

Rameau and Rousseau:
Harmony and History in the Age of Reason

Nathan Martin
Schulich School of Music
McGill University
Montreal

A thesis submitted to McGill University in partial fulfillment of the requirements
for the degree of Ph.D. in Musicology

Submitted August, 2008

© 2008 Nathan Martin, all rights reserved



Library and Archives
Canada

Published Heritage
Branch

395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque et
Archives Canada

Direction du
Patrimoine de l'édition

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence
ISBN: 978-0-494-66663-0
Our file Notre référence
ISBN: 978-0-494-66663-0

NOTICE:

The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

AVIS:

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protègent cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.

■ ■ ■
Canada

Acknowledgements

One of the many pleasures of completing a study of this kind is the opportunity to acknowledge the many debts—personal, intellectual, and otherwise—that I have contracted in its preparation. First and foremost, I would like to thank my wife Naila, my parents, and my supervisor William Caplin for their support, encouragement, and advice. All of them have endured more talk about Rousseau and Rameau than anyone should have to. Claude Dauphin kindly granted me access to materials from his critical edition of Rousseau's *Dictionnaire de musique* and was generous in sharing his knowledge of that text. I have also benefited from on-going conversations with David Cohen and Michael O'Dea, who forced me to clarify numerous points in my interpretation. Many of the ideas ventured here were first sounded out in conversation, generally at odd hours and often at the *Cheval blanc*, with friends and colleagues from McGill, especially Andy Deruchie, Erin Helyard, Julie Pedneault, Sarah Gutsche-Miller and Liz Blackwood. Professor Caplin offered valuable comments on various drafts of this study. It should be evident that the errors and infelicities that remain are due either to my incapacities or to my intransigence.

This study might have been possible without access to manuscript sources, but it would have been very different. For that access I am indebted both to the librarians who granted it and to the funding agencies that facilitated it. In particular, I would like to thank Maryse Schmidt-Surdez, who allowed me to consult a wealth of Rousseau autographs at the Bibliothèque publique et universitaire de Neuchâtel. Funding for research trips and other expenses came, at various stages and in various guises, from McGill University, the Social Sciences and Humanities Research Council of Canada, the Makhani Foundation and the American Musicological Society.

Abstract

Rousseau's articles on music for Diderot and d'Alembert's *Encyclopédie*, and to a lesser extent his *Dictionnaire de musique*, have rarely attracted the scholarly attention they deserve. As a result, the pivotal role that Rousseau played in the early French reception of Rameau's theory of harmony has never been fully appreciated. Far from being a quarrel over musical aesthetics, Rousseau's dispute with Rameau raised fundamental questions about the composer's theory of harmony. Rousseau interrogated the empirical adequacy of Rameau's theory, the soundness of its foundations, the logic of its derivation, and its pretension to universality. Over the course of his criticism, Rousseau came to regard tonal harmony as a historically-induced particularity of Western music to be explained through historical inquiry. In this respect, he anticipates a range of ideas that historians of music theory have associated far more readily with François-Joseph Fétis.

Les articles de Rousseau pour l'*Encyclopédie* de Diderot et d'Alembert et, à un moindre degré, son *Dictionnaire de musique*, ont rarement attiré l'attention qu'ils méritent au sein du milieu académique. L'influence capitale de Rousseau sur la réception de la théorie ramiste de l'harmonie en France demeure donc insuffisamment reconnue. Le différend entre Rousseau et Rameau, loin d'avoir été une polémique à propos de questions esthétiques, toucha plutôt à des concepts fondamentaux de la théorie ramiste. Plus particulièrement, Rousseau remit en question la justesse empirique de la théorie ramiste, la validité de ses fondations, la logique de son élaboration et sa prétention à l'universalité. Dans sa critique, Rousseau en vint à concevoir l'harmonie tonale comme une idiosyncrasie propre à la musique européenne qui demande, et ne pouvant être expliquée qu'à la lumière de ses origines historiques. Ce faisant, Rousseau fut le précurseur d'un large éventail d'idées que les historiens de la théorie de la musique ont plus généralement attribuées à François-Joseph Fétis.

Contents

Introduction	1
Chapter 1: Rameau and the <i>philosophes</i> in 1749	19
1.1. Rameau's Theory of Harmony, 1722-1749	20
1.2. Rameau and Condillac	47
1.3. Rameau and Diderot	58
1.4. Rameau and d'Alembert	68
Conclusion	73
Chapter 2: Rameau and Rousseau to 1749	75
Chapter 3: The <i>Encyclopédie</i> Articles of 1749	90
3.1. Reading the <i>Encyclopédie</i>	93
3.2. HARMONIE, <i>selon les modernes</i>	101
3.3. Revisions and Extensions to Rameau	115
3.4. Empirical Inadequacies in <i>ramiste</i> Theory	135
3.5. Rameau's Logical Failings	140
3.6. Implications	145
3.7. HARMONIE, <i>selon le sens que lui ont donné les anciens</i>	156
Conclusion	173
Chapter 4: "Du Principe de la mélodie" and the <i>Dictionnaire de musique</i> ..	175
4.1. Reading the <i>Dictionnaire de musique</i>	179
4.2. Acoustical Revisions	185
4.3. The Subdominant	196
4.4. The Minor Mode	202
4.5. "Dissonance"	205
4.6. "Harmonie"	208
Conclusion	212
Chapter 5: Consequences and Conclusions	214
5.1. Rameau's <i>système abstrait de l'harmonie</i>	220
5.2. Tartini's <i>Trattato di musica</i> and Rameau's <i>système</i> <i>hypothétique de l'harmonie</i>	226

5.3. Rousseau's <i>esquisse de l'histoire de l'harmonie</i>	244
Conclusion	272
Epilogue: Rousseau and Fétis	274
Bibliographical Essay	280
Appendix I: Tartini's Proof that the Circle is Harmonic	299
Appendix II: Tartini's Derivations of the Harmonic and Arithmetic Series	302
and the Series of Dissonances	
Bibliography	305

Abbreviations

- “Art” Jean-Philippe Rameau. “Art de la basse fondamentale.” Geneva, Bibliothèque publique et universitaire, ms. fr. 230.
- AT René Descartes. *Oeuvres*. Ed. Charles Adam and Paul Tannery. 11 vols. Paris: Vrin, 1996.
- Barker Andrew Barker, ed. *The Greek Musical Writings II: Harmonic and Acoustic Theory*. Cambridge: Cambridge University Press, 1989.
- CC Jean-Jacques Rousseau. *Correspondance complète*. Ed. R. A. Leigh. 52 vols. Oxford: Voltaire Foundation, 1965-98.
- CL Friedrich Melchior Grimm. *Correspondance littéraire*. Ed. Maurice Tourneux. 15 vols. Paris: Garnier frères, 1877-82.
- CTW Jean-Philippe Rameau. *Complete Theoretical Writings*. Ed. Erwin R. Jacobi. 6 vols. N.p.: American Institute of Musicology, 1967-72.
- Elémens* Jean le Rond d’Alembert. *Elémens de musique, théorique et pratique, suivant les principes de M. Rameau*. Paris: David, Le Breton, and Durand, 1752.
- “Mémoire” “Mémoire où l’on expose les fondemens du système de musique théorique et pratique de M. Rameau.” Paris, Bibliothèque-Musée de l’Opéra, collection Boisgelou, B. 24, f. 119r-128v. Transcribed in Thomas Christensen. “Rameau, Diderot and Vibrating Strings.” *Studies on Voltaire and the Eighteenth Century* 323 (1994): 153-66.
- OC Jean-Jacques Rousseau. *Oeuvres complètes*. Ed. Bernard Gagnebin and Marcel Raymond. 5 vols. Paris: Gallimard, 1959-95.
- OD Denis Diderot. *Oeuvres complètes*. Ed. Herbert Dieckmann, Jean Fabre and Jacques Proust. 25 vols. to date. Paris: Hermann, 1975-.
- OP Étienne Bonnot de Condillac. *Oeuvres philosophiques*. Ed. George

Le Roy. 3 vols. Paris: Presses universitaires de France, 1947-51.

“Du Principe” Jean-Jacques Rousseau. “Du Principe de la mélodie.” Neuchâtel, Bibliothèque publique et universitaire, ms. R. 60. Transcribed in Robert Wokler. *Rousseau on Society, Politics, Music and Language*. New York: Garland, 1987. Pp. 437-501.

Trattato Giuseppe Tartini. *Trattato di musica*. Padua: Giovanni Manfrè, 1754.

Articles from the *Encyclopédie* are cited by headword in small caps and encyclopedic designant. Articles from the *Dictionnaire* are cited by headword enclosed in double quotation marks. Thus, DISSONANCE, *en Musique* is Rousseau’s article in Diderot and d’Alembert’s *Encyclopédie*. “Dissonance” is the corresponding entry in Rousseau’s *Dictionnaire de musique*.

Introduction

On February 21, 1753, Denis Diderot made a second foray into the sometimes riotous *guerre des plumes* that has come to be known as the *Querelle des Bouffons*. The pamphlet that he published on that occasion—"Au petit prophète de Boemischbroda [et] au grand prophète Monet"—is a facetious call to order.¹ Affecting a mock severity, Diderot begins by upbraiding his contemporaries for their delight in wit and invective. He then enjoins them to forsake "la sublimité du bon mot" and descend instead to the humble plane of reasoned inquiry (OD, XIX, 11). No doubt some of the combatants will balk at the edge of this *terra incognita*. But Diderot is there to show the way. Let both sides in the dispute, he continues, consider two examples side by side: the one, three celebrated scenes from Lully's *Armide* (including the monologue "Enfin il est en ma puissance"); the other, a similar passage from Terradellas' *Sesostri*. If the *coin du roi* can show that Lully's music excels in force, truth, variety, resourcefulness and intelligence, then the French will have scored a decisive victory. But if the *coin de la reine* can demonstrate that Lully's music, in comparison to Terradellas', is but a languid psalmody, "une mélodie sans feu, sans âme, sans force & sans génie" ("a melody without fire, without soul, without strength and without genius"), then the Italian faction will have carried the day (OD, XIX, 13). "Je n'ai qu'un but," writes Diderot in concluding, "et j'y aurais atteint, si par hasard cette mauvaise lettre occasionnait un bon ouvrage" ("I have only one goal and I will have attained it if by chance this miserable letter occasions a good one," OD, XIX, 15).

Diderot's two most celebrated respondents were Jean-Jacques Rousseau and Jean-Philippe Rameau. Rousseau's incendiary *Lettre sur la musique française* appeared in November 1753. Over its course, Rousseau scatters barbs at Rameau, excoriates *Armide*, and ends up declaring the French language inherently unsuited to music. Rameau, provoked, responded with his *Observations sur notre instinct pour la musique* (1754).

¹ The title refers, respectively, to Grimm's *Le petit prophète de Boemischbroda* (1753) and to Mathieu François Mairobert de Pidansat's response, *Les prophéties du grand prophète Monet* (1753).

That much of their dispute will be familiar. Musicologists have long studied Rousseau's *Lettre* and Rameau's *Observations* in connection with the *Querelle des Bouffons*. Students of Rousseau, more recently, have been drawn to these same texts in reconstructing the genesis of the *Essai sur l'origine des langues* (c. 1762). But the public dispute of 1753-1754 was only one small part of a wider exchange. Four years before the public quarrel erupted, Rousseau had compiled over four hundred articles on music for Diderot and d'Alembert's *Encyclopédie*. In their course, he had surveyed Rameau's theory of harmony and criticized it on many points.² When Rousseau's articles began to appear, Rameau responded with two anonymous attacks: the *Erreurs sur la musique dans l'Encyclopédie* (1755) and the *Suite des erreurs* (1756). Rousseau answered by refining and expanding his arguments, first in "Du Principe de la mélodie" (1755)³ and then in his *Dictionnaire de musique* (1767).

Rousseau's *Lettre* and Rameau's *Observations* thus constitute only one small cross-section in a broader dispute. To characterize the quarrel between Rameau and Rousseau on these two texts alone is thus a perilous enterprise. But that is what has been generally done. As a result, Rousseau's close, critical engagement with Rameau's theory of harmony *per se* has been eclipsed. Already in the *Encyclopédie* articles of 1749, Rousseau had begun to press Rameau on the empirical adequacy of his theory, the logic of its derivation, and its pretension to universality. If these themes recede into the background in the *Lettre sur la musique française*, they reemerge no less forcefully in Rousseau's later musical writings. For in "Du Principe de la mélodie" and in the *Dictionnaire*, Rousseau consolidated and elaborates these early lines of criticism. The result is a comprehensive internal critique of *ramiste* theory.

² Persistent problems of attribution make the attempt to fix the exact number somewhat precarious. The most authoritative counts are to be found in Richard N. Schwab and Walter E. Rex, *Inventory of Diderot's Encyclopédie*, 7 vols., *Studies on Voltaire and the Eighteenth Century* 80, 83, 85, 91-93, 223 (Oxford: Voltaire Foundation, 1971-84), vol. 6, 222-224, and Alain Cernuschi, *Penser la musique dans l'Encyclopédie* (Paris: Champion, 2000), 111-12, 707-13. Schwab and Rex count 392 articles; Cernuschi counts 383 signed articles, 43 signed articles definitely attributable to Rousseau, and 11 probably by him.

³ Bibliothèque publique et universitaire de Neuchâtel, ms. R. 60. Drafted in 1755, the text was put aside unpublished. Rousseau later incorporated ff. 7r-17r of "Du Principe" into the *Essai sur l'origine des langues*, where they comprise most of chapter 18 and all of chapter 19. Rousseau reworked the remaining materials as his *Examen de deux principes avancés par M. Rameau* in 1765, when he considered appending the text to his *Dictionnaire de musique*. See below, pp. 182-85.

For that critique alone, Rousseau would undoubtedly deserve a place in the history of music theory. But Rousseau's critical engagement with Rameau also lead him to a novel conception of harmony and harmonic theory. Rameau had claimed to found harmony on physical acoustics. If that enterprise were sound, harmony would necessarily be no more variable than the acoustical substratum on which, *ex hypothesi*, it depends. Since that substratum presumably remains constant across geographic, cultural, and historical distances, harmony would be the same at all times, in all places. Of course, it is not. And Rousseau was the first critic of Rameau to recognize that fact and draw out its implications. If, as Rousseau came to realize, the harmonic system that Rameau's theory describes is but one musical system among others, then the quest for universal principles accounting for its every aspect is futile. For no such principles exist. That conclusion, furthermore, has methodological implications. If tonal harmony is merely a particular idiosyncrasy of European music, then its characteristics are not to be explained by appeal to some putatively natural foundation, but rather by an inquiry into the particular historical developments that have made harmony what it is. In his later writings, Rousseau attempted to do just that, and in this crucial respect, he anticipated a conception of harmony and harmonic theory that historians of music theory have more generally associated with François-Joseph Fétis.

The dual claim of this study, therefore, is that Rousseau deserves a place in the history of music theory both as an early and insightful critic of Rameau and as an important precursor to Fétis.

This is not, to say the least, how Rousseau has typically been construed. To most writers on music, Rousseau is a dilettante: at best, a suggestive thinker on questions of musical aesthetics; at worst, a *philosophe* prone to sententious pronouncements on an art whose rudiments he scarcely understands. That both characterizations are tendentious, that Rousseau wrote lucidly and at length about technical questions of music theory, and that he was remarkably well informed about the musical-theoretical developments of his era are not facts readily gleaned from the secondary literature.

The first history of theory, Fétis' *Esquisse de l'histoire de l'harmonie* (1840) mentions Rousseau exactly twice, once to chastise him for having uncritically copied an assertion of Brossard's, and a second time to censure (unjustly) his exposition of Tartini's

system in the *Dictionnaire*.⁴ Fétis' general verdict on Rousseau, given in the *Biographie universelle des musiciens* (1835-1844), presumably accounts for his exclusion from the *Esquisse*:

Sans être savant dans la théorie et dans l'histoire de la musique; sans avoir possédé une connaissance pratique de l'harmonie et du contrepoint; sans avoir même été assez habile lecteur pour déchiffrer une simple leçon de solfège, Jean-Jacques Rousseau exerça une grande influence sur la musique de son temps en France. La hardiesse de ses idées, le charme de son style, les singularités de sa vie, ses malheurs, attachaient à toutes ses productions un intérêt qui devait rejaillir sur ses oeuvres musicales et sur ses opinions. Dans l'esthétique de la musique, il eut d'ailleurs des vues justes, élevées, et ce qu'il en a écrit n'a pas été sans fruit pour la réforme du goût des Français dans cet art.⁵

Though he knew little about the theory and history of music, had no practical knowledge of harmony or counterpoint, and could not even decipher a simple solfège exercise, Jean-Jacques Rousseau exerted a great influence on the music of his time in France. The boldness of his ideas, the charm of his style, the peculiarities of his life, and his sufferings attached an interest to everything he produced that extends also to his musical works and opinions. With regard to musical aesthetics, moreover, his views were accurate and elevated, and what he wrote was not without fruit for the reform of French taste in that art.

Fétis' sketch has by now become the standard one amongst historians of theory:

Rousseau was ignorant of music theory and music history, lacked a practical grasp of harmony and counterpoint, and indeed could barely even sight-sing; his importance for music history lies only in the influence of his aesthetic opinions.

