early modern nerve and brain theories, particularly of Thomas Willis. Denis Diderot, who later picked up strands of Willis's theories in his two dialogues *Rameau's Nephew* and *D'Alembert's Dream*, was emboldened by analogies to stringed instruments, particularly the harpsichord, as a nervous, resonating body in the musically rich dialogue between Descartes and Willis. The scientific discourses on nerves, sensations, and consciousness then crystallized in the aesthetic style of "sensibility," again using the harpsichord as a sympathetic, sensible receiver. The degree to which one was sensible indicated one's educational and social refinement, and one's capacity to absorb, feel, and process more rarified stimuli with greater bandwidth. I argue that Joseph-Nicolas-Pancrace Royer's (d. 1755) first book of harpsichord *pièces* (Paris, 1746) explores the nascent manifestations of sensibility in two opposing rondeaux: "Le Vertigo" and "La Sensible." In the case of "Le Vertigo," the harpsichord acts a sensing body with "nervous" strings that are overstimulated, shocked, and thus experience out-of-control, unbalanced pathological consequences. By contrast, "La Sensible" shows the sensing body of the harpsichord as receptive and refined, reproducing regulated movement

through a number of key areas, fluid, ascending melodic motives, and a measured coordination between bass and upper registers. Both also manage the rondeau form differently—the first mangling it, the second reinforcing it—which emulated the capacities for memory and reflection in the sensible. Overall, my analysis takes neurocultural metaphors seriously and understands the harpsichord as a kind of nervous processing unit.

In writing a chapter of my dissertation on nerves and music, I do not wish to make the same positivistic moves of traditional organology. That is, I understand the perils of investing in the materiality of objects alone as the only evidence that can stand up to scrutiny and restricting myself to practicing the virtues of documentation, preservation, and replication alone. Rather, I use early modern nerve theory and sensibility to discuss how the human was finally severed from animals and machines via nerve theory. In this final chapter, the most analytical in nature, I will give special focus to the harpsichordist Pancrace Royer who published heavy-handed pieces for harpsichord often with thick writing and an unapologetically dense level of dissonance, which altered speeds and textures rapidly, and often abused ornaments to offset any moments of delicacy. But he also wrote forms that were recognizable and easy to track, the rondeau being a favorite, which allows the player greater freedom in the episodes whereas the return brings a sense of completion. The character pieces in his collection are little compact worlds that adhere to a kind of cultural modality of being and, as such, are particularly conscious of principles of circularity and reflection. But more than other harpsichordists, Pancrace Royer's writing seems to capture the reflective, regulatory processes that were the mark of eighteenth-century neuroculture.

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What is neuroculture and how is it different than other frameworks for understanding cognition, sensation, and bodily responses? Neuroculture is the increasingly widespread belief in the late seventeenth and eighteenth centuries that human perception of external stimuli, formulation of new knowledge, planning, making memories, and imagining new possibilities was distinct from animals and machines and could largely be attributed to the unique nerve and brain organization in humans. In a neurocultural frame, all questions on how cognition, sensation, and expression were rerouted through the nerves to the brain, the body's centralized processing unit. Prior to the neurocultural paradigm, the humoral system of bodily fluids dominated the understanding of the relationship between inner and outer body experience. The humors were a holistic and self-contained system of fluid relationships that were responsible for mood, temperament, amd bodily reactions, and, although not impenetrable, largely remained internal. External forces could influence the balance of the humors with different kinds of stimuli, such as with sound, food, and medicine, but how much phlegm or bile you had remained proportional and interior.[1]

The direction of bodily responses was precisely reversed in the "nervous" framework. External stimuli freely entered the body via nervous conduits, whether hollow or fibrous, in a free-flowing, porous exchange between outer world stimuli and inner response. No longer was the body a closed-circuit system as in the humoral model, but an open circuit that depended on the free traffic between inner and outer states. Unlike in the humoral model, one's sensitivity to

[1] According to an early modern physician tradition, the balance of the humors was fixed at conception and remained relatively stable throughout life, working together with "inner heat" that determined temperament and the growth of the body, even purportedly influencing sexual development at puberty. See Roger Freitas's helpful explanation of inner heat pre-determination at birth in *Portrait of a Castrato: Politics, Patronage, and Music in the Life of Atto Melani*, *New Perspectives in Music History and Criticism*, Jeffrey Kallberg, Anthony Newcomb, and Ruth Solie , eds. (Cambridge: Cambridge University Press, 2009).

external stimuli, and the bandwidth needed for processing sensations that came into contact with the body remained relatively fixed throughout life.

George Rousseau first articulated the prevailing definition of neuroculture, describing it as the late-Enlightenment

> view that neural life is enabled by nervous sensation, and that humans would be remarkably different creatures if their cerebral organization had evolved differently or their neural apparatus had been nuanced in other ways. Their identities and subjectivities, their forms of cognition and ranges of emotional response were predetermined, it seemed, by this fact of cerebral realism.[2]

I take Rousseau's comprehensive definition, which has largely held in social history, further to its cultural applications. If neurocultural values and motivations produced new subjectivities and identities, they should register or show development in musical manifestations. Following Rousseau, scholarship on early modern music and anatomy, neurological disease, and sensibility stops short of analyzing music.[3] I advance this line by arguing that music was not simply a convenient metaphor but also a group of necessary techniques for processing and working out circulating beliefs about nerve function and receptivity that ultimately took shape as the style composition and performance style known as sensibility.

Early on in the seventeenth-century, physicians studying the brain and nerves were making musical analogies. They recognized that the workings of the auditory nerve were essential to explaining how external sensations could affect and disrupt the nerves that sent signals to the brain and produced effects of physical feeling. Famously, Descartes used the pipe

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[2] George Rousseau, "(Nervously) Grappling with (Musical) 'Pictures in the Mind': A Personal Account," in *Music and the Nerves, 1700-1900*, edited by James Kennaway (New York: Palgrave Macmillan, 2014): 26.

[3] Penelope Gouk, "Music and the Nervous System in Eighteenth-Century British Medical Thought," in *Music and the Nerves, 1700-1900*: 44-71; Kennaway, *Bad Vibration: The History of the Idea of Music as a Cause of Disease* (London: Routledge, 2016); ibid., "From Sensibility to Pathology: The Origins of the Idea of Nervous Music around 1800," *Journal of the History of Medicine and Allied Science* 65, no. 3 (July 2010): 396-426; Rousseau, "Nerves, Spirits and Fibres" (1975) in *Nervous Acts: Essays on Literature, Culture and Sensibility* (New York: Palgrave Macmillan, 2004): 157-184.

organ as a demonstration of the way hollow nerves operate, which was critical to his theory of how the bodies of humans and animals are machine-like. In brief, the chest of the organ that expels air is the circulatory system (the heart and arteries), the brain is the wind trunks, the pipes themselves are the nerves, and the airy "information" that passes through them is "animal spirits."

> If you have ever had the curiosity to examine the organs in our churches, you know how the bellows push the air into certain receptacles (which are called, presumably for this reason, wind-chests). And you know how the air passes from there into one or other of the pipes, depending on the different ways in which the organist moves his fingers on the keyboard. You can think of our machine's heart and arteries, which push the animal spirits into the cavities of its brain, as being like the bellows of an organ, which push air into the wind-chests; and you can think of external objects, which stimulate certain nerves and cause spirits contained in the cavities to pass into some of the pores, as being like the fingers of the organist, which press certain keys and cause the air to pass from the wind-chests into certain pipes. Now the harmony of an organ does not depend on the externally visible arrangement of the pipes or on the shape of the wind-chests or other parts. It depends solely on three factors: The air which comes from the bellows, the pipes which make the sound, and the distribution of the air in the pipes. In just the same way, I would point out, the functions we are concerned with here do not depend at all on the external shape of the visible parts which anatomists distinguish in the substance of the brain, or on the shape of the brain's cavities, but solely on three factors: the spirits which comes from the heart, the pores of the brain through which they pass, and the way in which the spirits are distributed in these pores.[4]

Called a myriad of names, such as "nervous juice," "vital liquor," "animal aether," or "the sensitive soul," animal spirits were the fluid that circulated rich information to the brain aggravated by sensations through the body.

The organ fit neatly with the mechanistic tradition both because it was a machine itself and because it adheres well to the cartesian theory that the nerves were hollow and porous through which animal spirits flowed from the brain outward. Registered musically, Descarte's analogy of the pipe organ took advantage of its actual lifelessness. By way of example, the

[4] René Descartes, *L'Homme… et un Traité de la Formation du Foetus* (Paris: Charles Angot, 1664), 165-166, translated as *Treatise on Man* by John Cottingham, Robert Stoothoff, Dugald Murdoch, in *The Philosophical Writings of Descartes*, vol. 1 (Cambridge: Cambridge University Press, 1984), 104.

famous bass aria (originally for countertenor) by Henry Purcell "Wond'rous Machine," from *Hail! Bright Cecilia*, Z. 328 the ode to St. Cecilia's Day features prominent organ accompaniment along with two dueling oboes to give a sense of tubular winds flooding the air. The form of the piece is also a *ground*, with a bass line that repeats incessantly, creating movement that feels unconscious and machine-like. Replicating machine-like movements resonated with dualist conceptions of mechanism, since the souls of men and animals had little to do with the functions, motions, and responses of the body: the body was simply a machine that would work unconsciously according to mechanistic and physico-scientific principles. The mind, thus, had little control or effect on the body. Indeed, Thomas Willis, in harkening back to the analogy in his own treatises on brain and nerve theory, remarked in his *Two Discourses Concerning the Soul of Brutes, Which is that of the Vital and Sensitive of Man* (1683) that he sometimes saw organ shutters open on their own volition and thus required no cognitive central control.[5]

> In most Mechanical things, or those made by humane Art, the Workmanship Excels the matter: who would think there could be an Instrument made out of Iron or Brass, being most fixed and sluggish Mettals, whose Orbs like to those of the Celestial, without any external Mover, should observe almost continual motions, the Periods of which being renewed at a constant turn or change, should certainly shew the spaces of Time? No Body admires that a rude and simple sound is given by wind, blown into a Pipe; but indeed, by Wind sent into musical Organs, and that being carryed variously thorow manifold openings of Doors, into these or those pipes, that it should create a most grateful Harmony, and Composed Measures of every Kind; this I say deservedly amazes us, and we acknowledg [sic] this Effect, far to Excel both the matter of the Instrument, and of the hand of the Musitian striking it. Further, altho the Musical Organ very much requires the labour of him playing on it, by whose direction, the spirit or wind being admitted, now into these, anon into those, and into other Pipes, causes the manifold harmony, and almost infinite Varieties of Tunes; yet sometimes I have seen such an Instrument so prepared, that without any Musitian directing, the little doors being shut up, by a certain law and order, by the mere Course of a Water, almost the same harmony is made, and the same tunes, equal with those

[5] Originally published as *De anima brutorum quae hominis vitalis ac sentitiva est: exercitationes duae* (London: 1672).

> Composed by Art. And indeed Man, seems like to the former, in which the rational Soul, sustains the part of the Musitian playing on it, which governing and directing the animal spirits, disposes and orders at its pleasure, the Faculties of the Inferior Soul: But the Soul of the Brute, being scarce moderatrix of its self, or of its Faculties, Institutes, for Ends necessary for it self, many series of Actions, but those (as it were tunes of harmony produced by a water Organ, of another Kind) regularly prescribed by a certain Rule or Law, and almost always determinated to the same thing.[6]

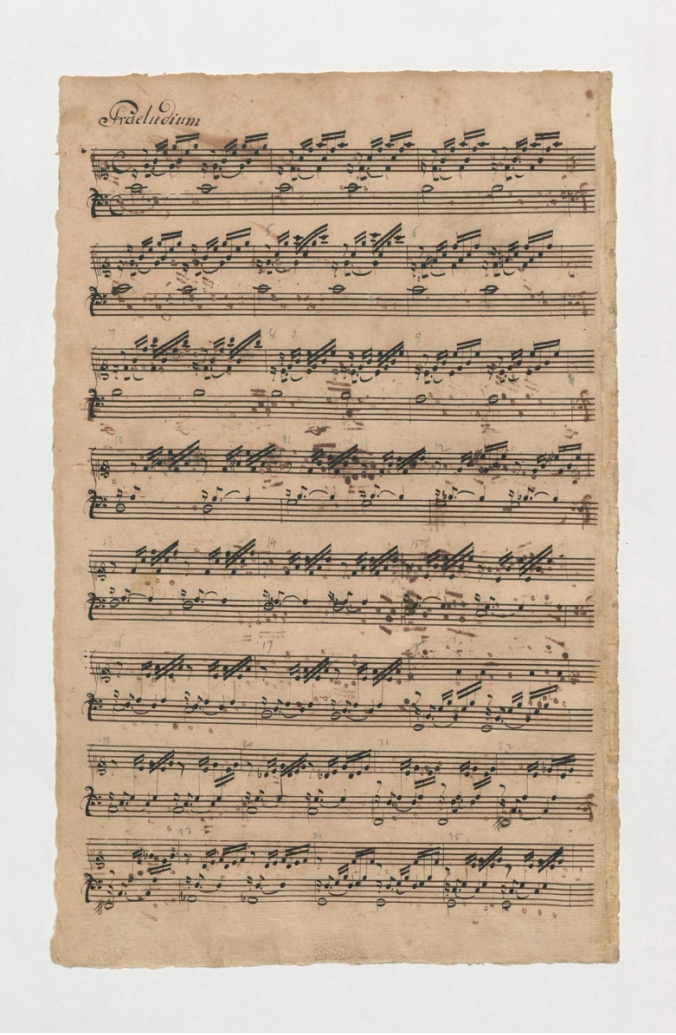
The pipe organ is also a completely stationary instrument that has its appeal in sound production and machine-like construction in equal measure ("organ crawls," or tours of the innards and machinery of a pipe organ are still popular).

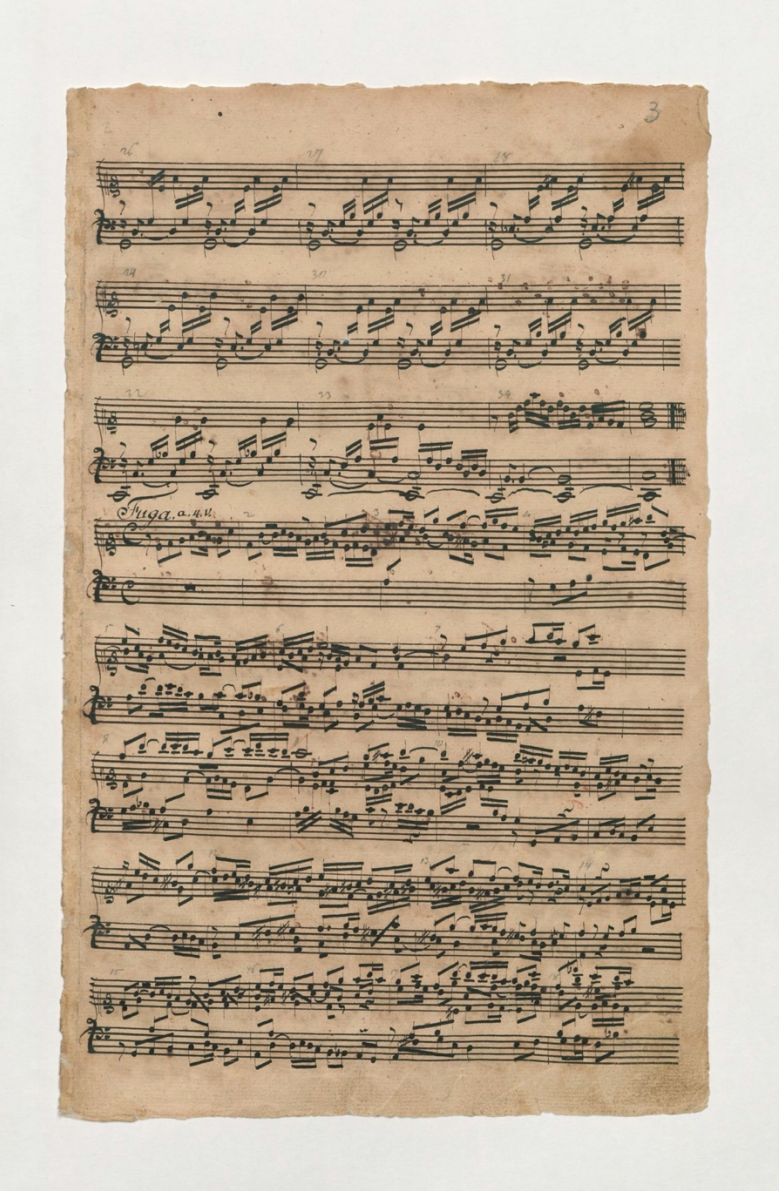
Purcell's "Wond'rous Machine" describes the "conquest" of the organ over the lute. The poet-singer of the lute, "though used to conquest, must be forced to yield unable to dispute" the supremacy of the organ. This antagonism between pipes with air and strings that are plucked carries over to the historical opposition between pipe organ and harpsichord. Many players of historical keyboards consider the harpsichord the sister keyboard instrument to the organ when actually it is far closer to the lute in action because it plucks the strings with plectra like the lutenist plucks with the fingers. By way of example, J. S. Bach's first prelude in C major from the *Well-Tempered Clavier, BWV 846* bridges that small gap between harpsichord and lute (Example 1). Preludes in the seventeenth and eighteenth-centuries were free-form movements that typically opened a traditional dance suite. However, they likely arose from improvisatory tuning exercises that slowly developed into what they were: exploratory passages that moved

[6] Thomas Willis, *De anima brutorum quae hominis vitalis ac sensitiva est, exercitationes duae. Prior physiologica ejusdem naturam, partes, potentias & affectiones tradit. Altera pathologica morbos qui ipsam, & sedem ejus primariam, nempe cerebrum & nervosum genus afficiunt, explicat, eorumque therapeias instituit* (London: George Wells and Robert Scott, 1672), translated into English by Samuel Pordage as *Two discourses concerning the soul of brutes which is that of the vital and sensitive of man. The first is physiological, shewing the nature, parts, powers, and affections of the same. The other is pathological, which unfolds the diseases which affect it and its primary seat; to wit, the brain and nervous stock, and treats of their cures: with copper cuts* (London: 1683), 34-35, *Early English Books Online Text Creation Partnership*, 2011, https://quod.lib.umich.edu/e/eebo/A66518.0001.001/1:5?rgn=div1;view=fulltext.

through a wide range of key areas. The opening prelude to the first book of the *Well-Tempered Clavier* moves through rare key changes that complicates the generally understood simplicity of C major. The complexity of the key movement is offset by the regularity of the harmonic rhythm: one chord for each measure articulated twice.