Rousseau fared little better in the next major history of music theory, Hugo Riemann's *Geschichte der Musiktheorie im IX.-XIX. Jahrhundert* (1898). Riemann mentions Rousseau seven times, five times in the body of the text and twice in the notes.⁶ All of the references are to the *Dictionnaire de musique*, sometimes in the annotated reproduction of the work's first half published by Nicholas-Etienne Framéry and Pierre-Louis Guigené in 1791 as the first of the *Encyclopédie méthodique*'s two volumes on music. Riemann cites the entry "Accord" on the term *accord parfait*, the article "Chiffres" for its table of figured bass symbols, and the work as a whole on the terms *sous-médante* and *sudominante*; he gives an extract from the entry "Système" while

⁴ *Revue et Gazette musicale* 7 (1840): 296, 537.

⁵ François-Joseph Fétis, *Biographie universelle des musiciens* (Brussels: Leroux, 1835-1844), vol. 7, 408 (s.v. "Rousseau, Jean-Jacques").

⁶ Hugo Riemann, *Geschichte der Musiktheorie im IX.-XIX. Jahrhundert*, 3rd ed. (Hildesheim: Olms, 1961), 437n, 468, 495, 491n, 495, 506.

discussing Tartini, cites “Accord” again concerning the *accord de sixte ajoutée*, and refers the reader to the entry “Accompagnement” on the reception of Rameau’s *Dissertation sur les différentes méthodes d’accompagnement* (1733). In none of these places does Riemann offer any substantive discussion of Rousseau’s ideas.⁷

Rousseau is also largely absent from the recent *Cambridge History of Western Music Theory*. Joel Lester’s contribution, “Rameau and Eighteenth-Century Harmonic Theory,” mentions the *Encyclopédie* articles in passing but ventures no appraisal of their contents, a feature that it shares with Lester’s earlier and authoritative study *Compositional Theory in the Eighteenth Century*.⁸ The full extent to which Rousseau may eventually figure in the *Cambridge History*’s German counterpart, the fifteen-volume *Geschichte der Musiktheorie* edited by Frieder Zaminer, remains to be seen since the relevant volume (the twelfth) is not yet available. But Renate Groth, who will contribute the requisite materials, has previously published an independent study on *Die französische Kompositionslehre des 19. Jahrhunderts*, and that text probably gives an indication of the forthcoming volume’s likely contents. In her earlier text, Groth briefly considers Rameau’s system and its eighteenth-century French reception but ignores Rousseau entirely.⁹ Volker Helbing’s essay “Tonalität in der französischen Musiktheorie zwischen Rameau und Fétis” in the *Handbuch der systematischen Musikwissenschaft*’s volume on *Musiktheorie* likewise makes little room for Rousseau, though Helbing

⁷ Presumably because Rousseau’s musical writings, in Riemann’s implicit verdict, neither furthered nor retarded the progress of music theory: “Ich betrachte es nicht als meine Aufgabe, hier alle theoretischen Werke zu registrieren und zu exzerpieren: nur diejenigen, welche für die Entwicklungsgeschichte der Theorie des Tonsatzes eine nennenswerte Bedeutung erlangten, gleichviel ob im positiven (fördernden) oder negativen (hemmenden) Sinne, können uns interessieren” (ibid., 506). Notoriously, Riemann’s criterion for judging whether a given body of theory is progressive or regressive is the extent to which it can be construed to anticipate his own position, an attitude that sometimes involves him in serious distortions. See, for instance, Carl Dahlhaus, “War Zarlino Dualist?” *Die Musikforschung* 10 (1957): 286-90; Scott Burnham, “Method and Motivation in Hugo Riemann’s History of Harmonic Theory,” *Music Theory Spectrum* 14 (1992): 1-14.

⁸ In *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (Cambridge: Cambridge University Press, 2002), 771. Elsewhere, Lester remarks that “Rousseau wrote many of the articles [for the *Encyclopédie*], generally following Rameau’s theories but differing with him on many points,” *Compositional Theory in the Eighteenth Century* (Cambridge, MA: Harvard University Press, 1992), 145. That judgment is unobjectionable enough, but as I hope to show, there remains a good deal more to say.

⁹ Renate Groth, *Die französische Kompositionslehre des 19. Jahrhunderts* (Wiesbaden: F. Steiner, 1983), 26-30. Rousseau receives a passing mention later in the study when the entry “Contre-point” is quoted from his *Dictionnaire* in another context (p. 78).

mentions in passing that Rousseau's *Dictionnaire* figured in the early reception of Rameau's theory.¹⁰

For the most part, then, general surveys of the history of music theory have occasionally mentioned Rousseau's *Encyclopédie* articles or cited isolated passages from his *Dictionnaire de musique* but have offered little appraisal of the contents or significance of either work. One exception is Mathew Shirlaw's 1917 study *The Theory of Harmony*, which briefly discusses the reception of *ramiste* theory in the *Encyclopédie*. Shirlaw's account, however, is highly selective and frequently confuses Rousseau's and d'Alembert's contributions.¹¹ Another partial exception comes in Carl Dahlhaus' work. In his two volumes for the *Geschichte der Musiktheorie*, Rousseau figures briefly as a theorist of melody antedating Koch, a characterization that Dahlhaus has amplified elsewhere.¹² In considering the (German) reception of Rameau, however, Dahlhaus ignores Rousseau entirely.¹³

The specialist literature on *ramiste* theory has been no kinder to Rousseau. Some of the most perceptive writers on Rameau's theory of harmony have ignored the composer's quarrels with the *philosophes* entirely.¹⁴ When the subject does come up, the impression is generally given that of the two phases of that dispute—the exchange between Rameau and Rousseau in the early 1750s and that between Rameau and d'Alembert in the late 1750s and early 1760s—only the second touched substantively on questions of music theory. Anne-Marie Chouillet devotes most of her 1987 article on Rameau's relations with the *philosophes* to the dispute between Rameau and d'Alembert; her discussion of the earlier dispute with Rousseau is confined to a brief synopsis of the *Lettre* and a passing mention of the *Encyclopédie* articles.¹⁵ Herbert Schneider even

¹⁰ Volker Helbing, "'Tonalität' in der französischen Musiktheorie zwischen Rameau und Fétis," in *Handbuch der systematischen Musikwissenschaft*, ed. Helga de la Motte-Haber and Oliver Schwab-Felisch, vol. 2, *Musiktheorie* (Laaber: Laaber Verlag, 2005), 182-83.

¹¹ Mathew Shirlaw, *The Theory of Harmony*, 2nd ed. (DeKalb, IL: Birchard Coar, 1955), 276-82.

¹² Carl Dahlhaus, *Die Musiktheorie im 18. und 19. Jahrhundert*, vols. 10 and 11 of *Geschichte der Musiktheorie*, ed. Frieder Zaminer (Darmstadt: Wissenschaftliche Buchgesellschaft, 1986-89), vol. 10, 22-23, vol. 11, 64-65. See also: Dahlhaus, "Unité de mélodie," in *Aufklärungen: Studien zur deutsch-französischen Musikgeschichte im 18. Jahrhundert*, ed. Wolfgang Birtel and Christoph-Hellmut Mahling (Heidelberg: Carl Winter Universitätsverlag, 1986), vol. 2, 23-29.

¹³ *Geschichte der Musiktheorie*, vol. 11, 75-90.

¹⁴ Among them, Carl Dahlhaus, David Cohen and Markus Waldura.

¹⁵ Anne-Marie Chouillet, "Présupposés, contours et prolongements de la polémique autour des écrits théoriques de Jean-Philippe Rameau," in *Jean-Philippe Rameau: colloque international organisé par la*

suggests that after the *Lettre sur la musique française*, Rousseau ceded his role in the public quarrel entirely to d'Alembert.¹⁶ Cynthia Verba's 1973 article on the Rameau-Rousseau dispute is primarily devoted to the two men's competing analyses of the *Armide* monologue, with the bulk of the discussion concerned with the shifts in Rameau's position between the *Nouveau système*, the *Observations*, and the *Code de musique pratique* (1760).¹⁷ In his 1979 study, Jean-Claude Malgoire similarly concentrates on Rameau's and Rousseau's analyses of Lully's monologue.¹⁸

Specialists on Rameau have sometimes acknowledged that Rousseau's *Dictionnaire* played a role in the early dissemination of Rameau's theory. Rameau's distinguished editor Erwin R. Jacobi does so, for instance, in the epilogue to his edition of Rameau's *Complete Theoretical Writing*. Yet Jacobi is reluctant to grant that that influence might have flown from any intrinsic merit: only when we bear in mind Rousseau's dominant position in the "spiritual climate of the 18th century," he writes, "is it possible to understand how his views on Rameau and his theories could have had such a great and widespread influence."¹⁹ Marie-Elisabeth Duchez gives an even more scathing appraisal while accounting for the "incomprehension" with which Rameau's contemporaries allegedly met his theory:

La raison principale de cette incompréhension tient en partie au fait que, au début de la deuxième moitié du dix-huitième siècle, la théorie ramiste a été répandue non par les textes mêmes de Rameau . . . mais par des 'Philosophes' peu musiciens, qui en donnèrent une version extrêmement simplifiée et en appauvrirent considérablement le contenu musical.²⁰

This incomprehension is due in part to the fact that *ramiste* theory was not disseminated by means of Rameau's own writings at the beginning of the second half of the eighteenth century . . . but rather by 'philosophes' little versed in music who gave an extremely simplified version and impoverished its musical content considerably.

Société Rameau, Dijon—21-24 septembre 1983, ed. Jérôme de la Gorce (Paris: Champion; Geneva: Slatkine, 1987), 425-33. Rousseau's subsequent writings on Rameau receive no mention at all.

¹⁶ Herbert Schneider, "Rameaus musiktheoretisches Vermächtnis," *Musiktheorie* 1 (1986): 153. This is to ignore the *Dictionnaire de musique* entirely.

¹⁷ Cynthia Verba, "The Development of Rameau's Thoughts on Modulation and Chromatics," *Journal of the American Musicological Society* 26 (1973): 69-91.

¹⁸ Jean-Claude Malgoire, "L'Analyse ramiste du monologue d'*Armide*," in *Musique raisonnée: Jean-Philippe Rameau*, ed. Catherine Kintzler (Paris: Éditions Stock, 1980), 201-15.

¹⁹ Jacobi, "Epilogue to the Complete Edition," CTW, IV, xlix.

²⁰ Marie-Elisabeth Duchez, "Valeur épistémologique de la théorie de la basse fondamentale de Jean-Philippe Rameau: connaissance scientifique et représentation de la musique," *Studies on Voltaire and the Eighteenth Century* 245 (1986): 114.

The *philosophes* in question are d'Alembert and Rousseau, and thus while acknowledging Rousseau's role in the early dissemination of Rameau's ideas, Duchez sees his influence as essentially pernicious:

Rousseau et d'Alembert ramenèrent la théorie ramiste au niveau de leur compréhension musicale: ni l'un ni l'autre n'étaient assez musiciens, ne possédaient, selon l'expression de Rameau, assez de "sensibilité à l'Harmonie," pour comprendre et faire comprendre la riche capacité de variétés de la progression harmonique, et les possibilités inférentielles de la basse fondamentale[.]²¹

Rousseau and d'Alembert reduced Rameau's theory to the level of their musical understanding: neither the one nor the other was enough of a musician—neither possessed, in Rameau's expression, enough "sensitivity to harmony"—to understand the rich variety of harmonic progressions and the inferential possibilities of the fundamental bass, or to make these things understood.

The general reception of the Rousseau's musical writings amongst historians of theory should by now be clear. Rousseau's *Encyclopédie* articles are mentioned in passing, if at all; the dispute between Rousseau and Rameau is shrunk to the public exchange of 1753-1754, with Rousseau's position being extrapolated largely from the *Lettre sur la musique française*, and while it is sometimes acknowledged that the *Dictionnaire* played a significant role in the early reception of Rameau, its influence is seen as deleterious.²² This sketch is frequently accompanied by the insinuation or outright assertion that Rousseau's alleged musical incompetence disbarred him from any real engagement with Rameau's ideas. If there is serious criticism of Rameau's theory of harmony to be found amongst the *philosophes*, it is generally implied, we should look to d'Alembert's writings and not Rousseau's.

These themes coalesce with particular clarity in two of the most recent studies to touch on the dispute: Cynthia Verba's *Music and the French Enlightenment* and Thomas Christensen's magisterial *Rameau and Musical Thought in the Enlightenment*. In her 1993 study, Verba expands on her earlier treatment of the Rameau-Rousseau dispute. Curiously, Verba accurately diagnoses one of the principal distortions that has afflicted

²¹ Duchez, "Valeur épistémologique," 116.

²² These tendencies can equally be observed in Hans Pischner, *Die Harmonielehre Jean-Philippe Rameaus: ihre historischen Voraussetzungen und ihre Auswirkung im französischen, italienischen und deutschen musiktheoretischen Schrifttum des 18. Jahrhunderts* (Leipzig: Breitkopf & Härtel, 1963), 160-67; James Krehbiel, "Harmonic Principles of Jean-Philippe Rameau and his Contemporaries" (Ph.D. diss., Indiana University, 1964), 144-47. Cynthia Geselle does, however, draw attention to Rousseau's criticism of Rameau's handling of dissonance and the subdominant in "The Institutionalization of Music Theory in France: 1764-1802" (Ph.D. diss., Princeton University, 1989), 34, 49-50.

the critical reception of the dispute—namely the selectivity with which the texts have been read—but then falls into it herself.²³ For Verba, the dispute between Rameau and Rousseau is about the nature of musical expression: the *Lettre* and the *Observations* “stand apart from the main body of the literature of the pamphlet war [the *Querelle des Bouffons*] precisely because the authors deal with the larger issue about the nature of music as expressive art, rather than confining themselves the more limited debate over the French-Italian musical rivalry”; “their quarrel [is] over melodic versus harmonic supremacy in musical expression . . . with Rameau an advocate of harmony, and Rousseau of melody.”²⁴ In the second chapter of her book (“Rameau and Rousseau Launch the Debate”), Verba retraces the ground covered in her 1973 article, though now with greater emphasis on Rousseau’s side of the exchange. Her third chapter (“Music as Expressive Art”) turns to Rousseau’s subsequent musical writings, which she presents as developments and expansions of the *Lettre sur la musique française*.²⁵ The *Encyclopédie* articles and the draft on the origin of melody (“Du Principe de la mélodie) are mentioned only in passing, and with the exception of the long entry “Opéra,” the *Dictionnaire de musique* is ignored. One difficulty that results from this selectivity lies in explaining Rameau’s vehement response to the *Encyclopédie* articles in the *Erreurs*. If Rousseau’s *Encyclopédie* articles are innocuous, why did Rameau bother to attack them? To answer that question, Verba must position the *Erreurs* primarily as a response to Rousseau’s *Lettre*.²⁶ As for why Verba neglects all of Rousseau’s technical writings on music theory, the answer presumably lies in her conviction that Rousseau “was a self-taught amateur,

²³ “The abundance and rapidity with which new arguments appeared, further complicated by their changing forums and focal issues, presented little difficulty for the participants themselves in following the continuity of the dialogue. For the current scholar, however, this is a more serious problem. Some of the arguments appeared in unexpected places; others were never identified as part of an exchange” (Cynthia Verba, *Music and the French Enlightenment: Reconstruction of a Dialogue, 1750-1764* [Oxford: Oxford University Press, 1993], 3-4).

²⁴ *ibid.*, 5, 8. Because harmony, for Rameau, is founded upon universal principles and because melody, for Rousseau, is intimately linked to the idiosyncrasies of particular languages, the debate touches on the issue of the universality or relativity of musical practices. Verba clearly sees this implication (see, e.g., pp. 5, 31), but the point remains underdeveloped because she does not consider the texts in which it is most fully expounded.

²⁵ “The distance between Rousseau and Rameau on musical expression, already considerable in the positions presented in the *Lettre sur la musique française* and the *Observations*, respectively, grew even wider as Rousseau developed a theoretical foundation for his views in subsequent writings” (*ibid.*, 33). In practice, “subsequent writings” here means the *Essai sur l’origine des langues* and the entry “Opéra” from the *Dictionnaire de musique*, the only later texts of Rousseau’s that Verba discusses in any detail.

²⁶ *ibid.*, 39.

with limited training and composition skills.”²⁷ Lacking the musical ability to understand Rameau’s system, therefore, Rousseau had to attack Rameau “primarily on aesthetic and philosophical grounds.”²⁸

A similar picture emerges from Thomas Christensen’s 1993 study. It is, as Christensen fairly notes, beyond the scope of his investigation to consider Rousseau’s musical writings in their entirety. Nonetheless, Christensen does claim to survey their contents “insofar as they impinge upon Rameau’s ideas.”²⁹ To that end, he briefly considers Rousseau’s articles for the *Encyclopédie*. Christensen acknowledges that Rousseau was “the philosophe with the most musical experience and knowledge” and so was “a logical choice” to contribute the requisite articles.³⁰ Still, his discussion of Rousseau’s articles is not without an air of condescension (for instance: “[Rousseau] *tried as best he could* to present Rameau’s theory accurately”), and in general, Christensen concludes that “there is little to be found in the first volumes of the *Encyclopédie* that any objective reader could interpret as disrespectful or critical towards [Rameau’s] theory.”³¹ To explain Rameau’s vehement reaction to Rousseau’s “generally innocuous articles,” Christensen must, like Verba, invoke the *Lettre sur la musique françoise*. And though he goes on to mention the *Examen de deux principes* and the *Dictionnaire de musique*, his discussion gives the impression that these texts merely follow upon and amplify the *Lettre*.³² “Interesting and important as Rousseau’s development as a musical thinker is,” Christensen concludes, “it is a development that no more concerned Rameau.”

Most of Rousseau’s arguments with Rameau were driven by his own ideological agenda, and reflect his maturing thoughts on language, education, society, and politics—an agenda Rameau was fully incapable of recognizing or appreciating. For his part, Rousseau was blind to the systematic *desiderata* of Rameau’s theory and deaf to its musical subtleties.³³

²⁷ The decision is strange, since Verba criticizes her predecessors on precisely this point: “Many specialists on Diderot or Rousseau, for example, who have closely followed their musical discussions, have done so mainly from the point of view of aesthetics; they have stopped short of entering the realm of music theory” (ibid., 7).

²⁸ ibid., 10.

²⁹ Thomas Christensen, *Rameau and Musical Thought in the Enlightenment* (Cambridge: Cambridge University Press, 1993), 212.

³⁰ ibid., 213, 247.

³¹ ibid., 248, my italics.

³² ibid., 249-250.

³³ ibid., 250.

From the historian of music theory's perspective, therefore, it was d'Alembert, among the *philosophes*, whose relationship with Rameau "was ultimately the most complex and consequential."³⁴

As the foregoing survey makes clear, Rousseau's musical writings have been consistently ignored, denigrated, and otherwise marginalized by historians of music theory. The principal reason for this neglect is clear enough: the relevant texts either have not been read at all or have not been read in the necessary ways. How and why this has occurred, however, is a complex matter.

One obvious factor is the stubborn prejudice that insists, despite all evidence to the contrary, on Rousseau's musical incompetence. How and why this prejudice has arisen would warrant a study in its own right, but quite obviously, a man barely able to sight sing could not have had anything worthwhile to say about Rameau's theory of harmony. One of its principal functions has therefore been to absolve historians of theory of the need to take his writings seriously. However unfounded, the prejudice is so firmly entrenched that no amount of abstract pleading is likely to dislodge it. Whether Rousseau was really incapable of following the technical intricacies of Rameau's theorizing, however, will emerge quite clearly over the course of this study.

A second factor in the neglect of Rousseau's technical writings on music theory has been the relative inaccessibility of the relevant texts. The fifth and final volume of the authoritative Pléiade edition of Rousseau's works, which contains the musical writings, did not appear until 1995. Though now readily available, the volume omits the *Encyclopédie* articles entirely, gives "Du Principe de la mélodie" only in part (under the title *Origine de la mélodie*), and prints the *Dictionnaire* without critical apparatus. Readers wishing to consult Rousseau's 1749 articles have therefore had to go to the considerable trouble of locating them within the *Encyclopédie*'s 17 folio volumes. The full text of "Du Principe" is available only in an appendix to Robert Wokler's doctoral dissertation.³⁵ As for the *Dictionnaire*, the Pléiade volume simply reprints the original

³⁴ *ibid.*, 212. Accordingly, Christensen devotes a mere five pages (pp. 247-251) to Rousseau; d'Alembert receives an entire chapter.

³⁵ Robert Wokler, *Rousseau on Society, Politics, Music, and Language: An Historical Interpretation of his Early Writings* (New York: Garland, 1987).

1767 edition without alerting the reader of the many important corrections and variants preserved in the Neuchâtel autograph of the work.

The absence of critical editions of the *Encyclopédie* articles and *Dictionnaire de musique* has been problematic in another respect as well. One of the peculiarities of Rousseau's critique of *ramiste* theory is that it was largely expounded in dictionaries. That mode of presentation poses a number of interpretive problems, some of which a critical edition can help to ameliorate. A dictionary or encyclopedia article differs from many other kinds of expository prose in that there is no particular expectation that its text be entirely the authors' own. Even by the eighteenth century's rather more generous standards, to copy wholesale from another writer in the course of a treatise or essay constituted plagiarism. To do the same in a dictionary article did not. Rather, a considerable amount of paraphrase, and some outright theft, was a norm of the genre. Dictionary articles, after all, make no explicit claim to originality but rather strive to reflect a general consensus. As a result, entries frequently take on an aspect of pastiche or collage, with much of the content being quoted or paraphrased from sources named and unnamed. If the goal, as here, is to isolate the position of the author, then it is imperative always to know who is talking.³⁶ This in turn can only be accomplished by comparing the article against its sources. And one task of a critical edition is to alert the reader to the author's borrowings.

The format of Rousseau's critique also poses problems of another kind. For in general it is far from obvious how a dictionary should be read. Indeed, in a certain sense, a dictionary is not really intended to be read at all. It is rather to be consulted on particular points, hence the morselling of its contents into discrete and easily retrievable articles arranged alphabetically by head-word. That procedure, as Ernst Cassirer has remarked, has a leveling effect: it favours comprehensiveness over consistency and co-ordination over systematic exposition.³⁷ To extract a systematic argument from the mass

³⁶ This endeavour might strike the reader as strange: it is less so if the polemical character of many eighteenth-century dictionaries is kept in mind. Consider, for instance, Bayle's *Dictionnaire historique et critique*, Voltaire's *Dictionnaire philosophique*, or indeed the *Encyclopédie* itself.

³⁷ "[D]as Wörterbuch läßt, entgegen dem Geist der Über- und Unterordnung, der die rationalen Systeme beherrscht, den Geist der bloßen Nebenordnung am reinsten hervortreten. In ihm gibt es keine Hierarchie der Begriffe, keine deduktive Ableitung des einen aus dem anderen; sondern in ihm gibt es nur noch ein einfaches Beisammen von Materien, deren jede der anderen gleichbedeutend ist und sich mit ihr in den

of its materials is therefore to grasp at something that runs counter to the expectations of the genre. Naturally, there are ways of mitigating this difficulty.³⁸ But the general problem is one that any would-be exegete must confront.

A further factor in the neglect of Rousseau's engagement with *ramiste* theory has been the reception of Rousseau's musical writings amongst musicologists and students of Rousseau. Musicologists have typically approached Rousseau from the perspective of eighteenth-century French operatic history.³⁹ The narrative in the background is usually concerned with the gradual incursion of the *goût italien* into France, beginning with the exchange between Ragueneau and Le Cerf, continuing through the *Querelle des Bouffons* and ending with the triumph of Gluck at the Opéra, which is to be celebrated or lamented in accordance with the predilections of the individual writer. This backdrop establishes the frame within which Rousseau's writings are read. The *Lettre sur la musique française* then attracts disproportionate attention because it fits the background narrative so well: it is, after all, an attack on French operatic traditions and a defense of Italian music. Seen in these terms, the exchange between Rameau and Rousseau appears as yet another chapter in the seemingly endless dispute over the relative merits of Italian and French operatic styles.

Students of Rousseau, in contrast, have tended to read the dispute from the perspective of the *Essai sur l'origine des langues*. The reasons have to do with the internal development of Rousseau scholarship over the course of the twentieth century and are surveyed in their place.⁴⁰ The practical effect, however, has been to cast Rousseau's exchange with Rameau as a controversy over the nature of musical expression, with the disputants respective positions conveniently encapsulated under the slogans of "harmony" and "melody." The opposition between harmony and melody maps readily onto the other binary oppositions (*articulation/accent*, *nord/sud*, *physique/moral*, etc.) that bifurcate the *Essai*, and the *Essai* itself provides the most obvious point of contact between Rousseau's musical writings and his social and political

Anspruch auf vollkommene Darstellung und erschöpfende Behandlung teilt" (Ernst Cassirer, *Die Philosophie der Aufklärung* [1932; repr. Hamburg: Felix Meiner Verlag, 2007], 211).

³⁸ For the solutions that I adopt, see below, pp. 93-100, 175-84.

³⁹ The contentions advanced in this paragraph and the one that follows are defended, and the relevant literature surveyed, in the bibliographical essay at the end of this study.

⁴⁰ See below, pp. 285-99.

concerns (these latter being the aspect of his thought with which his interpreters have usually been preoccupied).

In sum, concerns intrinsic to their respective disciplines have drawn the attention of music historians and Rousseau scholars towards the *Lettre sur la musique française* or the *Essai sur l'origine des langues* and away from the *Encyclopédie* articles and *Dictionnaire de musique*, and it is on the basis of this restricted selection of texts that both groups have tended to characterize Rousseau's dispute with Rameau. In both cases, the dispute is cast as a controversy over questions of musical aesthetics—over the relative merits of Italian and French opera or the respective importance of harmony and melody in musical expression—that touch tangentially, if at all, upon the real core of Rameau's theorizing. These scholarly traditions, together with the prejudice against Rousseau's musicianship and the inaccessibility of the texts that would discount it, have meant that Rousseau's musical writings have rarely piqued the professional interest of historians of music theory. As a result, a significant chapter in the early French reception of Rameau's theory of harmony has been unduly neglected.

The chief purpose of this study is to remedy that neglect. Chapter 1 ("Rameau and the *philosophes* in 1749") treats Rameau's relationship with Diderot and d'Alembert in the late 1740s and early 1750s. The principal question it addresses is why, in the early stages of their project, Diderot and d'Alembert decided to accord so prominent a place to Rameau's ideas in the *Encyclopédie*. The answer is that Rameau's theory seemed to the two editors to exemplify certain epistemological and methodological positions to which they were themselves committed. More precisely, Diderot and d'Alembert initially regarded Rameau's system as an exemplary application of Condillac's scientific methodology to a sphere that had previously seemed governed by nothing but the arbitrary dicta of habit and tradition. Rameau, they believed, had discovered the *vrai système de l'harmonie*. This conviction, it turns out, also provides the essential backdrop against which Rousseau's *Encyclopédie* articles demand to be understood.

Chapter 2 ("Rameau and Rousseau to 1749") considers Rousseau's reception of Rameau's ideas and his relations with the composer prior to the preparation of the *Encyclopédie* articles in 1749. The primary goal of the chapter is to explain why Diderot assigned the task of redacting Rameau's ideas to Rousseau. The answer, in brief, is that

of the available candidates Rousseau was the one most capable of doing so. In reconstructing Rousseau's study of Rameau's writings in the 1730s and 1740s, the chapter also provides a convenient synopsis of the sources Rousseau exploited in 1749.

Chapter 3 ("The *Encyclopédie* Articles of 1749") turns to Rousseau's exposition of *ramiste* theory in the *Encyclopédie*. Far from being the superficial, orthodox redaction of Rameau's ideas for which they has sometimes been mistaken, Rousseau's articles offer a lucid though highly critical account of Rameau's system. Rousseau attacks Rameau for having omitted the augmented-sixth chord, and for his handling of diminished seventh chords, deceptive cadences and parallel six-three chords. He identifies problems and inconsistencies in Rameau's derivations of dissonant intervals and fundamental-bass progressions from the *corps sonore*. And finally, he challenges the universality that Rameau claims for his system by means of counterexamples drawn from Greek harmonic theory.

Chapter 4 ("Du Principe de la mélodie' and the *Dictionnaire de musique*") considers the development of Rousseau's criticisms in the later 1750s and their eventual expression in the *Dictionnaire de musique*. In addition to recapitulating and refining the criticisms ventured in the *Encyclopédie*, Rousseau inaugurates a new series of criticisms directed at Rameau's acoustical observations and his accounts of the minor triad and the subdominant.

Chapter 5 ("Conclusions and Consequences") turns to the consequences that Rousseau drew from his critique. On occasion, Rousseau dismisses Rameau's theory as *système abstrait*—a web of confusions held together by a tissue of misleading analogies. In his more conciliatory moods, however, Rousseau concedes that Rameau's system represents an enormous practical improvement over previous thorough-bass methods. In such passages, Rousseau sometimes suggests that Rameau's theory is instead a *système hypothétique*—a valuable first approximation to be supplemented and perhaps ultimately supplanted by further investigation and research (it is in this light, I suggest, that Rousseau's puzzling enthusiasm for Tartini's *Trattato di musica* can be best understood). This conclusion, however, meshes poorly with another, more radical inference that Rousseau sometimes draws. For at times, Rousseau suggests that Rameau's theoretical enterprise—the attempt to found harmony on physical acoustics—is simply untenable.

Harmony, as a historically constituted system particular to recent European musical cultures, cannot be explained by appeal to some putatively natural foundation. Explaining harmony instead means doing history; it means searching out, in the historical record, the developments that have made harmony what it is. In the researches he undertook at the Bibliothèque du Roi in the mid 1750s—researches that found expression in “Du Principe de la mélodie,” the *Essai sur l’origine des langues* and the historical articles of the *Dictionnaire de musique*—Rousseau attempted to do just that.

It is in this third trajectory, in my opinion, that Rousseau’s most profound response to Rameau’s theory lies. For here, Rousseau anticipates a conception of harmony that historians of music theory have more typically associated with François Joseph Fétis. Accordingly, I conclude with a brief epilogue (“Rousseau and Fétis”) on the relationship between Fétis’ ideas and Rousseau’s. I do not claim—though the possibility remains open—that Rousseau figured amongst Fétis’ sources, but he certainly numbered amongst Fétis’ precursors.

My study has only one direct antecedent: Xavier Bouvier’s article “Rousseau et la théorie ramiste.”⁴¹ Bouvier, however, limits his discussion to the entries “Acompagnement,” “Accord,” “Basse-fondamentale,” “Dissonance,” and “Harmonie” from the *Dictionnaire de musique*, together with parallel passages from the *Examen de deux principes avancés par M. Rameau*. The *Encyclopédie* articles, which he regards as “assez inoffensifs,” are evoked only in passing,⁴² and while Bouvier identifies some of Rousseau’s departures from Rameau in the *Dictionnaire*, he misses or misconstrues others.⁴³ Finally, though he does acknowledge that in the entries “Dissonance” and “Harmonie” of the *Dictionnaire*, “Rousseau se lance dans une démolition quasi systématique du système de Rameau” (“Rousseau launches into a near-systematic demolition of Rameau’s system,” OC, V, 1690), he offers no analysis of the substance of

⁴¹ Xavier Bouvier, “Rousseau et la théorie ramiste,” in OC, V, 1664-93.

⁴² Bouvier must therefore explain Rameau’s vehement response in the *Erreurs* as a reaction to the *Lettre à Grimm* and the *Lettre sur la musique françoise*: “On ne peut s’expliquer la virulence des attaques de Rameau dans les *Erreurs* de 1755 contre des articles somme toute assez inoffensifs que si l’on tient compte des écrits de Rousseau parus durant cette période de 1752 à 1755: La *Lettre à M. Grimm* (1752) et la *Lettre sur la musique françoise* (1753)” (OC, V, 1687). The only *Encyclopédie* articles that Bouvier discusses directly are TEMPERAMENT, *en Musique* and SUSPENSION, *en Musique*.

⁴³ Bouvier identifies some of Rousseau’s revisions to Rameau in the *Encyclopédie* (which are recapitulated in the *Dictionnaire*). For details see below, pp. 115-35.

this “démolition,” and he misdates the passages in which it occurs so that Rousseau’s criticisms appear as derivative from d’Alembert’s.⁴⁴

That my study has few direct antecedents does not, however, mean that my debts to earlier writers are not substantial. Readers will note my reliance on Alain Cernuschi’s exemplary *Penser la musique dans l’Encyclopédie* at numerous points.⁴⁵ I am equally indebted to Michael O’Dea’s 2003 article “Consonances et dissonances: Rousseau et d’Alembert face à l’oeuvre théorique de Rameau,” which first drew my attention to many important points.⁴⁶ In my fifth and sixth chapters, I have drawn extensively on Jean-Jacques Eigeldinger’s careful dating of the Neuchâtel manuscript of the *Dictionnaire de musique*, Brenno Boccadoro’s close study of Rousseau and Tartini, and Marie-Elisabeth Duchez’s extraordinarily erudite article “Jean-Jacques Rousseau: historien de la musique.”⁴⁷ The similarity that I see between Rousseau’s mature conception of harmony and Fétis’ has been pointed out previously by Stephen Blum.⁴⁸ My general characterization of Rousseau’s approach to the historiography of harmony draws both on Duchez’s 1991 article and on Lionel Gossman’s “Time and History in Rousseau.”⁴⁹

⁴⁴ The manuscript evidence does not support Bouvier’s case. The passages that he cites from “Dissonance” and “Harmonie” are not late additions but rather belong to the first layer of the Neuchâtel autograph of the *Dictionnaire*. See below, pp. 205-11.

⁴⁵ Alain Cernuschi, *Penser la musique dans l’Encyclopédie: étude sur les enjeux de la musicographie des Lumières et sur ses liens avec l’encyclopédisme* (Paris: Champion, 2000). Cernuschi’s book stands as a lesson in how to read the *Encyclopédie*. Its subject is eighteenth-century *encyclopédisme*, which is broached through an investigation of the place of music in, or rather at the interstices of, the *Encyclopédie*’s division of the sciences. As Cernuschi shows, music cuts across four of the *Encyclopédie*’s disciplinary divisions: *physique*, *médecine*, *belles-lettres*, and *techniques*. In the course of elucidating the intersections and tensions between these concerns, Cernuschi offers exemplary close readings of particular articles and a compelling view of the corpus of musical articles as a whole (not just Rousseau’s). In his handling of the *Encyclopédie*’s exposition of Rameau, however, Cernuschi tends to downplay the critical tenor of Rousseau’s contributions and to emphasize that of d’Alembert’s. And of course, Rousseau’s later musical writings fall outside the scope of Cernuschi’s already monumental study.

⁴⁶ These are, in particular, the significance of the Greek enharmonic genus and Rousseau’s comments on the augmented-sixth chord (see below, pp. 102-104, 123-29, 171-93). See Michael O’Dea, “Consonances et dissonances: Rousseau et d’Alembert face à l’oeuvre théorique de Jean-Philippe Rameau,” *Recherches sur Diderot et sur l’Encyclopédie* 35 (2003): 105-30. O’Dea concentrates, however, on the influence of Rousseau’s articles on d’Alembert and does not claim to survey Rousseau’s reception of Rameau exhaustively.