Example 1. J.S. Bach's Prelude No. 1 in C Major, *The Well-Tempered Clavier*, Bk. 1, BWV 846, 1772. MS date ca. 1775. Copied by Karl Heinrich Ernst Müller (d. 1835), corrected by W.F. Bach (d. 1784). Staatsbibliothek zu Berlin (D-B): Mus.ms. Bach P 202(1). https://opac.rism.info/metaopac/search?View=rism&id=467020201&Language=en.





Bach's ascending, arpeggiated articulation pattern is also identical to a lute or theorbo (*chitarrone* in Italy) prelude or toccata pattern. Giovanni Girolami Kapsperger's (d. 1651) "Toccata Arpeggiata" from his *Libro Primo D'Intavolatura di Chitarone* (1604) (Figure 1) features similar arpeggiated patterns that are articulated four times in quick succession, but whose regularity is also betrayed by sudden harmonic shifts initiated by the alteration of a single tone at the bottom of the arpeggio or in an internal voice until the entire chord buckles under the

weight of the changes (Example 2). In his prelude, Bach takes advantage of the style of theorbo playing that frequently uses the open bass strings by beginning each flourish with a heavy bass note. He also preserves the typical "broken" (or *brisé*) theorbo-style play. Throughout, the improvisatory spirit is barely controlled by the harmonic rhythm. The only opportunity for a rhapsodic moment is at the end, where the unbroken arpeggiations trail off into two melodic endpieces that may tease as motivic material for the fugue.

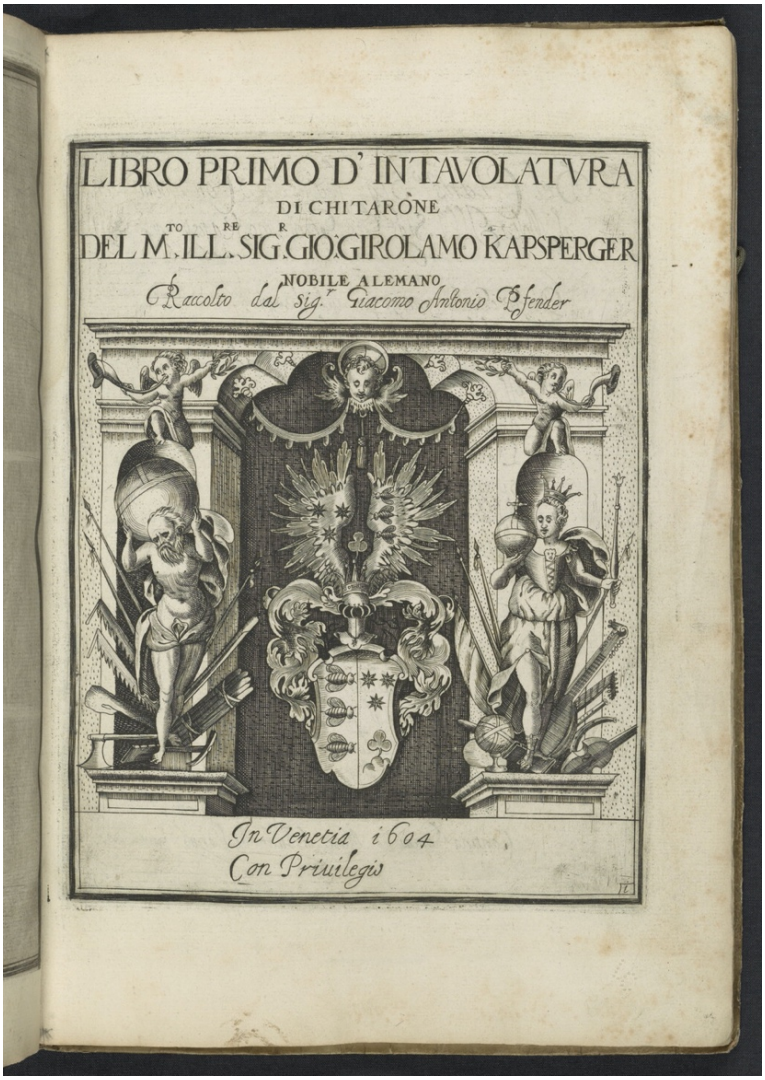
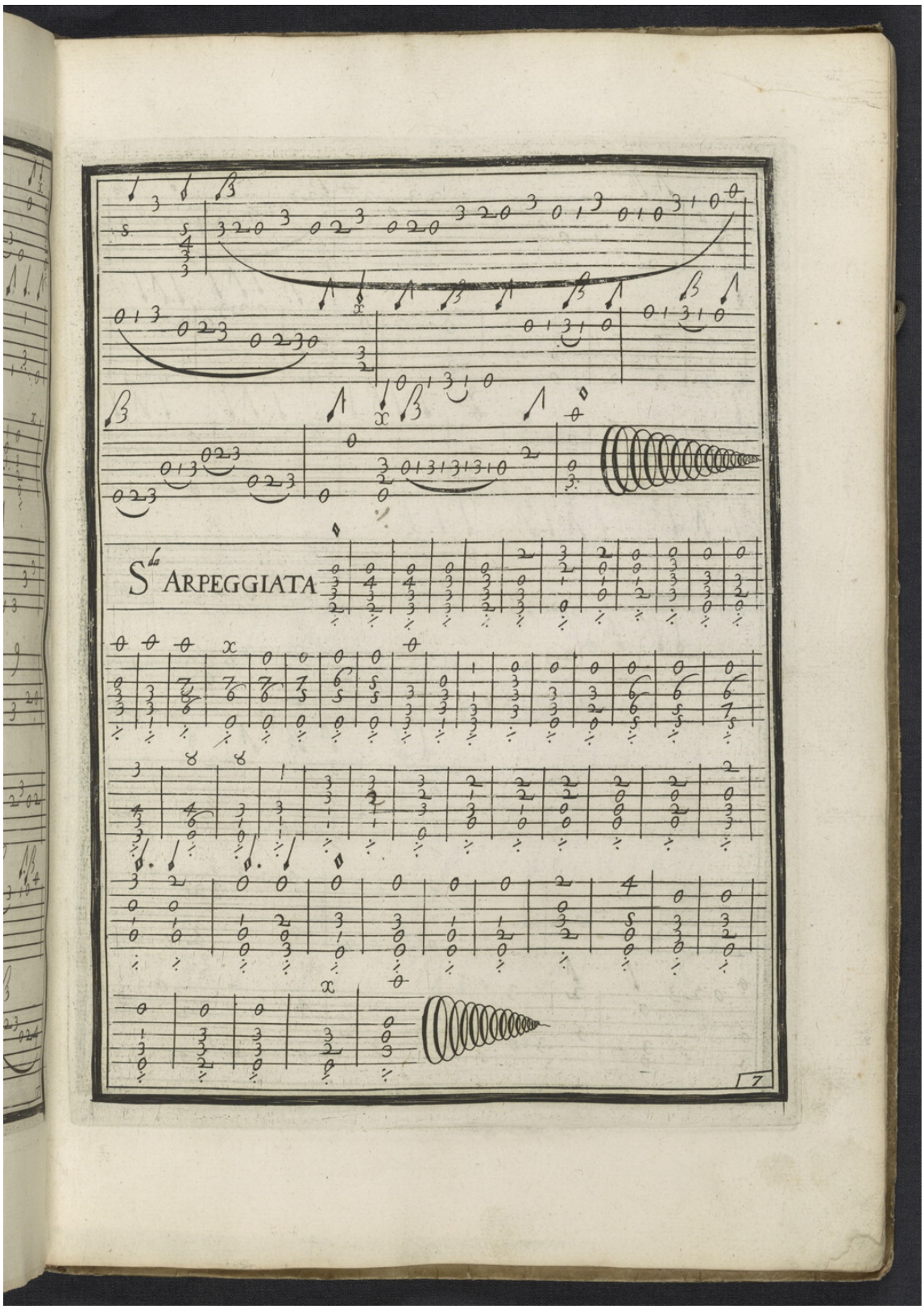


Figure 1. Frontispiece of Giovanni Girolami Kapsperger's *Libro Primo D'Intavolatura di Chitarone*, 1604.

Example 2. Kapsperger's "Toccata Arpeggiata," in lute tablature, 1604.



Overall, the prelude and toccata genres displayed the entire harmonic range of the dance suite, the skill of the performer, and the scale of the instrument itself. These subtle shifts and shadings in plucked string music, both for harpsichord and lute-family instruments, can only be produced with the sensitivity of a single finger caressing the string. Compare this with the pipe organ, whose subtlety is often lost in a super-resonant space of cathedrals and whose unique sound is achieved through coupling of multiple pipes rather than one single string. Two personal anecdotes can help me demonstrate my point on the shared sensitivity, closeness, and intimacy between plucked stringed instruments and the harpsichord. When I was studying at the Vancouver Early Music Baroque Vocal Programme in 2013, I had masterclasses with a lutenist, who told us that the closeness afforded by seventeenth- and eighteenth-century instruments is why articulation often takes precedence over pitch range or intonation. In addition, the detailed lattice-work rose on the faces of lute-instruments, he told us, are not for the player, but for listeners who are so near the player that they can gaze into the kaleidoscopic or geometric patterns. The same is true for harpsichords, which have detailed painted, gilded, or lace-work rose on their sound board. Second, when I was studying harpsichord, I remember authors of harpsichord pedagogy books remarking that the method of playing the keys on the instrument is different from that on the piano, even though they share a similar keyboard. The nature of the plucking mechanism and the constant contact that a player feels with the string (I sometimes called this “communion”) means that you can stroke and not press the key. In the harpsichordist’s mind, fingers extend through the cavity of the instrument which pluck the instrument as one would a lute or harp, hence harpsichord. At no time is there an impression that you are striking the string in a manner that the pianoforte mechanism strikes the strings.