⁴⁷ Jean-Jacques Eigeldinger, introduction to *Dictionnaire de musique*, in OC, V, cclxix-cxcviii; Marie-Elisabeth Duchez, “Jean-Jacques Rousseau: historien de la musique,” in *La Musique du théorique au politique*, ed. Hugue Dufourt and Joël-Marie Fauquet (Paris: Aux amateurs des livres, 1991), 39-111; Brenno Boccadoro, “Rousseau, Tartini, et les Lumières,” in OC, V, 1694-711.

⁴⁸ Stephen Blum, “Rousseau’s Concept of *Système musical* and the Comparative Study of Tonalities in Nineteenth-Century France,” *Journal of the American Musicological Society* 38 (1985): 341-61.

⁴⁹ Lionel Gossman, “Time and History in Rousseau,” *Studies on Voltaire and the Eighteenth Century* 30 (1964): 311-49.

Finally, though I am critical of his interpretation of Rousseau, my debt to Thomas Christensen's invaluable work on Rameau and the *philosophes* will be evident to all readers familiar with his book.

Readers will perhaps be struck by two omissions. First, I devote comparatively little space to Rameau's *Erreurs* and *Suite des erreurs*. The reason is straightforward. Even by Rameau's lamentable standards, both texts are written in appallingly bad faith. In most cases, Rameau either failed to understand or willfully distorted Rousseau's positions. With a few exceptions, his responses miss the critical thrust of Rousseau's articles and seize instead on trivialities. But even if he had read Rousseau's articles with more charity or more insight, the full force of Rousseau's criticism would have been difficult for Rameau to appreciate in the mid 1750s. For thanks to the vagaries of the *Encyclopédie's* publishing history, most of Rousseau's articles remained in manuscript until 1765. Perhaps the only reader who, at the time Rameau's *Erreurs* appeared, could really appreciate the scope of Rousseau's argument was d'Alembert, who read the articles in manuscript in his capacity as Rousseau's editor.

A second omission will perhaps seem more surprising: I say almost nothing about the *Lettre sur la musique françoise* and the *Observations sur notre instinct pour la musique*. To a slightly lesser extent, the same holds for the *Essai sur l'origine des langues*. This reticence is explained by the fact that these texts have been so extensively treated elsewhere. My intention is by no means to dispute the scholarly consensus that has grown up around the interpretation of these texts. (It would be perverse, for instance, to deny that the *Lettre sur la musique françoise* is an attack on French operatic traditions, and I have no intention of doing so.) I wish merely to draw attention to a facet of Rousseau's dispute with Rameau, and of his musical writings more generally, that too exclusive a concentration on the *Lettre* and *Essai* has served to overshadow. Whether the aesthetic and philosophical positions Rousseau develops in these latter texts can be made to harmonize with the more properly music-theoretical positions that he takes in the *Encyclopédie* and *Dictionnaire* is a question that must be left for another study and quite possibly for another writer.

Chapter One:

Rameau and the *philosophes* in 1749

Diderot was quick to see the need for a popular introduction to Rameau's theory. Already in his *Principes généraux d'acoustique* (1748), he exhorted some enterprising *savant* to draw out Rameau's system out from its author's opaque prose and place it *à la portée de tout le monde*:

Le bruit est un; le son au contraire est composé; un son ne frappe jamais seul nos oreilles; on entend avec lui d'autres sons concomitants qu'on appelle ses harmoniques. C'est de là que M. Rameau est parti dans sa *Génération harmonique*; voilà l'expérience qui sert de base à son admirable système de composition, qu'il serait à souhaiter que quelqu'un tirât des obscurités qui l'enveloppent et mît à la portée de tout le monde, moins pour la gloire de son inventeur, que pour les progrès de la science des sons. (OD, II, 265)

Noise is simple; pitched sound, in contrast, is complex. No such sound ever strikes our ear alone; we hear other sounds concomitantly that we call its overtones. M. Rameau sets out from this point in his *Génération harmonique*; this is the observation that serves as the basis of his admirable system of composition, which someone should draw out from the obscurities that envelope it and make accessible to everyone, less for the glory of its inventor than for the progress of the science of sounds.

Diderot himself may have been contemplating such a work, and if so the remark could well have been meant as advance publicity. In the end, however, it was d'Alembert who wrote the most enduringly popular introduction to Rameau's ideas, the anonymously published *Elémens de musique théorique et pratique suivant les principes de M. Rameau* of 1752. Diderot would instead make his most important contribution to the dissemination of Rameau's ideas in his capacity as the editor of the *Encyclopédie*.

Why Diderot and d'Alembert accorded so prominent a place to Rameau in the *Encyclopédie* is far from immediately obvious. To say the least, Rameau cuts an unusual figure alongside Bacon, Locke and Newton, in the pantheon of encyclopedic luminaries that graces the second part of d'Alembert's *Discours préliminaire*.¹ Yet in a deep and abiding sense, Rameau belongs in that group—at least as Diderot and d'Alembert initially interpreted him. At the outset of their endeavour, both Diderot and d'Alembert thought that Rameau had discovered the *vrai système de l'harmonie*—a true science in

¹ See *Discourse préliminaire*, I:xxxii-xxxiii.

the sense that Condillac developed in his *Traité des systèmes* (1749).² Insofar as Condillac's thought has a good claim to comprising the *Encyclopédie*'s official philosophy, Rameau's system as co-opted by the editors fits naturally into the fabric of the text.

Both editors also helped Rameau in other ways. In November 1749, the composer presented his theory of harmony to the Académie Royale des Sciences. The *mémoire* that he read on that occasion was largely written by Diderot, and the committee struck to review it was chaired by d'Alembert, whose enthusiastic appraisal later found its way into the *Discours préliminaire* (1751) to the *Encyclopédie*. Of course, both Diderot's and d'Alembert's versions of *ramiste* theory differ subtly but importantly from the original. A careful reading of their respective texts suggests that both editors reconfigured Rameau's ideas in Condillacian terms (Sections 1.3 and 1.4). Elucidating their responses to Rameau therefore requires some preliminary attention to Condillac's thought (Section 1.2). Before considering the *philosophes*' reception of Rameau's theory of harmony, however, it is appropriate to consider its articulation in Rameau's own writings.

1.1. Rameau's Theory of Harmony, 1722-1749

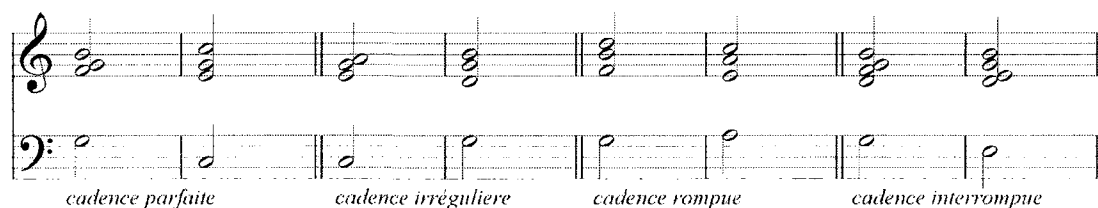
Rameau's first published treatise, the *Traité de l'harmonie réduite à ses principes naturels* (1722), presented a thorough-going rationalization of earlier French thorough-bass theory. Rameau's immediate predecessors, who lacked a comprehensive theory of chordal inversion, had regarded each figured-bass signature as the mark of a distinct chord type. To describe the preparation and resolution each type, they invoked a myriad of *ad hoc* rules. Rameau, in contrast, recognized only two fundamental chords—the triad and the seventh chord—and he found, in the perfect cadence, a paradigm for nearly all harmonic motion. The result was a fundamentally new way of looking at chords and their successions, one that arguably inaugurated the modern discipline of harmony.³

² Thomas Christensen offers a related interpretation of d'Alembert's interest in Rameau's ideas in "Music Theory as Scientific Propaganda: The Case of d'Alembert's *Éléments de musique*," *Journal of the History of Ideas* 30 (1989): 409-27. I place considerably more emphasis, though, on the centrality of Condillac's thought in the *philosophes*' reception of Rameau.

³ For a dissenting opinion, see Carl Dahlhaus, "Ist Rameaus *Traité de l'harmonie* eine Harmonielehre?" *Musiktheorie* 1 (1986): 123-27.

In the *Traité de l'harmonie*, Rameau recognized three types of cadences: the *cadence parfaite*, *cadence irrégulière*, and *cadence rompue*, to which he later added a fourth—the *cadence interrompue* (Ex. 1.1).⁴ In the *cadence parfaite*, a major-minor seventh chord resolves to the triad whose root lies a perfect fifth below. The *cadence rompue* and *cadence interrompue* are, as the names suggest, interrupted forms of the *cadence parfaite*. In the former, the seventh chord resolves deceptively to the triad whose root lies a whole-step above; in the latter, it moves instead to the seventh chord whose root lies a third below.⁵ Finally, in the *cadence irrégulière*, the triad (to which a dissonant sixth is typically added) resolves to another triad by an ascending-fifth bass motion.⁶

Ex. 1.1. Rameau's Cadence Types



Each of these four cadence types describes one way in which Rameau's two basic chord types can be joined into an elementary harmonic progression. With the exception of the *cadence interrompue*, a label that Rameau seems to have invented himself, the taxonomy is taken over from seventeenth-century French theory.⁷ The terminological continuity, however, disguises a significant shift in perspective. Unlike his predecessors,

⁴ For Rameau's discussions of cadences in the pre-1749 writings, see *Traité*, CTW, I, 84-97, 246-47, 261-65, 310-13; *Nouveau système*, CTW, II, 47-52, 71-72; *Génération*, CTW, III, 50-51, 92-93.

⁵ Rameau introduces the *cadence interrompue* for the first time at *Nouveau système*, CTW, II, 51. At *Génération*, CTW, III, 92-93, he specifies that the *cadence interrompue* consists of two seventh chords.

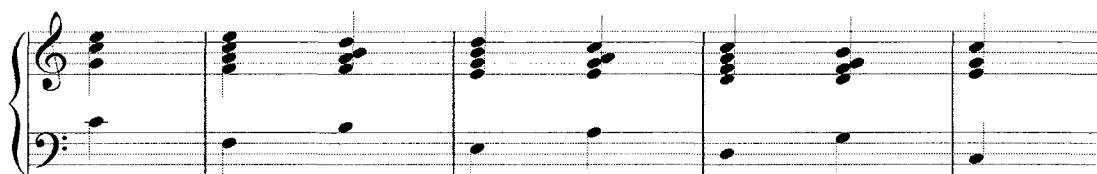
⁶ Rameau's *cadence irrégulière* covers both the progression from the tonic (with added sixth) to the dominant (roughly our half-cadence) and that from the subdominant added-sixth chord to the tonic (the so-called "plagal" cadence). Rameau is aware of the different effect of the two cases (see, e.g., *Traité*, CTW, I, 94-95) but never finds a way to express it theoretically, no doubt because he defines cadences primarily by the interval traversed by the fundamental bass rather than by location of the pitches it joins within the key. To my knowledge, the first commentator on Rameau to insist on the distinguishing the two kinds of *cadences irrégulières* was Charles Henri de Blainville, who retains the label *cadence irrégulière* for the subdominant-*tonic* cadence only and calls the *tonic-dominant* cadence (but curiously also the motion from leading-tone seventh chord to tonic) the *cadence de repos* in his *Harmonie théorico-pratique* (Paris, 1746), 5.

⁷ Markus Waldura, *Von Rameau und Riepel zu Koch: zum Zusammenhang zwischen theoretischem Ansatz, Kadenzlehre und Periodenbegriff in der Musiktheorie des 18. Jahrhunderts* (Hildesheim: Olms, 2002), 179-87.

Rameau sees cadences as primarily harmonic, rather than formal, entities. His cadence types are defined by the harmonic (and contrapuntal) relationships obtaining between their constituent chords, not by their role in articulating musical phrases. The traditional sense of “cadence” as “ending” thus becomes attenuated in Rameau, and “cadence” almost collapses into “harmonic progression” *tout court*.⁸

This reinterpretation is important, for it allows Rameau to understand harmonic progressions in general as constellations of interlocking cadences. This reconceptualization is facilitated by the distinction that Rameau draws between full (*pleines*) and evaded cadences (*cadences évitées*).⁹ The *cadence parfaite* shown in Ex. 1.1, for instance, is full. It can be evaded in a number of ways, but most importantly by adding a seventh to its second chord.¹⁰ The second chord can then do double duty as the first chord of a new *cadence parfaite*. This second cadence can likewise be evaded and, continuing in this way, a more extended progression can be formed. Ex. 1.2 gives the paradigmatic instance: a descending fifth sequence comprised of interlocking evaded *cadences parfaites*. Analogous progressions can be formed from evaded *cadences irrégulières*, and the *cadence rompue* and *cadence interrompue* may be similarly treated. More elaborate progressions can be constructed by freely intermingling elements from these models and by introducing further variations such as diminished seventh chords or chords by supposition.

Ex. 1.2. The Descending-Fifth Sequence



These possible elaborations notwithstanding, the *cadence parfaite* remains Rameau’s basic model of harmonic motion. This feature of Rameau’s thinking has an

⁸ *ibid.*, 187-99. Rameau does in fact think that cadences will occur primarily at the ends of phrases. Yet that stipulation does not figure explicitly in his definitions. For a careful elucidation of the two senses of cadence, see William E. Caplin, “The Classical Cadence: Conceptions and Misconceptions,” *Journal of the American Musicological Society* 57 (2004): 56-76.

⁹ See, in particular, *Traité*, CTW, I, 97-107.

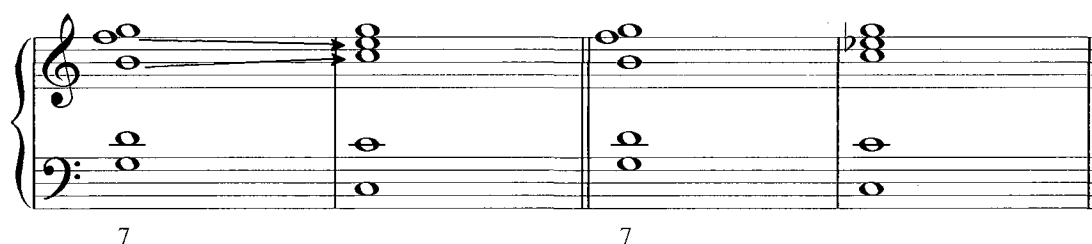
¹⁰ A cadence is also evaded if one or both of its constituent chords is inverted, if an *accord de supposition* is substituted for the first chord, or if the first chord is any seventh chord other than a major-minor seventh chord.

important corollary: namely that any dissonant sonority should in principle be reducible to a seventh chord.¹¹ Put another way, the resolution of the (dissonant) seventh chord to the (consonant) triad in the *cadence parfaite* is the underlying paradigm to which Rameau tries to reduce all pair-wise harmonic progressions. It is therefore worth giving some further attention to Rameau's account of the perfect cadence.

In a (full) *cadence parfaite* the bass moves by descending fifth from a major-minor seventh chord to a triad (Ex. 1.3). The *note sensible* of the *dominante-tonique*—that is, the major third above its bass—resolves by ascending half-step to the root of the following *tonique*, while seventh of the *dominante-tonique* descends by step to its third. These two notes—the *note sensible* and minor seventh—are the *dominante-tonique*'s two dissonances.¹² Of these two dissonances, however, only the seventh (the *dissonance mineure*) forms a dissonance against the bass. The *note sensible*, being a major third above the bass, is consonant with it and dissonant only with respect to the seventh. For this reason, Rameau regards the *dissonance mineure* as the seventh chord's only fundamental dissonance.

To interpret all dissonant sonorities as seventh chords is therefore to construe dissonant notes as a *dissonances mineures* whenever possible. By applying this routine relentlessly, Rameau was able to bring an impressive number of progressions under the rubric of the *cadence parfaite*.

Ex. 1.3. After *Traité de l'harmonie*, p. 57



One such group is the set of progressions shown in Ex. 1.4. Rameau's immediate predecessors tended to regard $\frac{7}{5}$, $\frac{6}{5}$, $\frac{4}{3}$ and $\frac{4}{2}$ chords as distinct entities, each with its own

¹¹ This point is made with particular force by Rameau's contemporary Jean-Adam Serre. See his *Essais sur les principes de l'harmonie* (Paris: Prault 1753), 56.

¹² Rameau calls the former the *dissonance majeure* (because it resolves upward) and the latter the *dissonance mineure* (since it resolves down). See *Traité*, CTW, I, 84-91. On the term *dominante-tonique*, see below, p. 39.

idiosyncratic mode of resolution.¹³ They were then at a loss to explain why, for example, the fifth in the $\frac{6}{5}$ chord or the third in the $\frac{4}{3}$ (both of them apparently consonant intervals), should be required to resolve downward by step. Rameau's solution invokes the distinction—a distinction absolutely fundamental of his theory—between the *basse continue*, or sounding bass, of a given chord and its *basse fondamentale*, or root. In the *cadence parfaite* shown in Ex. 1.3, these two basses coincide. But they need not, for any chord factor may be placed in the bass. When the third, fifth or seventh of the *dominante-tonique* is sounded in the bass, the *basse fondamentale* will differ from the *basse continue*. For Rameau's predecessors, who classified chords by interval content above the sounding bass, each of these positions represented a distinct chords type. But Rameau determines chord identity by interval content above the *basse fondamentale* rather than the *basse continue*. Accordingly, for Rameau, the inverted forms of the seventh chord are just that: variant instantiations of a single type. When the seventh chord is inverted, the *dissonance mineure* will either form a consonance with the sounding bass, as in the $\frac{6}{5}$ and $\frac{4}{3}$ chords, or will itself appear in the bass, as in the $\frac{4}{2}$ chord. But in all of these cases, the dissonant note continues to form a seventh against the *basse fondamentale*, which remains invariant across all possible inversions. Thus, the fifth in the $\frac{6}{5}$ chord, the third in the $\frac{4}{3}$ chord and the bass of the $\frac{4}{2}$ chord all turn out to be the *dissonances mineures* of inverted seventh chords, and as a result, Rameau can regard each of the progressions shown in Ex. 1.4 as an altered *cadence parfaite*.

Ex. 1.4. Inverted Cadences

Rameau's perspective is by now so ingrained that it requires a conscious effort of historical imagination for us to think ourselves back into the attitudes of his predecessors. It is therefore useful to consider a further application of the perfect-cadence model in

¹³ On chordal inversion before Rameau, see Joel Lester, *Compositional Theory*, 96-100; Christensen, *Rameau and Musical Thought*, 87-90, and Christensen, "The Spanish Baroque Guitar and Seventeenth-Century Triadic Theory," *Journal of Music Theory* 36 (1992): 1-42.

Rameau's theory, one that has now become entirely counter-intuitive. This second application is Rameau's notion of supposition.

Rameau's first detailed account of chords by supposition comes in the second book of the *Traité de l'harmonie*, where the progression reproduced as Ex. 1.5 appears.¹⁴ The bottom staff of the example gives the *basse fondamentale*, the middle staff the *basse continue*. In mm. 2-5, the latter is identical with the *basse fondamentale* only in the second half of each measure. In the first halves of these measures, in contrast, the *basse fondamentale* is displaced by a *note de supposition* placed either a third or a fifth below the root of the relevant chord.¹⁵ In each case, the new *accord par supposition* resolves just like the *dominante* or *dominante-tonique* from which it was formed: the ninth chord on G (m. 2) resolves like a seventh chord on Bb, the augmented-fifth chord on F (m. 3) like a seventh chord on A, and so on. For this reason, the progressions in the example are, as Rameau puts it, *imitations* of perfect cadences.

Ex. 1.5. *Traité de l'harmonie*, p. 75.

The *accord de quarte* on the downbeat of m. 5 calls for some additional explanation. As Rameau interprets it, the harmony is an incomplete eleventh chord: E is the root, and D its seventh; G# and B are omitted, and A is a *note par supposition* (doubled, in this case, in an upper part). Rameau calls this particular harmony the *accord*

¹⁴ *Traité*, CTW, I, 103-107. In French theory before Rameau, *supposition* refers to the introduction of passing dissonances in a melodic line. See Albert Cohen, "La Supposition and the Changing Concept of Dissonance in French Theory," *Journal of the American Musicological Society* 24 (1971): 63-84; Christensen, *Rameau and Musical Thought*, 65-67. Rameau uses the term in this older sense at *Traité*, CTW, I, 338-43. Rameau's more characteristic use of the term, however—namely to denote the addition of a pitch below a seventh chord (*note de supposition*) or the chord thus formed (*accord de supposition*)—has no known precedent.

¹⁵ The result is a near-exhaustive synopsis the *accords par supposition* itemized in Rameau's theory: the *accord de neuvième* appears in m. 2, the *accord de quinte superflue* in m. 3, and the *accord de septième superflue* and *accord de onzième* (or *accord de quarte*) in mm. 4 and 5 respectively; only the *accord de septième superflue et sixte mineure* is missing. For Rameau's typology, see *Traité*, CTW, I, 303-12.

heteroclite, and he adds, revealingly, that the eleventh chord appears most commonly in this form.¹⁶ That off-hand remark goes a long way towards clarifying the role that supposition plays in Rameau's theory. What Rameau's *accord heteroclite* offers is an explanation of the 4-3 suspension, and indeed, it turns out that Rameau's notion of supposition is largely a way of accounting for dissonances introduced by melodic suspensions.¹⁷ The explanation operates by interpreting the suspended note as the *dissonance mineure* of some seventh chord and thus accounting for its resolution by appealing to the model of the *cadence parfaite*.

By invoking chordal inversion, supposition and other devices such as "borrowing" (*emprunter*), Rameau was able to interpret most pair-wise harmonic successions as modified *cadences parfaites*.¹⁸ He accomplishes this reduction by treating each dissonant note as the *dissonance mineure* of an appropriate seventh chord. All dissonant chords, that is to say, can in principle be reduced to seventh chords, which resolve, paradigmatically, on the model of the *cadence parfaite*.

As we have already seen, extended harmonic progressions, what Rameau calls *phrases harmoniques*, are concatenations of cadences. Rameau introduced the term in passing in the *Nouveau système*:

Nous ne croyons pas qu'il soit hors de propos de faire icy une petite comparaison de la Musique avec le discours, pour donner une intelligence un peu distincte de la *Modulation*.

De même qu'un discours est ordinairement composé de plusieurs Phrases; de même aussi une Piece de Musique est ordinairement composée de

We do not think it irrelevant to draw a small comparison here between music and discourse, in order to give a clearer idea of harmonic succession.

Just as a discourse is normally composed of many phrases, so too is a piece of music normally composed of many complete progressions, which we can regard as so many harmonic phrases.

¹⁶ "l'Accord de la Onzième, chiffré par un 4. étant extrêmement dur dans sa composition ordinaire, on en retranche presque toujours les Sons moyens, en conservant seulement les deux principaux, qui sont le Fondamental & la Septième, & quelquefois encore sa Tierce mineure ou sa Quinte au dessous du fondamental, & qui fait par conséquent la Onzième, & non pas la Quarte avec la Septième du fondamental; c'est pourquoy l'on peut appeller cet Accord heteroclite, en ce qu'il n'est point divisé comme les autres" (*Traité*, CTW, I, 106).

¹⁷ Suspension, it is worth emphasizing, is the traditional concept, and Rameau's notion of supposition the innovation. On the relationship between the two, see Joel Lester, *Compositional Theory*, 108-14, 140-43; and Christensen, *Rameau and Musical Thought*, 123-29.

¹⁸ Rameau explains the diminished seventh chord as a modified *dominante-tonique* in which the root is replaced by the pitch a minor semi-tone above. In Rameau's parlance, the diminished seventh chord "borrows" its root from its associated *dominante-tonique*. Its resolution, accordingly, is a kind of modified *cadence parfaite*. See *Traité*, CTW, I, 71-74, 109-11.

plusieurs *Modulations*, qu'on peut regarder
comme autant de *Phrases harmoniques*.
(CTW, II, 50-51)]

Only in the *Dissertation sur les différentes méthodes d'accompagnement* (1732), however, does he begin to delineate his conception more clearly. In that treatise, Rameau distinguishes three broad classes of *phrases harmoniques*: “Toute la succession des Accords,” he writes, “ne consiste . . . que dans celle des Consonans entre’eux, des Dissonans entr’eux, & de leur entrelacement” (“all successions of chords consist either of [successions of] consonances among themselves, dissonances among themselves or the combination of the two,” CTW, V, 27). There are, that is to say, three general classes of *phrases harmoniques*: (1) progressions of consonant chords; (2) progressions of dissonant chords; and (3) progressions involving both. This initial taxonomy, though, is somewhat deceptive, as the continuation of Rameau’s discussion reveals. The progressions in the third class are cadences, which, as we have already seen, also provide the model for progressions of dissonant chords (i.e. for progressions in the second class). For this reason, the distinction between the second and third classes becomes blurred, with the second more or less encompassing the third. As for the first class of *phrases harmoniques*, these progressions consist exclusively of triads, and for Rameau, notoriously, any unadorned triad is in principle the tonic of its key.¹⁹ A succession of triads, then, is in principle a succession of tonics, each of which belongs to a different key (CTW, V, 27). In this sense, progressions of triads are not really *phrases harmoniques* at all, and consequently Rameau ignores them for the remainder of his treatise. We are left, therefore, with Rameau’s second class:

La succession des Accords Dissonans entr’eux se fait généralement dans un même *Ton*; la Dissonance y lie, pour ainsi dire, le sens Harmonique; un Accord y fait souhaiter l’autre; le sens, par ce moyen, n’est pas fini; & c’est cette succession qui fournit toujours les Phrases les plus longues en Harmonie. (CTW, V, 27)

The succession of dissonant chords generally takes place in a single key; the dissonance connects the sense of the harmony, so to speak; one chord makes us desire the next; by this means, the sense remains unfinished, and it is this succession that always furnishes the longest phrases in harmony.

¹⁹ Subordinate chords within a key being marked, in principle, by characteristic dissonances. See, in particular, *Génération*, CTW, III, 68-69.

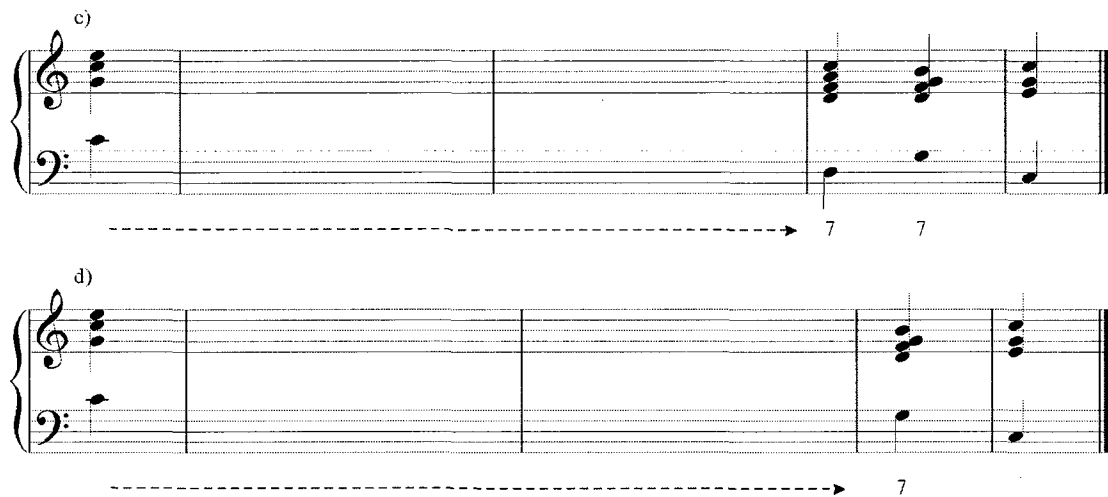
The tonic can be followed by one of four chords: the dominant, supertonic, subdominant or submediant seventh chords (Ex. 1.6; CTW, V, 42-43). Once this second chord is chosen, the remainder of the phrase is determined. This is so because “la Règle générale de la succession des Accords Dissonances se tire de la *Cadence* appelée *Parfaite*” (“the general rule for the succession of dissonant chords is drawn from the perfect cadence,” CTW, V, 35). After its second chord, each *phrase harmonique* continues on by means of a descending fifth sequence until a final perfect cadence is reached. There are, consequently, four resultant *phrases harmoniques* (Ex. 1.7). The first, and most extended phrase, moves from the tonic to the seventh chord on the subdominant and continues around the circle of fifths until it returns to the original tonic. The remaining three phrases are abridgements of the first that skip, respectively, from its first chord to its fourth, third and second last respectively.

Ex. 1.6. After Rameau, *Dissertation*, pp. 35-37

Ex. 1.6 shows four phrases (a, b, c, d) in G major. Each phrase starts with a tonic chord (G major) and is followed by a seventh chord. Phrase a) is followed by F#m7, b) by Dm7, c) by Bm7, and d) by Gm7. Each phrase ends with a descending fifth sequence leading to a final perfect cadence (G major).

Ex. 1.7. After Rameau, *Dissertation*, pp. 39-40

Ex. 1.7 shows two phrases (a, b) in G major. Phrase a) is the most extended, moving from the tonic to the seventh chord on the subdominant (F#m7) and continuing around the circle of fifths until it returns to the original tonic (G major). Phrase b) is an abridgement of the first, skipping from its first chord to its fourth, third, and second last respectively.



Even more explicitly than the *Traité*, therefore, the *Dissertation sur les différentes méthodes d'accompagnement* takes the descending fifth sequence as its basic model of harmonic motion. To a limited extent, Rameau allows that model to be interrupted by *cadences rompues*, *cadences interrompues*, and *cadences irrégulières* or elaborated by suspensions and diminished seventh chords. But the model is still highly restrictive, and despite Rameau's insistence to the contrary, it seems doubtful that it is sufficiently flexible to accommodate the wide variety of progressions encountered in eighteenth-century French practice. Accordingly, Rameau loosened it in his later writings, in particular by allowing an expanded role to ascending fifth progressions and root motions by thirds. That loosening does not, however, dislodge the descending-fifth sequence from its privileged position: even in the late *Code de musique pratique* (1760), Rameau continues to present the evaded perfect cadence as the primary engine of harmonic motion.²⁰

Whatever its practical inadequacies, Rameau's account of the *phrase harmonique* obviously represents an enormous conceptual simplification of the vocabulary and syntax of tonal harmony. In place of a myriad of distinct chord types and *ad hoc* rules, the student need only learn to recognize triads and seventh chords and be able to resolve the latter properly in order to realize the most common harmonic progressions at the

²⁰ See *Code*, CTW, IV, 49, 54-55, 71. The point is made with particular force in Burnham, "Method and Motivation," 5-9.

keyboard. Rameau was certainly cognizant of the immense practical advantage that his new perspective afforded. But he also made far more ambitious claims on its behalf: not only did his system represent a comprehensive rationalization of thorough-bass pedagogy; it also marked a substantive theoretical advance. For Rameau did not merely claim that his system offered a good description of tonal harmony; he also maintained that its every detail derived logically from a single, evident principle. In his own eyes at least, Rameau had established a veritable science of harmony.

Retrospectively, of course, Rameau's achievement appears in a very different light. What Rameau did in the *Traité*, seen from the vantage-point of the present, was to bring together two streams of music theory that his seventeenth-century predecessors had regarded as essentially distinct: on the one hand, a practical tradition (*musica practica*) concerned primarily with thorough-bass and composition pedagogy; on the other, a speculative tradition devoted to the scientific investigation of musical phenomena (*musica speculativa*).²¹ Rameau's innovation was to take *musica speculativa* as the foundation of *musica practica*. Thus, speculative theory comes in the *Traité* to serve as the purported basis for a new practical theory.²²

The claim that all of harmony is derived from a single, evident principle is a constant refrain in Rameau's writings. But the nature of that principle shifts constantly.²³ One significant shift occurs early on, between the *Traité de l'harmonie* (1722) and the *Nouveau système de la musique théorique* (1726). In the *Traité*, Rameau sets out from a series of string divisions adapted from Descartes' *Compendium musicae* (c. 1618).²⁴ He begins by dividing the string successively into two, three, four, five six and eight parts (CTW, I, [3-5]). Rather than comparing each part to its immediate precursor (i.e. $\frac{1}{6}$ back to $\frac{1}{5}$, $\frac{1}{5}$ back to $\frac{1}{4}$, and so on) as Descartes had done, Rameau compares each part back to the original undivided string. The ratios he produces thus correspond to the octave,

²¹ Christensen, *Rameau and Musical Thought*, 29-31, 39-42.

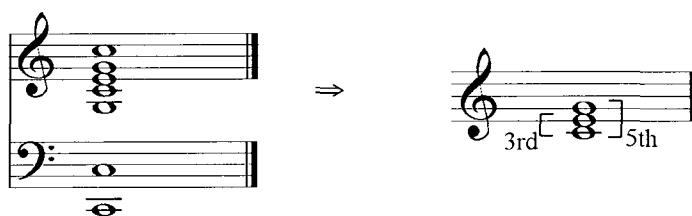
²² The obvious model for Rameau's conception of the relationship between *musica speculativa* and *musica practica* is Gioseffo Zarlino's *Istitutioni harmoniche* (Venice, 1558), which Rameau read in the 1573 edition (see *Traité*, CTW, I, 6).

²³ As Thomas Christensen, in particular, has emphasized. See below, pp. 44-45.

²⁴ Compare *Traité*, CTW, I, 33-35 with Descartes, *Compendium musicae*, AT, X, 96-98. Rameau read Descartes' treatise in Nicolas Poisson's French translation, *Traité de la mécanique, composé par Monsieur Descartes. De plus l'Abrégé de musique du mesme autheur mis en françois* (1668).

perfect twelfth, double octave, major seventeenth, perfect nineteenth, and triple octave respectively, and the result of Rameau's divisions is therefore the widely-spaced *accord parfait* shown on the left-hand side of Ex. 1.8. The assumption of octave equivalence, introduced subsequently, allows Rameau to rewrite the chord in the closed position shown on the right of the same example (CTW, I, 36-37). He then goes on, in the remainder of the *Traité*'s first book, to manipulate these divisions so as to produce (with varying degrees of success) the minor triad, the seventh chords and their inversions.²⁵

Ex. 1.8. After Rameau, *Traité*, pp. 3-14



When Rameau wrote the *Traité*, he was evidently unaware of the existence of overtones: the *principe* of the *Traité* is the undivided string of the monochord. In all probability, the overtone series was first brought to his attention by the Jesuit scientist Louis-Bertrand Castel who noted in a 1722 review of the *Traité* that in the overtone series “la nature nous donne le même système que M. Rameau a découvert dans les nombres” (“nature gives the same system that M. Rameau has discovered in numbers”).²⁶ In his *Nouveau système de musique théorique* (1726), Rameau accordingly adopted the phenomenon of acoustic resonance as the principle of his system:²⁷

Une seule Corde fait résonner [*sic*] toutes les consonances, entre lesquelles on distingue principalement la Douzième & la Dix-septième majeure; comme toute personne capable de discerner ces Consonances pourra s'en assurer, en pinçant l'une des plus basses Cordes d'un

A single string makes all the consonances resonate, among which we principally distinguish the twelfth and the major seventeenth, as anyone capable of discerning these consonances will be able to convince himself by plucking one of the lowest strings of a harpsichord or bowing

²⁵ For a careful account of Rameau's procedures, see David Lewin, “Two Interesting Passages in Rameau's *Traité de l'harmonie*,” *In Theory Only* 4 (1978): 3-11.