The fleshy, fibrous nature of the lute/harpsichord and the cold, porous nature of the organ will come to a head as post-Cartesian nerve-brain theorists and writers on sensibility will choose the harpsichord over the organ to differentiate sensation and consciousness between humans, animals, and machines. The consequences of the mechanistic theory of porous and hollow nerves were vast. As George Rousseau explains:

> The mechanists, unlike their vitalist and animist opponents, were dualists. Followers of Descartes, they accepted mechanist explanation of all bodily functions except that of the soul, which again like Descartes, they located everywhere in the body whose activities they asserted, do not act in any mechanistic fashion. When asked by vitalists how the soul does act, mechanists from the time of Descartes and Newton to that of La Mattrie and Haller more than a century answered it does not matter because: (1) the soul has little power in and of itself—virtually everything depends on the clockwork movements of the body, a perfectly constructed machine whose basic motions would be enacted whether or not the soul willed them voluntarily.[7]

As Penelope Gouk more succinctly summarizes, in the mechanistic view "the body is conceptualized as a system of fluids and fibres whose movements are assumed to follow the laws of mechanics and hydraulics."[8] Willis also supported a pneumatic model, though not entirely hollow, nerve organization:

> As to the Offices and Uses of the streaked Bodies, though we can discern nothing with our eyes, or handle with our hands, of these things that are done within the secret Conclave or Closset of the Brain; yet, by the effects, and by comparing rationally the Faculties, and Acts, with the Workmanship of the Machine, we may at least conjecture, what sort of works of the Animal Function, are performed in these or those, or within some other parts of the Head; especially because it plainly appears, that the Offices of the Interior Motions, and Senses, as well as the Exterior, are acted by the help of the Animal Spirits, ordained within certain and distinct Paths, or as it were small little Pipes.[9]

His contribution was intermediate in that "animal spirits" still moved like wind but through porous, "piped" nerves. Ultimately, he chose the harp and not the organ as his model describes

[7] Rousseau, "Nerves, Spirits and Fibres," 167.

[8] Gouk, "Music and the Nervous System in Eighteenth-Century British Medical Thought," 48.

[9] Willis, *The Soul of Brutes*, 27.

the way solid sensations "strike" the semi-solid fibrous nerves, "which are the instruments of touching."[10] The nerves then vibrate to active the processing of sensations in the brain. In Chapter 11, in a section entitled "Fibres are that Organ, implanted in the whole frame or make of these or those Parts," Willis writes:

> For it seems, that these [fibres] are irritated or provoked one way, with heat, and another way with cold, and so from the rest of the Qualities, after a manifold manner; therefore, the Animal Spirits implanted in them, enter into a peculiar way of Gyration or turning round, or of undulation or waving, according to which, the Spirits being harmonized, which flow within the passage of the Nerve belonging to those Fibres, do propagate the same Figure or Type of their carrying forth, to the Medullary Stock, and by its means, to the Common Sensory.[11]

Later, he returns to the harp to describe sound that, though invisible, is made by striking solid bodies, such as drums or harp strings, to stir up solid "Sonorific Particles" in the air and then putting into vibration the "Organ of Hearing."

> A vibration being excited from the stroke and shaking Body, and impressed on the Sonorific Particles, is the whole Cause of every produced sound, or of long Continuance, and also thô but of a minutes durance or sounding. For both Metals, also Stones, and Wood, and other solids, being struck, make the Air to tremble and yield vibrations or shakings, in some measure like Bells, and the strings of an Harp: Wherefore, when by the Finger or any soft Body being lay'd upon them, that shaking is stopt, presently the sound is intercepted. As it thus appears, by what means the Sonorific Particles are stirred up into act, there remains a no less difficulty, concerning the way, whereby they affect the Organ of Hearing, that by it a Feeling or Sension [sic] is produced.[12]

Willis also focuses on the impact of music on nerve receptivity and the "impressions" music leaves on the brain. He describes how sound, as a collection of material particles that travel through air, strikes the tympanic membrane, and aggravates the air in the cochlea which then vibrate the semi-solid animal spirits in the auditory nerve.

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[10] Ibid., 61.

[11] Ibid.

[12] Ibid., 71.

> Objects (sounding body) which consist of Particles Congruous and Curiously fitted to the Sensory, so that they stroke gently the Spirits there flowing, and cause them to run and to rejoyce together, these bring forth a desirable Sension, whose Impression being transmitted, by the passage of the Nervous Processes to the Brain, by pleasing there in like manner the Spirits, stirs them up into a pleasant apprehension of the sensible thing, and a desire of it: Hence these Spirits inhabiting the Brain, for the fruition of this Object, try several or manifold Endeavours.[13]

The vital fluids, having been agitated by these particles, feed into the brain which leave "impressions" of different "species." These impressions left on the brain, specifically the medulla oblongata and the cerebrum, produced images and memories. The pneumatic spirits then flow to the cerebellum where movement, posture, balance, and coordination occur and where the impressions of sound leave a lasting memory.[14] In his *Cerebri Anatome* (1664) Willis gives a long description of what makes one have a musical ear.[15] The saying having a "tin ear" is apt in some ways: for Willis, the softer, more sensitive the cerebellum the more easily animal spirits animated by sound can leave an "impression." Those with firm or hardened cerebellum will not perceive these impressions and thus cannot remember or reproduce melodies: they were, "Fools at Musick."[16] While admitting that lacking musical memory did not necessarily mean one lacks intelligence or other important faculties of memory, Willis's speculations are important for his inclusion of musical models in how human nervous systems are unique from animals. I quote him here at some length:

> But here (if I may digress a little) we should inquire in what part of the Head the Ideas of sounds are left: whether only in the Brain, which is the Chest of Memory acquired as it were artificial, or whether not also in the Cerebel, which is the place of natural memory?

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[13] Ibid., 50.

[14] Gouk, "Music and the Nervous System in Eighteenth-Century British Medical Thought," 54.

[15] Translated into English by Samuel Pordage as *The Anatomy of the Brain and the Description and Uses of the Nerves: The Remaining Medical Works of that Famous and Renowned Physician Dr. Thomas Willis (*London: Dring, Harper, Leigh & Martyn, 1681).

[16] Willis, *The Anatomy of the Brain*, quoted in Marjorie Lorch, "'Fools at Musick'—Thomas Willis (1621-1675) on Congenital Amusia," in *Neurology of Music*, ed. F. Clifford Rose (London: Imperial College Press, 2010), 157-158.

Truly we suppose, that sounds belong to both these, as it were to distinct Store-houses. Every audible impulse being struck against the Ear, it is presently carried by the passage of the auditory Process to the annulary Protuberance; but from thence it is carried, as other sensible Species, to the chambered bodies or the common Sensory; (which way it passes thither, shall be shewed afterwards) this impression tending from thence farther, and being also delivered to the Brain, stirs up the Imagination, and so leaves in its Cortex an image or private mark of it self for the Memory. Further also, as the auditory Process depends on the Cerebel, and receives from it the provision of the animal Spirits: so it is most likely, that by the recess of the same Spirits the Ideas of the Sounds are conveyed also to the Cerebel; which forming there footsteps or tracts, impress a remembrance of themselves, from whence when afterwards the Species there laid up are drawn forth by the help of the vocal process, voices, like the sounds before admitted, and breaking forth in a certain ordained series, come to be made.

Hence it is usual, that musick or melody is soon learnt by some men, which afterwards they bring forth with exact Symphony, without any meditation or labour of the Brain; to wit, from the distinct accents of the heard harmony, the Spirits moving within the Cerebel are disposed into peculiar 'Fools at Musick' Schemes; according to which, when they flow on both sides into the vocal process of the auditory Nerve, they render as it were with a certain spontaneous voice, and like a Machine or Clock with the succession of Species, the measures or Tunes of the Instrument which they had drunk in at the ears. Without doubt hence the reason may be sought, why some men learn Musick without any trouble, and others hardly or not at all. For it is observed, that some Children, before they can speak distinctly, quickly sing, and remember certain Tunes; whilst others, though very ingenious men and of excellent memory, are very Fools at Musick, and become uncapable, as an Ass for the Harp; wherefore 'tis commonly said, that some have musical ears, and others are wholly destitute of that faculty. In the mean time, 'tis to be confessed, that in these the Organs of the Voice are not defective; but all the fault, though wrongfully, is cast on the hearing. But in truth the genuine cause of this defect seems to consist in this, that when in all, the audible Species go to the Cerebel sooner and more immediately than the Brain; yet in some the Cerebel being harder, and not easily yielding to the received impressions, those Species, because they could impress nothing of themselves in their passing to the Cerebel, being carried towards the common Sensory, leave their Types or Ideas chiefly and almost wholly in the Brain: which part being still busied with disturbed motions, is less apt to keep distinctly the composures of Harmony. But in the mean time, in others the Species of audible things, besides that they are carried to the common Sensory and to the Brain, do also affect the Cerebel, especially if they are harmonically figured (forasmuch as in them there is a softer capacity of the impressions) with a peculiar order and Scheme of the animal Spirits: where, as the Species of the Harmony being disposed in convenient little places and cells are kept, afterwards they flow out from thence, almost unthought of, without any endeavour or labour of remembrance, but in a distinct series, and as it were in composed modes and figures, and so by blowing up the vocal processes, they constitute sweet Tunes and vocal Musick.[17]

[17] Ibid.

While Descartes and Willis were mostly concerned with the implications of their theories on notions of God, speculative philosophy, and politics, their philosophical anatomies also had an impact on stylistic movements, such as sensibility.[18] Early nerve and brain studies were not limited just to the mappings of the nervous system itself but also to its effects in everyday life, including perceptions of intelligence and aesthetic apprehension according to one's social station. Social status was linked to access to higher education and exposure to a diversity of knowledge, and thus higher sensibility. Superior nerve organization was not evenly distributed across humans and often negatively impacted the social organizations of those who did not have the same sensations to pleasure, pain, time, and even death. Voltaire wrote:

> More than half the habitable world is still populated by two-footed animals who live in a horrible condition approximating the state of nature, with hardly enough to live on and clothe themselves, barely enjoying the gift of speech, barely aware that they are miserable, living and dying practically without knowing it.[19]

In Diderot's *Rameau's Nephew* (posth., ca. 1805), the subject of the musical education of Diderot's daughter arises. Rameau's eccentric nephew probes Diderot for information on the life of "a grand gentleman" and what makes an educated man. Diderot replies, that he would like his daughter's music lessons to be infrequent or none at all. "But perhaps I don't worry very much about putting into the plan for her education a study which is so time-consuming and which is so little use."[20] Rather, he'd like his daughter to "reason better." "No dancing?" the nephew replies?

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[18] James P. B. O'Connor, "Thomas Willis and the Background to the *Cerebri Anatome*," *Journal of the Royal Society of Medicine* 96, no. 3 (March 2003): 193-143. See also Alexander Wragge-Morley, "Imagining the Soul: Thomas Willis (1621-1675) on the Anatomy of the Brain and Nerves," *Progress in Brain Research* 243 (2018): 55-73. See Lorch "'Fools at Musick'" who discusses the *Cerebri Anatome* in the contexts of the Reformation.

[19] Voltaire, *Homme*, *Questions sur l'Encyclopédie* in *Œuvres*, XIX, 384: 1771, quoted in Peter Gay, "The Recovery of Nerve," *The Enlightenment: An Interpretation, The Science of Freedom* (New York and London: W. W. Norton, 1969), 4.

[20] Denis Diderot, *Rameau's Nephew*, translated by Ian C. Johnston (2002), Project Gutenberg Australia (2017), http://gutenberg.net.au/ebooks07/0700101h.html.

Not really, Diderot offers: "Just as much that is necessary for formalities of curtsies and to walk elegantly enough. If there's a decent teacher of harmony, then maybe two hours," he says (there were plenty of teachers, including Rameau). Then Diderot admits perhaps why he is limiting his daughter's music education:

> Me (Diderot): Since in her case nature has been so ungrateful as to give her a delicate constitution with a sensible soul and to expose her to the same pains of life as if she had a strong constitution and a heart made of bronze, I'll teach her, if I can, to bear those pains bravely.
>
> Him (nephew): Oh, leave her to cry, suffer, and simper, with delicate nerves, like the others, provided she is pretty, amusing, and flirtatious.

The relationship between "delicate nerves" and the dangers of aggravating and over-stimulating them with music, were well known to Diderot. A more sensible person could take in more neural stimulation and thus experience a wider range of sensations. An overly sensible person could also be overloaded with sensations, as in hearing, and thus experience pathological effects, such as vertigo and madness.

Diderot's daughter was reportedly born with such a high sensibility that aggravating her nerves with music was out of the question. Furthermore, Diderot makes claims about the long-lasting impact of nervous aggravation by music. Such over-stimulation could bring the overly sensible to the point of sensory overload. George Rousseau paraphrases:

> Diderot super-added an element… when claiming that the human anatomical nervous apparatus itself involuntarily produced physiologically induced emotions—so powerfully that his rundown nephew has become mad; as if his nervous system is a harmonically resounding musical clavichord.[21]

This wouldn't be the last time Diderot used the early modern keyboard to make arguments about the mind, knowledge, and sensation.

[21] Rousseau probably mistranslated *clavecin*, which meant harpsichord not clavichord, "(Nervously) Grappling with (Musical) 'Pictures in the Mind'," 24.

Whereas *Rameau's Nephew* humorously explores the dispositions of the philosopher in an eccentric cultural landscape of indulgences, Diderot in *D'Alembert's Dream* is more interested in intellect in and of itself, including memory, consciousness, and the generation of ideas. In his *A Conversation Between D'Alembert and Diderot* (the first part of *D'Alembert's Dream*, 1769), he uses the harpsichord as a metaphor for the philosopher's mind and as a sensing being. The philosopher is an entire and complete instrument, whose "fibres of our organs [are likened] to sensitive vibrating strings which vibrate and resound long after they have been plucked."[22] Diderot's entire idea of the perceiving, of being conscious depends on his materialist notions of vibrating, sympathetic strings.

> Diderot: Can you tell me what constitutes the existence of a perceiving being, for that being itself?
>
> D'Alembert: The consciousness of continued identity from the first moment of reflection to the present.
>
> Diderot: And on what is this consciousness based?
>
> D'Alembert: On the memory of its actions.
>
> Diderot: And without this memory?
>
> D'Alembert: Without this memory it would have no identity, since, realizing its existence only at the instant of receiving an impression, it would have no life-story. Its life would be an interrupted series of sensations with nothing to connect them.
>
> Diderot: Very good. And what is this memory? Whence does it spring?
>
> D'Alembert: From a certain organization, which develops, grows weaker, and is sometimes lost entirely.
>
> Diderot: Then, if a being that can feel, and that possesses that organization that gives rise to memory, connects up the impressions it receives, forms through this connection a story which is that of its life, and so acquires consciousness of its identity, it can then deny, affirm, conclude and think.

[22] Diderot, "Conversation Between D'Alembert and Diderot" (1769), in *Diderot, Interpreter of Nature: Selected Writings,* translated by Jean Stewart and Jonathan Kemp (New York: International Publishers,1943), https://www.marxists.org/reference/archive/diderot/1769/conversation.htm.

D'Alembert: So it appears to me, there is only one more difficulty.

Diderot: You are wrong; there are many more…[23]

Diderot goes on to explain that the resonances of experience are common throughout all bodies and work like a harpsichord, except that the philosopher is sentient because it can process sensations. He asks, "If this phenomenon may be observed between resonant strings that are lifeless and separate, why should it not occur between points that are alive and connected, between fibres that are continuous and sensitive?"[24]

> Diderot: The philosopher is an instrument that has the faculty of sensation; he is, at the same time, both the musician and the instrument. As he can feel, he is immediately conscious of the sound he gives forth; as he is an animal, he retains the memory of it. This faculty of the organism, connecting up the sounds within him, produces and preserves the melody there. Just suppose that your harpsichord has the power to feel and to remember, and tell me if it will not know and repeat of its own accord the airs that you have played on its keys. We are instruments endowed with feeling and memory; our senses are so many keys that are struck by surrounding nature, and that often strike themselves. This is all, in my opinion, that happens in a harpsichord which is organised like you or me. An impression is created by some cause either within or outside the instrument, a sensation is aroused by this impression, a sensation that persists, since you cannot imagine it arising and dying instantaneously; another impression follows, which equally has its cause either within or outside the animal, a second sensation, and voices to indicate them by natural or conventional sounds.[25]

Finally, he arrives at his thesis that while all matter is fibrous, man is unlike machines, which are non-sensing organisms or animals who have sense but who only imitate and do not have memory.[26]

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[23] Ibid.

[24] Ibid.

[25] Ibid.

[26] Georges-Louis Leclerc, the Comte de Buffon, shared the idea that memory was only made possible by the exceptional power of the human brain to process sensations. In his *Natural History. Containing a Theory of the Earth, a General History of Man, of the Brute Creation, and of Vegetables, Minerals*, he asked, "Have animals no memory? […] I can demonstrate, that they deceive us, and that brute animals have no knowledge of past events, no idea of time, and of consequence no memory. In man memory flows from the power of reflection, for the

> D'Alembert: So then, if this harpsichord were not only sensitive and animate but were further endowed with the faculty of feeding and reproducing itself, it would live and breed of itself, or with its female, little harpsichords, also living and vibrating[?]
>
> Diderot: Undoubtedly. In your opinion, what, other than this, is a chaffinch, a nightingale, a musician or a man? […] Are you going to assert with Descartes that it is a purely imitative machine? Little children will laugh at you, and philosophers will retort that if this be a machine then you, too, are a machine. If you admit that between the animal and yourself the difference is merely one of organization, you will be showing good sense and reason, you will be honest… [But] from inert matter, organized in a certain way, and impregnated with other inert matter, and given heat and motion, there results the faculty of sensation, life, memory, consciousness, passion and thought.[27]

What differentiates man from machines and animals is not just the ability to feel and reproduce but the particular organization of those vibratory sensations, which allow for memory, consciousness, and the association of ideas. This argument that the organization of nerves determined sensibility and consciousness became an argument for humanity's supreme place as sensing beings. We will see in the next section how neurocultural notions of memory and sensation manifest in musical forms, particularly in the rondeau.