²⁶ Louis-Bertrand Castel, review of Jean-Philippe Rameau: *Traité de l'harmonie, Memoires pour l'Histoire des Sciences & des beaux Arts* [*Journal des Trévoux*] (October 1722): 1733-34; CTW, I, xxxiv-xxxv; see Christensen, *Rameau and Musical Thought*, 133-34.

²⁷ Eighteenth-century French writers use the word *résonance* to cover both the production of overtones and the phenomenon of sympathetic vibration, in contrast to modern usage.

Clavecin, ou en raclant la plus grosse Corde d'un *Violoncelle*. Ainsi nous croyons pouvoir proposer cette Experience comme un fait qui nous servira de principe pour établir toutes nos Consequences. (CTW, II, 27)

the lowest string of a cello. Thus, we believe that we can propose this observation as a fact that will serve as our principle in establishing all our consequences

Henceforth, the phenomenon of acoustic resonance is the principle from which Rameau claims to derive his theory.

In the *Nouveau système*, Rameau draws his acoustics from Marin Mersenne's *Harmonie universelle* (1636) and Joseph Sauveur's *Système générale des intervalles* (1701). His next major treatise, the *Génération harmonique* (1737), introduces a new source: the theory of sound propagation advanced by his contemporary Jean-Jacques Dortous de Mairan.²⁸ Impressed by Newton's *Opticks* (1704), Mairan advanced a theory of sound modeled broadly on Newton's account of light. To explain the production of overtones and the phenomenon of sympathetic vibration, Mairan suggested that the air must consist of an infinite number of particles naturally inclined to vibrate to different frequencies:

[J]e dis que l'air, en tant que véhicule du Son, est un assemblage d'une infinité de particules de différente élasticité, dont les vibrations sont analogues par leurs durées à celles des différents tons du corps sonore; qu'entre toutes ces particules, il n'y a que celles de même espece, de même durée de vibration, & à l'unisson du corps sonore, qui puissent retenir les vibrations semblables de ce corps, & les transmettre jusqu'à l'oreille; que la plus petite masse d'air sensible contient plusieurs de ces particules de toutes espece, & que leurs vibrations à la fois, ou les frémissesments de la masse dans toutes ses parties, ne peuvent produire que le Son en général ou le bruit.²⁹

I say that the air, as the vehicle of sound, is an assembly of an infinite number of particles of different elasticity, whose vibrations are analogous in their frequencies to those of the different pitches of the sounding body; that among all these particles, it is only those of the same species, i.e. of the same period of vibration and at the unison to [the pitches of] the sounding body, that can retain vibrations similar to those of that body and transmit them to the ear; that the smallest possible mass of air contains many and all kinds of these particles, and that if they vibrate all at the same time, or if the whole mass trembles in all its parts, the result can only

²⁸ That theory receives its fullest expression in Dortous de Mairan's "Discours sur la Propagation du Son dans les différents Tons qui le modifient," *Histoire de l'Académie Royale des Sciences. Année MDDXXXVII. Avec les Mémoires de Mathématiques et de Physique, pour la même Année, Tirés des Registres de cette Académie*. (Paris: Imprimerie Royale, 1737), 2-20. On the relationship between Rameau and Dortous de Mairan, see Christensen, *Rameau and Musical Thought*, 139-42.

²⁹ Dortous de Mairan, "Discours," 3. Dortous de Marain himself draws the analogy to Newton's optics in the following paragraph: "Je proposai cette idée à l'Académie en 1719; ce fut à l'occasion du Systeme de

be sound in general, i.e. noise.

Pitched sounds, as opposed to *bruit*, thus involve only some of the particles from which the air is composed. A vibrating string sets in motion only those particles that correspond to its fundamental frequency. These particles in turn act on other particles attuned to two, three, four, five and six times the fundamental frequency, and the vibration of these latter is what produces the overtones.³⁰ All of these vibrating air particles, finally, will also cause any nearby string tuned to their frequencies to tremble, and therein lies the explanation for sympathetic resonance. Dortous de Mairan concludes with a remark that must have flattered Rameau: “On trouve ici les principales loix de l’harmonie dictées par la Nature même, l’accord parfait fondé sur la correspondance que les particules harmoniques de l’air ont entre elles, & une source féconde de Regles, que l’Art & le Calcul pourront étendre, & que la Philosophie pourra avouer” (“We find here the principle laws of harmony dictated by Nature herself, the triad founded on the correspondance of the air’s harmonic particles among themselves, and a fecund source of rules that art and calculation can extend, and that philosophy will be able to endorse”).³¹

M. Newton sur la Lumière & les Couleurs, & en faisant le rapport de la seconde Édition Latine de son Optique, dont cette Compagnie m’avoit chargé. Car je pense qu’on voit déjà assés combien le Systeme de M. Newton sur la Lumière, & l’hypothese que je viens d’énoncer sur la propagation du Son se ressemblent. D’un côté, autant d’especes de corpuscules lumineux de différente réfrangibilité que de couleurs; de l’autre, autant de particules sonores d’Air de différente élasticité que de Tons: là le mélange de tous les corpuscules lumineux & colorés produit la Lumière, ici le frémissement de toutes les particules sonores & *toniques* forme le bruit.”

³⁰ *ibid.*, 13-14. To explain how this transmission occurs, Dortous de Marain invokes the phenomenon of sympathetic vibration: “La raison que nous avons donnée de l’ébranlement des cordes à l’unisson, s’applique aisément à celui des cordes harmoniques, & il est clair, que leurs vibrations venant à concourir, de 2 en 2, de 3 en 3, par exemple, avec celles de la corde immédiatement ébranlée, il en résultera bien-tôt un frémissement d’autant plus sensible, qu’elles seront plus harmoniques, ou que la coïccidence des impulsions sera plus fréquente. Je dis la même chose de l’air; les particules à l’unisson y ébranlent bien-tôt leurs harmoniques; c’est pourquoi une corde, qui ne pourroit par elle-même exciter dans l’air que cet unison, ou ces Octaves, ne laisse pas d’y occasionner & d’y faire entendre la Quinte, & la Tierce, ou leurs Octaves.” Essentially, then, Dortous de Mairan regards the production of overtones as a particular kind of sympathetic resonance. That fact perhaps explains why Rameau and his contemporaries used the phrase “the resonance of the *corps sonore*” to cover both phenomena.

³¹ *ibid.*, 14. Rameau’s *Génération harmonique* is singled out in the paragraph that follows: “Le sentiment confus de l’harmonie ainsi développé, & justifié par les propriétés du Son ou du milieu sonore, qu’on se proposeroit de réduire en pratique, selon ces Regles, seroit sans doute un très-digne sujet de recherche; mais je puis d’autant me dispenser d’entrer là dessus dans le detail, qu’un célèbre Musicien de nos jours, à qui ces idées & mon hypothese ne sont pas inconnuës, va donner incessamment au Public un Traité de Musique qui tend à ce but, & qui porte sur ces mêmes principes.”

In his *Génération harmonique*, Rameau enthusiastically adopted Dortous de Mairan's theory of sound propagation as the basis of his system.³² The existence of overtones appears as the third *expérience* in the *Génération*'s first chapter.³³

Raclez une des plus grosses cordes d'une Viole, ou Violoncello, vous entendrez, avec le Son de la totalité, ceux de son Octave, double, peut être même triple, de sa Douzième & de sa Dix-septième majeure, qui sont en rapport de $1\frac{1}{2}\frac{1}{3}\frac{1}{4}\frac{1}{5}\frac{1}{8}$, vous les entendrez quelquefois ensemble, quelquefois l'un après l'autre, quelquefois vous n'en entendrez qu'un seul, selon l'attention que vous donnerez plutôt à l'un qu'à l'autre, & selon, encore, la manière dont vous tirerez le Son de la corde; ce qui doit se faire plutôt avec douceur qu'avec force, & de tems en tems plus près du Chevalet qu'à l'ordinaire[.] (CTW, III, [10])

Bow one of the largest strings of a viol or a cello. You will hear the pitch of its whole length together with that of its octave, its double octave and perhaps its triple octave, and of its twelfth and major seventeenth, all in the relationship $1\frac{1}{2}\frac{1}{3}\frac{1}{4}\frac{1}{5}\frac{1}{8}$. You will sometimes hear them together, sometimes successively; sometimes you will only hear one, according to the degree of attention you give to each, and according also to the manner in which you draw the sound from the string, something that must be done gently rather than forcefully and at times somewhat closer to the bridge than is normal.

In the third and fifth propositions of that same chapter, Rameau presents Mairan's explanation of the phenomenon:

³² That fact clarifies the opening sentence, otherwise obscure, of Rameau's *Génération*:

"L'Harmonie qui consiste dans un mélange agreeable de plusieurs Sons différens, est un effet naturel, dont la cause reside dans l'Air agité par le choc de chaque Corps sonore en particulier" (CTW, III, 15).

³³ The *Génération* begins with twelve propositions followed by seven *expériences* intended to motivate them. These *expériences*, however, can be reduced to two phenomena (as d'Alembert would do in his 1749 review of Rameau's theory for the Académie des Sciences): the existence of overtones and the phenomenon of sympathetic vibration.

III. Proposition

Nous devons supposer l'Air divisé en une infinité de particules, dont chacune est capable d'un Ton particulier; lorsque par exemple, on entend à la fois les deux Sons de la Quinte, dont l'un fait deux vibrations pendant que l'autre en fait trois, on ne conçoit pas comment la même masse d'Air peut fournir dans un même tems ce différent nombre de vibrations; à plus forte raison encore s'il se trouve un plus grand nombre de Sons ensemble, au lieu qu'il est bien plus plausible d'imaginer en ce cas que chacun de ces Sons naît d'une masse d'Air particuliere, dont le nombre des vibrations occasionne le degré du Ton qui nous affecte pour lors.

.....

V. Proposition

Un Corps sonore mis en mouvement, communique ses vibrations, non-seulement aux particules de l'Air capables des mêmes vibrations, mais encore à toutes les autres particules commensurables aux premières; & ces différentes particules réagissant à leur tour sur ce même Corps, aussi-bien que sur tous ceux qui l'environnent, tirent non-seulement différens Sons des différentes parties aliquotes de ce premier Corps; & par-là lui font rendre des Sons plus aigus que celui de sa totalité; mais elles agitent encore tous ceux d'alentour, qui sont capables des mêmes vibrations, & les font quelquefois, même, resonner.
(CTW, III, 15-17)

The triad thus arises from the vibration of the *corps sonore* thanks to the action of different air particles upon one another. The crux of Rameau's system, however, is that the *corps sonore* not only produces the triad, but also governs its succession. Rameau turns his attention to this crucial claim in Chapter 4 of the *Génération*:

Oublions pour un moment tout ce que l'expérience peut suggérer en Musique, nous verrons bien-tôt, qu'à l'exception de

Proposition III

We must suppose that the air is divided into an infinity of particles, each of which is capable of [vibrating to] a particular pitch; when for example, we hear the two pitches of a fifth at the same time, the one making two vibrations while the other makes three, we do not conceive how the same mass of air can furnish two different vibrations at the same time, and the argument is even stronger if we find a larger number of sounds together. It is much more plausible to imagine in this case that each of these sounds results from particular mass of air, whose number of vibrations occasions the pitch of the sound that we hear.

.....

Proposition V

Once set in motion, a sounding body does not only communicate its vibration to the particles of air capable of the same vibration, but also to all the other particles that are commensurable with the first, and these different particles react in turn on this same body, as well as on all those around it, and so draw different sounds from the different aliquot parts of this first body—and by that make it emit sounds higher than that of its totality. They act also on those around, which are capable of the same vibrations, and even sometimes make them resonate.

Let us forget for a moment everything that musical experience can suggest to us. We will soon see that other than the octave,

l'Octave, de la Quinte & de la Tierce majeure, qu'on distingue avec le Son fondamental d'un Corps sonore, nul autre intervalle ne se présente pour le faire succéder à ce Son fondamental: ce n'est que de l'impression reçue de son Harmonie que peut naître en nous le sentiment de ce nouveau Son qui peut lui succéder[.] (CTW, III, 33-34)

fifth and major third, which we distinguish together with the fundamental sound of a sounding body, no other interval presents itself that can be made to follow this fundamental sound. It is only from the impression received from its harmony that the sentiment can arise in us of this new sound that can follow it.

The crucial determination—as Rameau puts it, “le grand noeud de la question”—is whether this new sound will remain a *son harmonique* of the original fundamental or will instead become a fundamental in its own right:

Puisque le Corps sonore ne fait résonner que l'Octave, la Quinte & la Tierce majeure du Son fondamental, nous ne connoissons que cela, & par conséquent nous n'avons point d'autres intervalles à faire succéder à ce fondamental; toute la liberté que nous aurons seulement, ce sera de les prendre tant au grave qu'à l'aigu, en consequence de la puissance réciproque des Vibrations plus lentes & plus promptes les unes sur les autres.

Mais quelle sera pour lors la qualité du Son qui succédera au fondamental? Sera-t'il fondamental, ou Harmonique? C'est encore-là le grand noeud[.] (CTW, III, 34)

Since the sounding body makes only the octave, fifth and major third of the fundamental sound resonate, we know only these intervals, and consequently we have no other intervals with which to follow the fundamental. The only liberty we will have is to take them either above or below, thanks to the reciprocal power that the slower and faster vibrations exert on one another.

But what will be the quality of the sound that follows the fundamental? Will it be a fundamental or an overtone? There again is the great knot.

If the new pitch that succeeds the original fundamental remains a *son harmonique*, then no harmonic progression can really be said to have occurred: the original fundamental will still be in effect. Rameau concludes, therefore, that the new pitch must replace the original one and so become a *son fondamentale* itself. From this new fundamental, we will proceed in turn to one if its “harmonics,” and in this way, an extended harmonic progression will result. The bass line formed by the successive fundamentals is, of course, the *basse fondamentale*. The key point—the claim that now becomes the fundamental postulate of Rameau's theory—is that the intervals by which the fundamental bass moves are identical to those that comprise the triad: both chords and harmonic progressions derive from the resonance of the *corps sonore*, for both are structured by the intervals that its resonance presents.

Rameau had already introduced this claim (minus, of course, the acoustical justification it receives in the *Génération*) in the second book of the *Traité de l'harmonie*:

[S]i nous pouvons donner une progression à la partie que nous représente cette corde entiere ce ne peut être qu'en la faisant proceder par ces intervalles consonans que nous rendent les premieres divisions de cette corde; ainsi chaque Son s'accordera toujours avec celui qui l'aura précédé, & chacun pouvant porter à son tour un accord pareil à celui que nous avons reçu de ces premieres divisions, nous représentera sans difficulté la corde entiere qui est le principe & le fondement de cet accord[.] (CTW, I, 80)

If we are able to give a progression to the part that this entire string represents [i.e. the fundamental bass], it can only be in making it proceed by those consonant intervals given by the first divisions of the string. Thus, each sound will always form a consonance with the one that precedes it, and since each is able in turn to bear a chord just like the one that we obtained from the first divisions, it will represent the entire string, which is the principle and foundation of this chord, without difficulty.

Later on in that treatise, however, Rameau gives considerably more latitude to the fundamental bass by allowing it to move by sevenths as well.³⁴ Thus only from the *Génération harmonique* does Rameau stringently limit fundamental-bass motions to the fifths and thirds.

The new acoustical theory elaborated in the *Génération harmonique* also leads Rameau to a significant re-conceptualization of the *phrase harmonique*. Each fundamental-bass note in a given phrase is now understood, in the acoustical sense, as a *son fondamental*; the notes comprising the remaining chord factors are its accompanying *sons harmoniques*; and the whole is generated by the original fundamental given by the *corps sonore*. The upper parts move through the *sons harmoniques* generated by the notes of the fundamental bass, and this general hierarchy is the picture that Rameau has in mind when he maintains, as he repeatedly does, that harmony generates melody.³⁵

Thanks to this re-conceptualization, Rameau now seems to have two somewhat different conceptions of harmonic motion. According to the first, harmonic progressions are concatenations of cadences; according to the second, they are structures generated from the intervallic motion of the fundamental bass through distinct third and fifth-related

³⁴ The revision is motivated by the need to account for progressions in which the fundamental bass appears to move by step—notably, the *cadence rompue*. The move is obviously unsatisfactory, however, for in effect it is tantamount to admitting that the fundamental bass can move by any (diatonic) interval at all. In the *Génération*, Rameau introduces the *double emploi* to accommodate apparently stepwise fundamental-bass progressions. See below, pp. 122-23.