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remembrance of things past supposes not only the duration of the impressions on our internal material sense, or renovation of former sensations, but also the comparison which the mind has made of those sensations, or the ideas it has formed. If memory consisted merely in the renovation of past sensations, those sensations would be represented to our internal sense without leaving any determined impressions; they would present themselves without order or connection, as they do in a state of intoxication, or in dreams, when they are so incongruous, and so incoherent, that we immediately lose all recollection of them. Of such things only as have a relation to others, which preceded or followed them, do we retain a remembrance; and ever solitary sensation, however powerful, passes away without leaving the smallest trace on the mind. Now it is the mind which establishes these relations of objects, by comparison it makes between them, and connects our sensations by a continued thread of ideas. As memory consists, then, in a succession of ideas, so it necessarily supposed the power by which ideas are produced." He then continues to explain the "nature of that remembrance left by our sensations when they are accompanied with ideas." See Leclerc, *Barr's Buffon. Buffon's Natural History. Containing a Theory of the Earth, a General History of Man, of the Brute Creation, and of Vegetables, Minerals, &c. &c. from the French. With Notes by the Translator in Ten Volumes,* Vol. 5 (London: Printed for the proprietor and sold by H.D. Symonds, 1797), 42-43, *Eighteenth Century Collections Online*, https://link.gale.com/apps/doc/CB0128088300/ECCO?u=uclosangeles&sid=ECCO&xid=d25f8e67.

[27] Ibid.

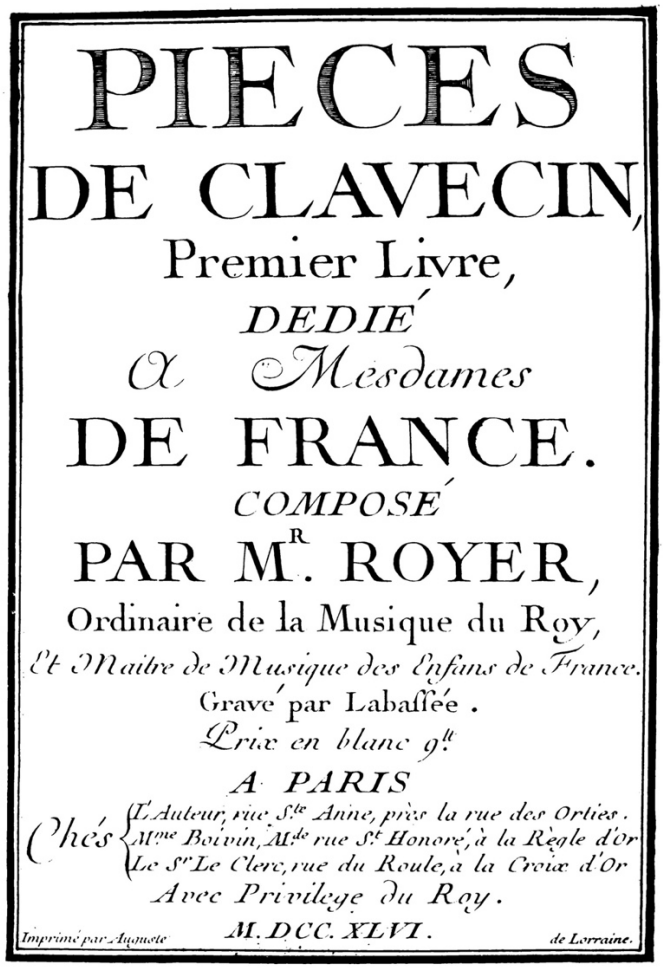
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Figure 2. Pancrace Royer's first, and only, book of harpsichord pièces, 1746.

Memory and Sensations

Few eighteenth-century harpsichordists were as equipped to write on nervous music, pathological or salubrious, as Pancrace Royer. Famous for his brash writing for the harpsichord, Royer takes a wholly different approach from his contemporary, Rameau. Born in Turin in 1703, Pancrace Royer moved to Paris in 1725 and became *Maître de musique des enfants de France*,

the private music instructor to the children of Louis XV. One would expect that in addition to music performance, Pancrace Royer was also responsible for teaching body comportment, music theory, and music performance in social contexts, which would have required him to have knowledge of emerging theories of music and bodily sensations.

I realize that in providing only two musical examples that are explicitly marked as related to nervous conditions may make my argument seem speciously narrow. I would argue that the mutual embrace of neuroculture and music was widespread. Certain musical conventions took over as neuroculture began to gain momentum, particularly the emphasis on circularity and the value of "roundness" to work through and resolve divergent melodic material and key areas. Prior to the eighteenth-century, variations, inventions, and linearity were primary modes of exploring a motive: themes and variations and grounds were favorite genres for the keyboard in the seventeenth-century. Generally, only repetition and movement through closely related keys were permitted partially due to the restrictions of a non-cyclical temperaments and meantones. While themes and variations were heard as inventive, they were also understood to be mechanical and innocent, like clockwork or the ceaseless motion of the planets.

In the eighteenth century, wider implementation of cyclical temperaments and forms that placed value on circularity, such as the rondeau or ternary forms, provided renewed certainty of stable processing of divergent melodic and harmonic material. J.S. Bach's *Well-Tempered Clavier* (1722) demonstrated the processing of the entire gamut of key areas. The rondeau, which had only middling success in the seventeenth century, also moves through variations but returns to the main thematic content, thereby processing and transforming divergent material. Ternary forms also privilege the roundness of absorbing distant key areas and returning or taming them to where they started. The *da capo* aria is an excellent example: in this ternary form, two outer

sections of relatively stable musical content buffer, frame, and contain the erratic melodic material of the middle section, often in opposing harmonic and irregular key areas. Previous musicological study has overlooked roundedness as a value. Susan McClary has in many essays explained how common practice music's primary goal was to replicate desire by building up formal, harmonic, and melodic crisis through denying climax and release. My claim is that other phenomenological experiences are at play in eighteenth-century musical conventions of form other than desire, one of harmonic absorption, successful processing of new and sometimes errant material, and a return to the tonic of melodic "home" to satisfy cerebral pragmatism, or the satisfying resolution of encountering, thinking through, and transforming ideas and sensations into stable forms.

The later development of sonata form also speaks to this process-based composition and phenomenological experience of listening with a cognitive bent toward neurocultural ideas about memory. In Pancrace Royer's "La Sensible," a sensibility manifests in a number of ways (Example 3). The first is in its imaginative motion through a number of key areas, both distant and dissonant, but all well-prepared. The second is in the fluidity of the broken arpeggiations, in *style brisé*, that always rise upward, as if the flow of sensation moves to the highest cognitive position. Next, the simple, yet refined melodic motives are well maintained, never out of control, and the coordination between upper and lower voices provide a sense of stability and regulation. Last, the returns to the rondeau replicate the human functions of memory with constant returns to primary ideas, or "impressions" as Willis called them.

Pancrace Royer seemed to enjoy the rondeau form. It appears throughout his oeuvre in a number of contexts, for instance in orientalist tropes ("Le Marche des Scythes"). In the context of "La Sensible," however, the rondeau serves as an "impression" of memory—a kind of

cognitive revisitation and reflection (A, B, A, *Finalle*, (A^1), A, *Dernière Finalle*). The return to the opening section (A) could also signify human memory recall possible only in the most sensible of listeners. As Thomas Willis wrote in *Cerebri Anatome*, humans without a soft and densely fibrous cerebellum were unable to make "impressions" from sensations and thus unable to remember musical tunes.

> Whilst therefor the audible Species passes through the Cerebel, in some men, it leaves in this region (for that it is of a soft temper, and fit for the receiving impressions) and tracts and marks of itself, and so they obtain musical ears. But in others who have a harder frame of the Cerebel, they produce no tracts of the same Sounds, and therefore such are wholly institute of the faculty of Musick.[28]

Key to the virtues of sensibility is a freely resonating body. The intentionality of each pitch, in single file without interruptions or digressions, replicates the iterative process of individual sensations entering the resonating body of the instrument. The long lines in the *finalle* sound like the flowing of vital spirits from the lower registers from the harpsichord to the brain, at which point they articulate every pitch in a given dissonant chord. Diderot wrote in *D'Alembert's Dream* that "our senses are so many keys that are struck by surrounding nature, and that often strike themselves. This is all, in my opinion, that happens in a harpsichord which is organized like you or me."[29] Moreover, the chordal outlines seem to be "thinking" in a sense that they travel through a number of key areas that, while dissonant, process slowly and imaginatively as if new ideas have come to bear from the impressions of the initial rondeau sections. One could easily have entire salvos of chordal walls; rather, these chordal structures are thinned out, rarified, and travel through the resonating body of the harpsichord with a certain amount of controlled discipline.