³⁵ See, *inter alia*, *Traité*, CTW, I, 168-71; *Nouveau système*, CTW, II, 39-46; *Génération harmonique*, CTW, III, 33-39, 43-45.

sons fondamentaux, each of which bears accompanying *sons harmoniques*. The two descriptions, however, are not fundamentally incompatible, and indeed, they implicate one another to a certain degree: the harmonic progressions that result from fundamental-bass motions through ascending and descending fifths will consist of interlocking *cadences parfaites*, *cadences irrégulières*, and *cadences interrompues* (fundamental-bass progressions by rising thirds, however, will form no recognizable cadence); similarly, in a harmonic progression formed from interlocking cadences, the roots of successive chords will be related by fifth or third (with the glaring exception of the *cadence rompue*). In practical contexts, henceforth, Rameau will tend to emphasize the former account; in more speculative contexts, the latter.

Neither the *Nouveau système* nor the *Génération harmonique* is particularly concerned with practical music theory (though the former contains celebrated analyses of Lully and Corelli, and the penultimate chapter of the latter proposes “un abrégé des règles pour la Composition”). For the practical theory corresponding to the *Génération*, we must therefore turn to another source: the manuscript treatise that Rameau prepared in the early 1740s under the title “Art de la basse fondamentale.”³⁶ Perhaps surprisingly, the practical theory outlined there remains very close to that presented in the *Traité* and *Dissertation*. Despite the upheaval undergone by its speculative foundations, Rameau’s practical theory changed relatively little.

Rameau introduces the *cadence parfaite* and *cadence irrégulière* early on in the “Art.” These cadences govern the relationship between the three primary degrees of the scale: the *tonique*, *dominante-tonique* and *soudominante*. The progression of both the *dominante-tonique* and the *soudominante* is fixed: each must resolve to the tonic. The progression from *dominante-tonique* to *tonique* forms the *cadence parfaite*; that from *soudominante* to *tonique*, the *cadence irrégulière*.³⁷ The progression of the tonic, in contrast, is much more varied. It can move to the *dominante-tonique*, to the

³⁶ Bibliothèque de l’Institut de France, ms. 2474. On the dating of the treatise, see Thomas Christensen, “Rameau’s ‘L’Art de la basse fondamentale,’” *Music Theory Spectrum* 9 (1987): 18–41. According to Christensen’s reconstruction, the “Art” was compiled in the early 1740s, for use in the composition classes that Rameau began to offer around that time. A second copy of the treatise (probably the autograph) is preserved alongside Rousseau’s papers at the Bibliothèque publique et universitaire de Genève, as ms. fr. 230. See below, p. 118n45.

³⁷ Rameau also allows the progression from *tonique* to *dominante-tonique* as a *cadence irrégulière*.

soudominante, or to the *sutonique* to the *sutonique* (second degree) or *sudominante* (sixth degree). These last two progressions introduces a new kind of *dominante*:

Il n'y a qu'une seule Tonique, une seule Soudominante mais il y a deux sortes de Dominantes, qui cependant ne different entr'elles, qu'en ce que l'une, sçavoir la Dominante-tonique, précède toujours la Tonique; d'où nous lui donnons l'epithète de Tonique; et l'autres, que nous appellons simplement Dominantes, précède[nt] toujours une autre Dominante. ("Art," ms. fr. 230, f.8v-9r)

There is only one *tonique*, and one *soudominante* but there are two kinds of *dominantes*, which nonetheless differ only in that the one, namely the *dominante-tonique* always precedes the *tonique*, whence we give it the epithet "*tonique*"; and the others, which we call simply "*dominantes*," always precede another *dominante*.

Like the *dominate-tonique*, this new *dominante* resolves by descending fifth:

La succession de ces Dominantes est d'ailleurs la mêmes [*sic*], elles doivent toutes descendre de Quinte; jusqu'à la Tonique, toujours précédée immédiatement de sa Dominante-tonique.

Ainsi, d'abord après la premiere Dominante où passe la Tonique, il faut toujours marcher de Dominante en Dominante jusqu'à ce qu'on arrive de nouveau à la Tonique.

Comme la succession des Dominantes est la plus frèquente, que même celle de la Soudominante en est renversée; on ne sçauroit trop tôt l'avoir présente à l'esprit, des sorte qu'on puisse se rapeller sur le champ quelle Note en domine une autre. ("Art," ms. fr. 230, 9r)

The succession of *dominantes* is everywhere the same; they must all descend by fifth until [they reach] the *tonique*, which is always immediately preceded by its *dominante-tonique*.

Thus, after the first *dominante* to which the *tonique* passes, it is necessary to continue from *dominante* to *dominante* until we arrive again at the *tonique*.

As the succession of *dominantes* is the most frequent, and that of the *soudominante* its inversion, we must hasten to learn it, so that we can remember right away which note is the *dominante* of another.

The progressions that result, as the reader will have recognized, are the abbreviated *phrases harmoniques* already familiar from the *Dissertation sur les différentes méthodes d'accompagnement* (cf. Ex. 1.8 above).

It is clear, therefore, that the outline of Rameau's practical theory remains relatively stable from the *Traité de l'harmonie* through to the "Art de la basse fondamentale." That is not to say that it remains entirely unchanged: in the *Nouveau système* and *Génération harmonique*, Rameau introduced a host of new music-theoretical entities: the subdominant, the *cadence interrompue*, *double emploi*, and the chromatic and enharmonic genera among them; his positions on certain other questions—

temperament, for instance, or the generation of the diatonic scale—also shifted considerably. Still, Rameau never abandoned the model of harmonic succession elaborated in the *Traité* and the *Dissertation*. Even in the *Code de musique pratique* (1760), his last practical treatise, he continues to present the descending fifth sequence as the default model for harmonic succession.³⁸ To be sure, Rameau begins to handle that model with greater flexibility after the *Dissertation*. He allows, for instance, an expanded role to fundamental-bass progressions by third or ascending fifth. But these changes are incremental revisions and extensions and in no way represent a repudiation of his earlier account.

This practical continuity is in striking contrast to the shifts—ruptures even—that mark Rameau’s speculative theory. That these latter should have exerted so little effect upon the practical theory is no doubt surprising, particularly if Rameau’s own conception of his music-theoretical enterprise is accepted. Rameau claimed, after all, to have established a science of harmony whose every result derived systematically from a single evident principle. Changes to the principle, one tends to assume, should lead to corresponding adjustments in the results that issue from it. That the expected upheavals do not appear in Rameau’s practical thought would seem to raise a considerable challenge to his own conception of his music-theoretical enterprise.

But what, more precisely, is that conception? What did Rameau understand by a science of harmony? That question turns out to be astonishingly difficult to answer. Rameau was little given to sustained methodological or epistemological reflection; in its place, he offers desultory sloganeering, most of which leaves considerable latitude for interpretation. Rameau’s readers are accordingly left to piece together his assumptions as best they can. There is, however, little consensus on the picture that emerges from that interpretive effort, or indeed on how that effort itself should be conducted. Can Rameau

³⁸ Waldura sees a fundamental shift between the *Traité* and the *Génération harmonique* in which the seventh-chord sequence (*Septakkordkette*) is abandoned as a model of harmonic succession in favour of a “three-step” (*dreistufige*) model in which the dominant and subdominant degrees are of (more) equal weight (*Von Rameau und Riepel*, 263-87). Certainly, the introduction of the *sous-dominante* in the *Nouveau système* leads to a significant reworking in Rameau’s account of *mode*. The subdominant, however, plays a far more important role in Rameau’s speculative theory than in his practical theory. Even in the *Code de musique pratique*, Rameau continues to maintain that there are only two fundamental chords—the triad and seventh chord—and he continues to present the descending-fifth sequence as his basic model of harmonic succession. See, e.g., CTW, IV, 49, 54-55, 71.

be said, for instance, to have advocated a single method across the whole corpus of his writings? Or does his methodological ideal shift from treatise to treatise?³⁹ What relevance should be accorded to the relationship, or lack thereof, between that ideal and its instantiation? Are we merely asking what conception of science is conveyed in Rameau's explicit methodological pronouncements? Or do we want to know what perspective, if any, can encompass both Rameau's programmatic utterances and the procedures he adopts in practice? The positions we stake out along these axes will obviously exert a considerable influence on how we reconstruct Rameau's conception of science. They determine, in particular, what counts as evidence and how it should be weighted and arranged. Must we consider the methodological pronouncements of the *Traité* in isolation from those of the *Génération*? Or can we use the one to elucidate the other? And to what extent can we appeal to what Rameau does in order to interpret what he says?

If commentators are at odds on these more fundamental questions, they are even more divided on the picture that these considerations partly determine.⁴⁰ Yet if there is no general consensus on the nature of Rameau's science, there are nonetheless some influential and well-established lines of interpretations. The most entrenched of these is undoubtedly the conviction that Rameau offered, or at least intended to offer, a Cartesian science of harmony.⁴¹ The most forceful recent advocate of that position is Catherine

³⁹ Brian Hyer, in preferring to speak of Rameau's "theories" of harmony, is perhaps the most extreme advocate of the disunity of Rameau's theoretical corpus. See Hyer, "Before Rameau and After," *Music Analysis* 15 (1996): 75-100.

⁴⁰ Commentators have taken a wide range of positions on the nature of Rameau's scientific enterprise. Jacques Chailley, "Rameau et la théorie musicale," *Revue musicale* 260 (1965): 65-95 presents it as the last gasp of ancient Pythagoreanism. Hyer, "Before Rameau and After," and Marie-Elisabeth Duchez, "Valeur épistémologique de la théorie de la basse fondamentale de Jean-Philippe Rameau: connaissance scientifique et représentation de la musique," *Studies on Voltaire and the Eighteenth Century* 254 (1986): 91-130, see in Rameau's writings the first stirring of music theory's current preoccupation with music cognition. Herbert Schneider, *Jean-Philippe Rameaus letzter Musiktraktat* (Wiesbaden: F. Steiner, 1986), 78-80, emphasizes the influence of Christian Wolff (a reading Christensen disputes in *Rameau and Musical Thought*, 301-302). Claude Palisca, "Scientific Empiricism in Musical Thought," in *Seventeenth Century Science and the Arts*, ed. Hedley Howell Rhys (Princeton: Princeton University Press, 1961), pp. 94-96, casts Rameau's enterprise as essentially Newtonian, as does Ellen McNiven Hine, *A Critical Study of Condillac's Traité des systèmes* (The Hague: Martinus Nijhoff, 1979), 179. The long tradition of regarding Rameau's science as Cartesian, together with Christensen's recent qualification of that tradition, is taken up in the following paragraphs.

⁴¹ The idea first appears in d'Alembert's *Essai sur les élémens de philosophie* (see below, p. 217). More recently, it appears in Pischner, *Die Harmonielehre Rameaus*, 79-85; Charles B. Paul, "Jean-Philippe Rameau (1683-1764): The Musician as *Philosophe*," *Proceedings of the American Philosophical Society*

Kintzler, for whom the whole of Rameau's theoretical endeavour is fundamentally Cartesian in inspiration.⁴² Kintzler's view is surely plausible on historical grounds—"science" in early eighteenth-century France conceivably did mean "Cartesian science"—yet her interpretation suffers from a paucity of unequivocal supporting evidence from Rameau's own writings.⁴³

Rameau directly invokes Cartesian method only once. The passage, from the beginning of the *Démonstration du principe de l'harmonie* (1750), runs as follows:

Eclairé par la Méthode de Descartes que j'avois heureusement lûe, & dont j'avois été frappe, je commençai par descendre en moi-même; j'essayai des chants, à peu près comme un enfant qui s'exerceroit à chanter[.] (CTW, III, 170)

Enlightened by the method of Descartes, which I had fortunately read and by which I was impressed, I began by descending into myself; I set about singing, much like a child would begin to sing.

The allusion, unmistakably, is to the method of radical doubt sketched the *Discours de la méthode* (1637) and the *Meditations* (1641). Yet the passage is hardly a methodological credo. The *Démonstration* as a whole is an augmented and much-revised version of the *mémoire* that Rameau read before the Académie des Sciences on November 19, 1749, and as the original version of the text makes clearer, the specter of Descartes is invoked only to be exorcised. In the original versions, the continuation of the passage runs as follows:

Je ne recontrois donc rien en moi même qui me satisfit. Toutes mes connaissances m'embarrassoient même ici plus qu'elles me servoient, car il n'en est de nos sensations ainsi que des qualités de des autres corps, et l'abstraction ne s'en fait pas

I found nothing in myself that satisfied me. All my knowledge here embarrassed me more than it served me, for our sensations are not like the qualities of other bodies, and abstractions are not made from them with the same facility.

114 (1970): 140-54; Jonathan Bernard, "The Principle and the Elements: Rameau's Controversy with d'Alembert," *Journal of Music Theory* 24 (1980): 42; Christensen, *Rameau and Musical Thought*, 11-12, 106-109; and Waldura, *Von Rameau und Riepel*, 217-25.

⁴² Catherine Kintzler, "Rameau et Rousseau: le choc de deux esthétiques," in *Jean-Jacques Rousseau: écrits sur la musique* (Paris: Stock, 1979), ix-liv; *Jean-Philippe Rameau: splendeur et naufrage de l'esthétique du plaisir à l'âge classique* (Paris: Sycomore, 1983), 13-133; *Poétique de l'opéra français de Corneille à Rousseau* (Paris: Minerve, 1991), 321-49.

⁴³ There is also, of course, considerable disagreement on the nature of Cartesian science. For a helpful introduction to the complexities involved, and to the various positions staked out in the literature, see Desmond Clarke, *Descartes' Philosophy of Science* (Manchester: Manchester University Press, 1982), 7-14. See also Daniel Garber, *Descartes' Metaphysical Physics* (Chicago: University of Chicago Press, 1992); Dennis Des Chene, *Physiologia: Natural Philosophy in Late Aristotelian and Cartesian Thought* (Ithaca: Cornell University Press, 1996); Stephen Gaukroger, *Descartes' System of Natural Philosophy* (Cambridge: Cambridge University Press, 2002).

avec la même facilité, ne pouvant toutefois me dissimuler que jusqu'à présent je n'avois aucun droit de rapporter tout le chant que j'avois fait à d'autres principes, qu'à une certaine habitude, qu'à des convenances peu raisonnées, et à d'autres lois tout aussi arbitraires, j'en fis abstraction de mon mieux, et je me plaçai le plus exactement qu'il me fut possible dans l'état d'un homme qui n'avoit ni chanté ni entendu du chant, me promettant bien de recourir à des expériences étrangères, toutes les fois que j'aurois le soupçon que l'habitude d'un état contraire à celui où je me supposois m'entraîneroit malgré moi hors de la supposition.

Cela fait, je me mis à regarder autour de moi, et à chercher dans la nature ce que je ne pouvois tirer de mon propre fond, ni aussi nettement ni aussi sûrement que je le désirais. ("Mémoire," 156)

Not being able to deny that up until now I had had no right to link all the singing I had done to any principles beyond a certain habit, or certain unreflective preferences and other equally arbitrary laws, I abstracted from these as best I could, and placed myself as exactly as possible in the state of a man who had neither sung nor heard singing, promising to go back to observations, any time that I suspected that habits foreign to the state in which I tried to place myself dragged me against my will back out of the one in which I imagined myself.

That done, I set about looking around myself, and searching in nature what I was unable to find in myself as clearly and as surely as I desired.

With that, Cartesianism is dismissed as a viable methodological alternative.

There are, of course, other references to Descartes in Rameau's writings. These, however, appear exclusively in the *Traité*, and refer without exception to Descartes' *Compendium musicae* (c. 1618), and that early text belongs squarely within the traditional framework of *musica speculativa*. As such, it can be assimilated to the strictures of Descartes later scientific methodology (however that is construed) only with considerable strain.

Advocates of a Cartesian Rameau are left, therefore, with such general methodological injunctions as the following much-quoted passage from the *Traité's* preface:

La Musique est une science qui doit avoir des regles certaines; ces regles doivent être tirées d'un principe évident, & ce principe ne peut gueres nous être connu sans le secours des Mathematiques: Aussi dois-je avouer que, nonobstant toute l'expérience que je pouvois m'être acquise dans la Musique, pour l'avoir pratiquée pendant une assez longue suite de temps, ce n'est

Music is a science that must have certain rules; these rules must be drawn from an evident principle, and this principle cannot be known to us without the aid of mathematics. Also, I must admit that, notwithstanding all the experience I have acquired in music, which I have practiced for a very long time, it was only with the aid of mathematics that my ideas were

cependant que par le secours des
Mathématiques que mes idées se sont
débrouillées, & que la lumière y a succédé
à une certaine obscurité, dont je ne
m'apercevois pas auparavant. (CTW, I,
3)

disentangled and that clarity replaced a
certain obscurity of which I had previously
been unaware.

Such statements, however, are by no means unequivocally Cartesian. The insistence that a science must be deduced from evident principles is sufficiently broad to admit a variety of conceptions of science: it is no less characteristic, for instance, of Aristotle's *Posterior Analytics*. As for the emphasis on mathematicization, such injunctions are as redolent of Galileo or Newton as they are of Descartes.