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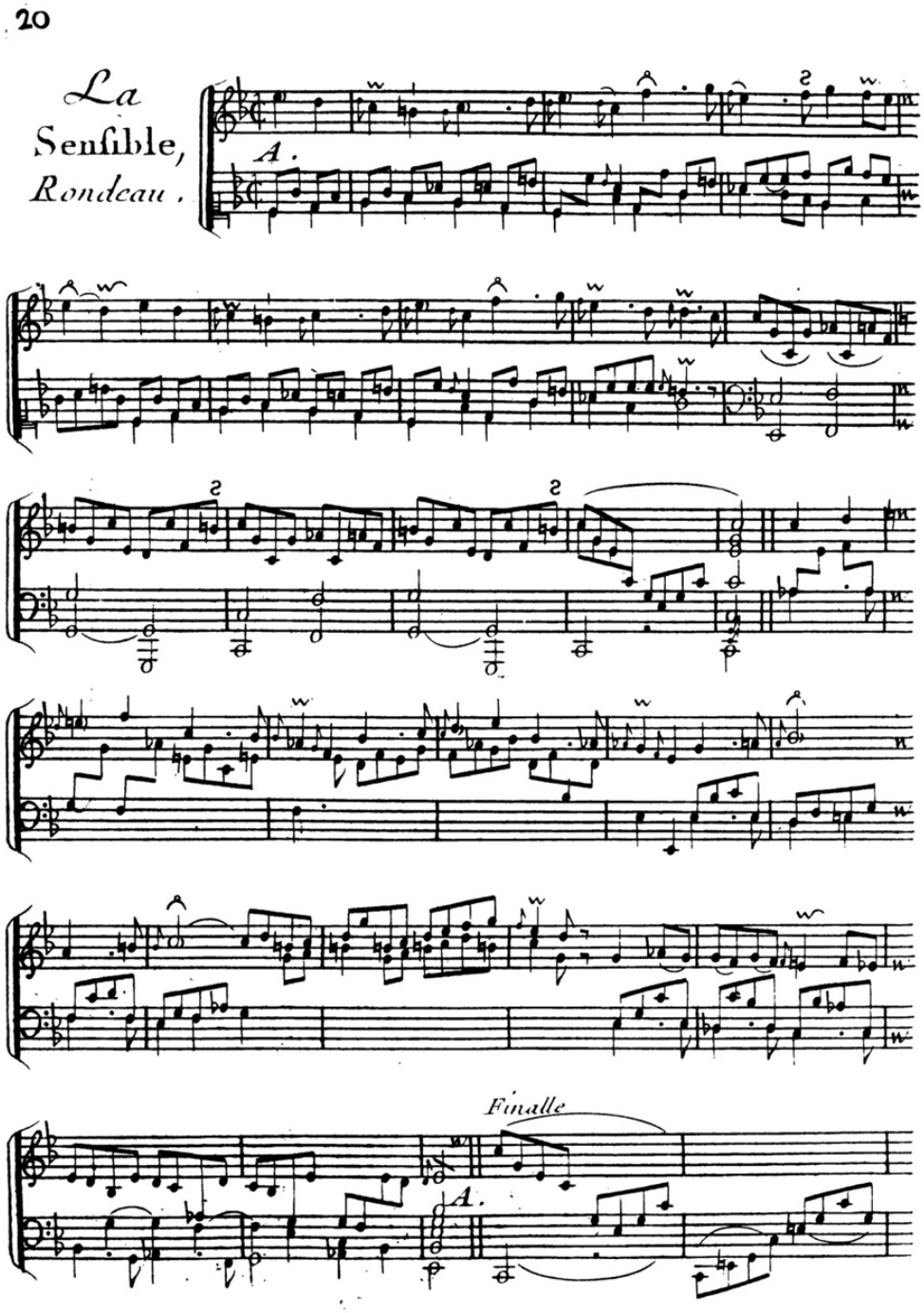
[28] Willis, *Anatomy of the Brain*, quoted in Lorch, "'Fools at Musick'," 159.

[29] Diderot, "Conversation Between D'Alembert and Diderot."

Example 3. Pancrace-Royer, “La Sensible,” 1746.



Derniere Finalle.
A.

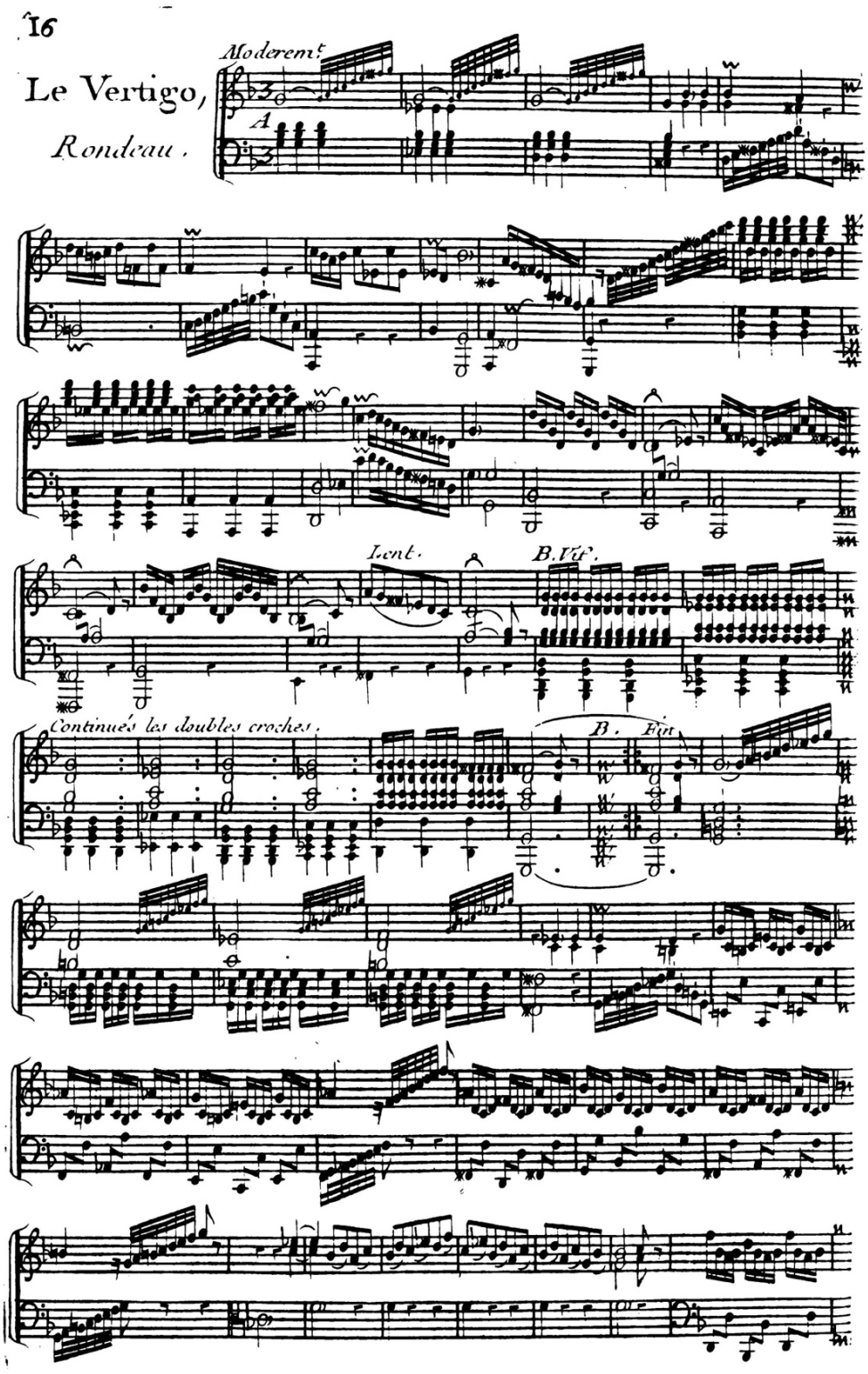
"Le Vertigo," by contrast, reproduces an over-resonant body that is too aggravated by discordant sounds (Example 4). The body is over-stimulated and unable to tell forward from back after being thrashed with too much stimulus. Consequently, there is significant memory damage and a failure of making lasting impressions. There is also no space nor time for the harmonic movement and rhythmic motives to resonate. Unlike "La Sensible," "Le Vertigo" feels oddly static and stuck given how rapid its harmonic motion. Repeated, crashing chordal blocks deny the harpsichord its full resonating capacity by filling up its cavity with discord. Completely different from "La Sensible," this pièce is not in the *style brisé*, or broken arpeggiations of chordal blocks that provide an ease and management of flow. These chordal blocks slam into you, as if assaulting the body. While a rapid harmonic motion is not problematic on its own, "Le Vertigo" is unregulated, shifting every measure too quickly, too invasively without reprieve.

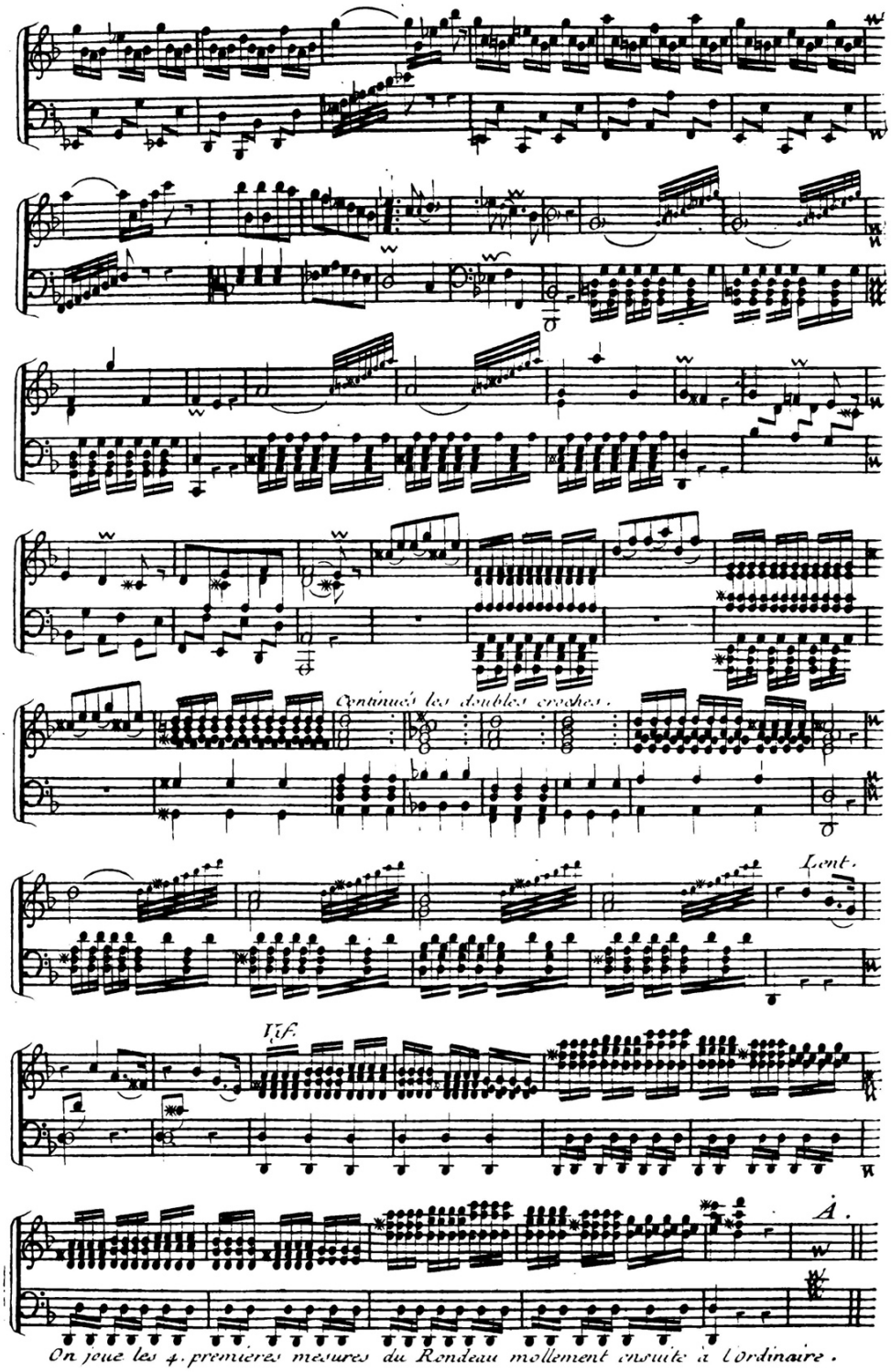
"Le Vertigo" contains insights into pathological experience. The crashing chordal blocks that are written in *les doubles croches* seem to split open the harpsichord. The rising, running lines that open the pièce are like the tearing of flesh or shooting pains. Because vertigo can be caused by lesions to the cerebellum or brain stem, the kind of tearing that seems to slice across the entirety of the keyboard's range gives the sensation of a particularly deep and traumatic gash. There are, however, small moments of relief from tension. These discursive and wandering moments generally appear in small melodic motives anywhere from two measures to six in a single register characterized by leaps of a simple third. Although small moments of reprieve are perhaps attempts at slowing down the flow of stimulus, the sudden departure from previous materials and the lack of cohesion between them gives an effect of having lost one's way. These wandering moments also "pool" together and do not elide with future material. These are only temporary breaks in the vertigo, a false sense of safety, and are immediately abandoned.

Pancrace Royer's treatment of the rondeau form in "Le Vertigo" also warrants comment. The pièce is not actually a true rondeau. While the harpsichord is overwhelmed with sensation, memory is also abandoned. Unlike his other rondeau, which are clearly written in episodes that return to the primary section, "Le Vertigo" is more deceptive. While motives and rhythmic patterns do return, there are no internal repeats and entire sections cannot be sectioned off as in a traditional rondeau. The return occurs only at the end of the first thirty-five stormy measures. The discursive nature of the entire pièce replicates a kind of disorientation not just in its inability to process an assault on the senses but also in its disabling of memory. Instead of roundness, circularity, or cyclicity one gets a sense of never-ending development. It is also curious that the final chord, a $vii^{\circ 7}$ with a G pedal tone, does not resolve to the tonic, leaving a tension that lingers and does not correct, heal, or recover itself.

While full of sensation, "Le Vertigo" fails to satisfy the human criteria for sensibility. Sensibility overall describes a sensitivity to external, environmental stimuli, particularly sound, smell, and light. Human, animal, and machine were capable of bodily sensations. In the case of machines and animals, sympathetic vibrations counted as sensations, but only humans had the consciousness to make sense of them, whether through memories or through imagination. This rondeau is far from sensible. It takes in sensation but is unable to process it. "Le Vertigo" is, thus, closer to animal music.

Example 4. Pancrace Royer, “Le Vertigo,” 1746.





On joue les 4. premieres mesures du Rondeau mollement ensuite à l'Ordinaire.

In this chapter, I have shown how the human was forever separated and set apart from animals and machines, via neuroculture, and how understandings of music, in particular the harpsichord—which scholarship on early modern music and anatomy, neurological disease, and sensibility stops short of analyzing—played a significant role in this development. As Peter Gay writes, the Enlightenment sensibility pursued a "social, ethical, political, and aesthetic program."[30] Diderot's dialogues in *Rameau's Nephew* and *D'Alembert's Dream* reveal that eighteenth-century neuroculture was foundational to the style of musical sensibility. Pancrace Royer's pair of rondeaux, "Le Vertigo" and "La Sensible," in his first book of harpsichord pièces (1746) demonstrates how harpsichord literature replicated neurocultural values as articulated by Diderot, primarily through imposing a system of memory recall as well as regulation and processing of new harmonic and melodic content (or stimulus). Much like Diderot, Pancrace Royer mobilized the harpsichord as a model for the resonating human body, strung with fibrous, vibrating nerves. His rondeaux both manifest eighteenth-century sensibility in musical terms and entangle the harpsichord with debates about nerve and brain anatomy.

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Resonance has been a major theme of the entire dissertation. Ideas resonate across treatises and dialogues, such as the speculative philosophies of Willis and Diderot. Objects also resonate across continents, such as on the diplomatic missions to France that brought scientific, musical, and devotional instruments on ships bound for Southeast Asia. In smaller, enclosed spaces, objects can resonate together, such as in animal collections in a salon, bird pièces for harpsichord, and books of natural history. When new ideas are voiced, sometimes unexpected

[30] Gay, "The Recovery of Nerve," 3.

objects begin to vibrate, as was the case with light and Castel's ocular harpsichord. In each of these arenas, the harpsichord's cavity is both conceptually and physically capacious enough to capture much of the resonate particulate that makes up the mentalities and practices of the eighteenth century.

I close here by returning to Ian Hodder's framework of entanglement.[31] An entangled organology can situate the harpsichord in discussions as important as human intelligence and imagination. *People depend on things* to make their arguments. Humans took natural things and restructured them, in the forms of keyboard instruments to mobilize their ideas. In Chapter Three, I showed how the harpsichord is one of the most preserved and "staged" pieces of natural history in the eighteenth century. In Chapter Four, it is staged according to Diderot's vision, as a resonant body capable of processing sensations and making memories. But more than just an individual specimen such as a bird skin, the harpsichord was a collection in its own right, cherry-picking elements that created a larger narrative about the functions and processes of the relationships between nature and culture.

Things depend on other things. Throughout this dissertation, I have stressed how non-human things form an assemblage with other things upon which, in turn, humans depend. For the eighteenth-century harpsichord in France, disparate materials were brought together in artisanal craftsmanship, including woods from the Americas and Africa, animals bone, feather, leather, and gut, as well as the tools and materials of painting, luthiers, furniture, and metal working. Things depend on other things when processes of production and consumption are brought into play. Production includes music publishing, pedagogy, and performance (music being conceptualized as a kind of thing). Consumption implies all means of absorption, such as

[31] Ian Hodder, *Entangled: An Archeology of the Relationships Between Humans and Things* (Chichester, UK: Wiley-Blackwell, 2012).

appropriation, imitation, and emulation as is the case in almost every respect as the harpsichord absorbs political motivations, imitates bird calls, and emulates nerve and brain functions.

Lastly, *things depend on humans*. Non-human or non-living things are never inert or fixed or stable. They depend on humans for maintenance, viability, and categorization as they change. The harpsichord constantly shifts categories between a living and dead thing; an instrument that is a composite of nature frozen in time but also nature revivified in performance. Maintaining viability also includes conversations and discourses surrounding the non-human thing that sustain its interest and social usability and functions. Were you interested in automata and mechanizing the freedom of motion? The harpsichord was a way to experiment with the idea of freeing yourself from or by way of mechanization. Were you interested in pet culture and books of natural history? The harpsichord was a means to collect and reanimate natural life in your home.

Musical instruments, the harpsichord in particular, can do more than make music. As Mitchell Morris says, they are "more than a mere assemblage of pitches." In my view, organologists, luthiers, historians of instruments, and performance practitioners should be excited about the immense flexibility of musical instruments, as technologies of science, natural history, diplomacy, economic conquest, and self-discovery of the human body as it relates or departs from animals and from machines.

One final word: the overall approach I have taken in this dissertation is to give privilege to different ways of reading and writing about material objects. But at the center of this project is a question about what kinds of stories are possible when the linkages between objects and ideas are loose or tenuous. Rather than repair these connections in ways recognizable and verifiable by contemporary historiography, my overall approach has been to give space to vibrations, subtle

reverberances, and to take note of how an idea is atomized across a resonant, ready space. This project represents what happens when we value resonance over solidity, evanescence and vibrancy as much as fixity and certainty.

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