Clearly, then, Rameau's alleged Cartesianism cannot be confidently established on the basis of internal evidence, and we should be skeptical about any too-ready assimilation of Rameau's system of harmony to the model of Cartesian science. If, on circumstantial and historical grounds, Cartesianism cannot be wholly dismissed as a possible methodological model, it nevertheless should not blind us to the range and extent of Rameau's other borrowings. That conclusion is undoubtedly among the general lessons of Thomas Christensen's magisterial study of Rameau's musical thought. Rameau's writings emerge, in Christensen's readings, as mosaics assembled from disparate, and not always fully compatible, sources.⁴⁴ One implication of Christensen's approach is that no single conception of science can be naively expected to encompass the methodological polyphony of Rameau's writings. That conclusion seems broadly correct, yet Christensen's procedure carries the attendant risk of making Rameau seem even less coherent than he is. Not all of Rameau's borrowings are equal. Some are fleeting; others recur.⁴⁵ And some of Rameau's methodological convictions remain

⁴⁴ "At one time or another, Rameau cast his theory of the fundamental bass in the varied rhetorics of neoplatonism, Cartesian mechanism, Newtonian gravitation, Lockean sensationalism, and Malebranchian occasionalism. One might compare his approach to the Australian Bower bird which builds its nest out of any discarded bits of colored paper and shiny metallic objects that it can find" (Christensen, *Rameau and Musical Thought*, 13); "[Rameau] tested a variety of philosophical methods and scientific languages, which, while individually insufficient in accommodating the richness and vicissitudes of his thoughts, together help to define the complex enterprise that was his system of harmony: neoplatonism, Cartesian mechanism, Newtonian experimental science, sensationalist psychology, neoclassical aesthetics, and occasionalism" (ibid., 304). Christensen's argument for this characterization spans the length of his book.

⁴⁵ Christensen himself would undoubtedly concur, for he places greater weight on some than on others. In particular, Rameau's writings trace an arc, in Christensen's view, from the Cartesian resonances of the *Traité* through Newtonian colourings in the *Génération* to the Lockean inflections that Rameau's ideas receive in the *Démonstration*. This aspect of Christensen's interpretation is particularly clear in his recent

relatively constant across his writings. In particular, Rameau frequently asserts that the criteria for judgment in his science of harmony are reason (*raison*) on the one hand and experience (*expérience*) or perception (*l'ouïe*, *l'oreille*) on the other. The following passage, from the *Traité*'s second book, is characteristic:⁴⁶

L'on ne peut juger de la Musique que par le rapport de l'ouïe; & la raison n'y a d'autorité, qu'autant qu'elle s'accorde avec l'oreille; mais aussi rien ne doit plus nous convaincre que leur union dans nos jugemens: Nous sommes naturellement satisfaits par l'oreille, & l'esprit l'est par la raison; ne jugeons donc de rien que par leur concours mutual.

L'expérience nous offre un grand nombre d'Accords susceptibles d'une diversité à l'infini, où nous nous égarerons toujours, si nous n'en cherchons le principe dans une autre cause . . . La raison au contraire ne nous met sous les yeux qu'un seul Accord, dont il luy est facile de déterminer toutes les propriétés, pour peu qu'elle soit aidée de l'expérience: Ainsi dès que cette expérience ne dément point ce que la raison autorise, celle-cy doit prendre le dessus; car rien n'est plus convaincant que ses décisions, sur tout lorsqu'elles sont tirées d'un principe aussi simple que celui qu'elle nous offre: Ne nous reglons donc que sur elle, si cela se peut, & n'appellons l'expérience à son secours, que pour affermir davantage ses preuves. (CTW, I, 155-56)

We cannot judge [questions of] music except by means of hearing, and reason has no authority except insofar as it is in accordance with the ear. But also nothing can convince us more than the union of their judgments: we are naturally satisfied by the ear, and the mind is satisfied by reason; let us not judge anything therefore except by their mutual agreement.

Experience offers us a great number of chords that are susceptible to an infinite variety, where we would lose ourselves entirely, if we did not search out their principle in another cause . . . Reason, in contrast, places before our eyes a single chord, whose properties are easy to determine so long as it is aided by experience. Thus so long as experience does not contradict what reason authorizes, the latter should be ascendant, for nothing is more persuasive than its decisions, particularly when they are drawn from a principle as simple as that which it offers us here. Let us follow it alone, if that is possible, and not call upon experience except to confirm its proofs.

The relationship that Rameau here posits between sensation (or experience) and reason recalls the familiar relationship between *sensus* and *ratio* detailed by generations of speculative music theorists: experience offers raw, undigested phenomena to reason;

essay, "Musiktheorie im Kontext: Rameau und die Philosophie der Französischen Aufklärung," in *Musiktheoretisches Denken und kultureller Kontext*, ed. Dörte Schmidt (Schiengen im Markgräflerland: Argus, 2005), 93-106.

⁴⁶ See also: *Traité*, CTW, I, 136, 141-142, 147, 157, 170, 353; *Nouveau système*, CTW, II, 18-19, 64-65, 98-104, 116; *Dissertation*, CTW, V, 15, 21, 48-49.

reason then seeks the principles that order and explain these data, and its constructions are then resubmitted to experience in order to be falsified or confirmed.⁴⁷

It is tempting, then, to suggest that the conception of science animating Rameau's theoretical enterprise might be most clearly illuminated if seen against the long tradition of speculative music theorizing of which it is in part a continuation. Such an interpretation, however, would require a study in its own right and cannot be pursued adequately here. Fortunately, though, the question is largely superfluous to the task at hand: what is necessary here is not so much to pinpoint Rameau's own understanding of science—fascinating and rich though that question undoubtedly is—but rather to determine how the *philosophes* understood his science. This second question admits a relatively straightforward answer, for unlike Rameau, Condillac, d'Alembert and, to a lesser extent, Diderot reflected lucidly and at length on questions of scientific method. They were explicit, moreover, about the kind of science that they took Rameau to have established. In the late 1740s and early 1750s, all three men thought that Rameau had discovered the true system of harmony—a science in the sense that Condillac developed in his *Traité des systèmes*. It is therefore to Condillac's treatise that we turn now.⁴⁸

⁴⁷ The resemblance is pointed out in David Cohen, "The 'Gift of Nature': Musical 'Instinct' and Musical Cognition in Rameau," in *Music Theory and the Natural Order from the Renaissance to the Early Twentieth Century*, ed. Suzannah Clark and Alexander Rehding (Cambridge: Cambridge University Press, 2001), 82. The *locus classicus* is Ptolemy's discussion of the roles of *logos* and *akoē* at *Harmonics* 3.3–5.10. Ptolemy, however, is by no means the only Greek harmonic theorist to meditate on the respective places of reason and sensation in his science. Similar considerations appear, for instance, at Aristoxenos *Elements* 2.33 and 2.38 (Aristoxenos' distinction is between *akoē* or *aisthēsis* and *dianoia*). In one crucial respect, moreover—namely, in the insistence that musical perception must be trained—Rameau's conception resembles Aristoxenos' schema more closely than it does Ptolemy's. Behind Aristoxenos' conception of harmonics, furthermore, is the model of Aristotelian science, and in fact Rameau's characterizations of reason and experience often seem to echo the distinction that Aristotle draws between *empeiria*, on the one hand, and *technē* and *epistēmē*, on the other, at *Metaphysics* A.1 and *Posterior Analytics* B.19. Rameau himself undoubtedly had no direct knowledge of the classical sources (the few references to Ptolemy's *Harmonics* in the *Suite des Erreurs sur la musique dans l'Encyclopédie* [1756], for instance, inspire little confidence that Rameau knew the text). He did, however, know Zarlino's *Istitutioni harmoniche* (1558), and Zarlino, unlike Rameau, was a competent humanist. It is my strong suspicion that coming to terms with Rameau's conception of science requires careful attention to the music-theoretical traditions that he imbibed indirectly through Zarlino. That suggestion has previously been entertained by Markus Waldura (*Von Rameau und Riepel*, 220n45); Waldura, though, ultimately prefers to see Rameau's approach to harmonic theory as Cartesian in spirit.

⁴⁸ Though the following discussion may seem to wander somewhat far afield, the material on Condillac's philosophy of science and philosophical psychology introduced in the following section is essential to understanding Rousseau's reception of Rameau's ideas in the *Encyclopédie*, particularly in the entry HARMONIE (*Musique*). Some readers may wish to skim the material at first and refer back as needed. I have added numerous cross-references to the relevant parts of Chapter 3 with such readers in mind.

1.2. Rameau and Condillac

In his *Traité des systèmes* of 1749, Condillac famously distinguished three general classes of systems: abstract systems (*systèmes abstraits*), hypothetical systems (*systèmes hypothétiques*) and true systems (*vrais systèmes*). All systems share a common structure: each orders the parts of a given discipline in such a way that the more complex parts follow from, and are explained by, the simpler. The simplest, most elemental parts are the system's principles, and the system is more perfect to the extent that its principles are few. Ideally, the entire system might follow from a single principle.⁴⁹ Since all systems are identical in their basic structure, the distinction between Condillac's three types of systems can only lie in the kinds of principles to which they appeal. Abstract systems draw on general or abstract postulates; hypothetical systems arise from suppositions adopted by hypothesis; and true systems flow from well-attested facts (OP, I, 121-22). As the labels suggest, only the last—true systems—offer real, scientific knowledge.

Condillac is unequivocal about the class to which Rameau's system belongs:

M. Rameau a fait sur la génération harmonique, un système qui pourroit me servir d'exemple. Il y réduit tout à l'harmonie du corps sonore. En effet il est evident que l'harmonie ne consiste que dans un son qui fait entendre ses harmoniques: auparavant ce n'est que du bruit. Ainsi quand on observera analitiquement toutes les variations que la combinaison et le mouvement font essuyer à cette harmonie, on la verra se transformer dans tous les phénomènes, qui paroissent n'avoir d'autre règle que l'imagination du musicien. Si ce système souffre des difficultés, c'est que les parties n'en ont pas encore été toutes bien analysées. (OP, I, 213)

M. Rameau has formed a system on the basis of harmonic generation that can serve me as an example. In it, he reduces everything to the harmony of the sounding body. It is clear that harmony inheres only in a sound that makes its overtones heard: otherwise there is only noise. When we observe analytically all of the ways in which this harmony can be moved and combined, we will see it transformed into all sorts of phenomena that previously appeared to have no rule beyond the imagination of the musician. If this system suffers difficulties, it is only because the parts have not yet all been analyzed well.

This brief encomium comes in the penultimate chapter of the *Traité des systèmes*, a chapter devoted to the possibility of true systems in the fine and mechanical arts. Three

⁴⁹ "Un système n'est autre chose que la disposition des différentes parties d'un art ou d'une science dans un ordre où elles se soutiennent toutes mutuellement, et où les dernières s'expliquent par les premières. Celles qui rendent raison des autres, s'appellent *principes*; et le système est d'autant plus parfait, que les principes sont en plus petit nombre: il est même à souhaiter qu'on les réduise à un seul" (OP, I, 121).

years later, Condillac reiterated his endorsement in the *approbations* that he appended to Rameau's *Nouvelles réflexions sur le principe de l'harmonie* (1752) and d'Alembert's *Elémens de musique* (1752). The first is as follows:

J'ai lû par ordre de Monseigneur le Chancelier, un Manuscrit, qui a pour titre: *Nouvelles réflexions de M. Rameau, sur la Démonstration du Principe de l'Harmonie, servant de base à tout l'art Musical théorique & pratique*: je crois que le Public ne peut recevoir, qu'avec empressement, les réflexions de M. Rameau, sur un Art dans lequel il excelle, & dont il me paroît avoir découvert les vrais principes. (CTW, III, 246)

On the order of Monseigneur the chancellor, I have read a manuscript entitled *Nouvelles réflexions de M. Rameau, sur la Démonstration du principe de l'Harmonie, servant de base à tout l'art Musical théorique & pratique*. I believe that the public will eagerly receive M. Rameau's reflections on an art in which he excels and of which he seems to me to have discovered the true principles.

And the second:

J'ai lû par l'ordre de Monseigneur le Chancelier, un Manuscrit intitulé *Elémens de Musique théorique & pratique*: les systèmes dont l'expérience donne ou confirme les principes, peuvent seuls contribuer aux progrès des Arts & des Sciences: celui-ci me paroît un modèle en ce genre: l'ordre, la netteté & la précision en font le caractère. M. Rameau doit être flatté de voir à la portée de tout Lecteur intelligent, un système dont il a découvert le principe, & qui, ce me semble, pour être approuvé, n'a besoin que d'être connu. (*Elémens*, 172)

On the order of Monseigneur the Chancellor, I have read a manuscript entitled *Elémens de musique théorique & pratique*. Only systems in which experience gives or confirms the principles can contribute to the progress of the arts and sciences: this one seems to me to be a model of the type: order, clarity and precision are its characteristics. M. Rameau must surely be flattered to see brought before the purview of any intelligent reader a system whose principle he discovered and which I think need only be known to be endorsed.

For Condillac, it is clear, the resonance of the *corps sonore* is the true principle of harmony. It is known through well-attested observations, and when taken up and transformed in the relevant ways, it promises to furnish all of the structures that the theory of harmony requires. The system erected upon it is thus (at least in embryo) the true system of harmony.

So what, more precisely, is a true system? In the *Traité des systèmes*, Condillac ventures a suggestive analogy:

Je suppose qu'un homme, qui n'a aucune idée de l'horlogerie, ni même de la mécanique, entreprenne de rendre raison

Suppose that a man who has no idea of clockwork, nor of mechanics, takes it upon himself to account for the effects of

des effets d'une pendule: il a beau observer les sons qu'elle rend à certaines périodes, et remarquer le mouvement de l'aiguille, privé de la connoissance de la statique, il lui est impossible d'expliquer ces phénomènes d'une manière raisonnable.

.....

Enfin ouvrez-lui cette pendule, expliquez-lui en le mécanisme; aussitôt il saisit la disposition de toutes les parties, il voit comment elles agissent les unes sur les autres, et il remonte jusqu'au premier ressort dont elles dépendent. Ce n'est que de ce moment qu'il connoît avec certitude le vrai système qui rend raison des observations qu'il avoit faites.

Cet homme, c'est le philosophe qui étudie la nature. (OP, I, 207)

the pendulum clock. He can certainly observe the sounds it makes at certain times and note the movements of the needle, but without any knowledge of statics, it is impossible for him to account for these phenomena in a rational way.

.....

Finally open the clock for him and explain its mechanism. As soon as he grasps the disposition of all the parts, he will see how they act on one another, and he will follow them back to the first spring on which the others depend. Only at that moment does he know the true system that explains the certain observations that he has made.

This man is the philosopher who studies nature.

The unique objective of the physicist "doit être d'observer les phénomènes, d'en saisir l'enchaînement, et de remonter jusqu'à ceux dont plusieurs autres dépendent" ("must be to observe the phenomena, to seize their interrelation, and to follow it back to those [phenomena] on which many others depend," OP, I, 210).⁵⁰ The student of nature should begin by observing his object carefully. He should endeavour to isolate its parts and try to grasp their interdependence. Over the course of this investigation, Condillac is confident, some of these parts will emerge as prior to the others, and these others will in turn be seen to depend on them.

Condillac's paradigm is drawn from physics, but he extends it to the *arts mécaniques* and *beaux arts* as well.⁵¹ In the mechanical arts, true systems are formed just as they are in physics:⁵²

⁵⁰ Condillac's phrasing tends to imply that this hierarchical interconnection (*enchaînement*), according to which some phenomena are prior to and explanatory of others, is intrinsically present in nature rather than being contributed by the observer: systems are possible, that is to say, because nature is itself already a system. Though the assumption remains implicit in the 1749 edition of the *Traité*, it is made explicit in the revised 1798 edition: "Les systèmes sont plus anciens que les philosophes: la nature en fait faire, et il ne s'en faisoit pas de mauvais, lorsque les hommes n'avoient qu'elle pour maître" (OP, I, 123).

⁵¹ Note that when Condillac considers the physical sciences more closely (see, esp., OP, I, 211), he refines (or perhaps modifies) his earlier account by introducing roles for *expériences* (here probably "experiments") on the one hand and *règles* (i.e. natural laws) on the other. The former play a subsidiary role in the elaboration of systems; they confirm or refute "conjectures" formed on the basis of prior observation. Condillac's conception of the place of *règles* in true systems is unclear to me. Clearly, they are not *principes*, since these must be "facts" (*faits*), not laws governing facts. Condillac cannot therefore

La mécanique pratique est la science qui apprend à appliquer à des machines artificielles les loix du mouvement. C'est une imitation des opérations de la nature. Les systèmes y suivent donc les mêmes règles, qu'en Physique. Il faut que dans une machine tout dépende d'un premier ressort, et que les parties en soient dans un si grande proportion, qu'elles agissent sans se nuire, et tendent toutes à la production des mêmes effets. (OP, I, 212)

Practical mechanics is the science that teaches us how to apply the laws of movement to artificial machines. It is an imitation of the operations of nature. Such systems follow the same rules as in physics. In a machine, everything must depend on a first spring and the other parts must be in so exact a proportion that they move without damaging one another and tend towards the production of the same effects.

The fine arts differ from the mechanical arts only in that the imitations of nature that they involve need not be consciously effected.⁵³ Still, Condillac has no doubt that the fine arts depend on principles and that they can therefore be described by true systems. To persuade his readers of that fact, he offers three examples: the "système sur l'art de penser" developed in his own *Essai sur l'origine des connoissances humaines* (1746), William Warburton's remarks on the history of writing in *The Devine Legation of Moses* (1738-41), and Rameau's *Génération harmonique*.⁵⁴

The first example offers an obvious point of intersection between the methodological concerns of the *Traité des systèmes* and the psychological and epistemological positions developed in the *Essai*, and it is worth considering Condillac's examples in some detail, both to illustrate his conception of true systems and because his

be thinking of the role Newton's laws of motion play in the *Principia*. Despite his much-vaunted, and perhaps over-emphasized, Newtonianism, Condillac actually classes Newton's cosmology as a *système hypothétique* in the *Traité des systèmes*, not as a *vrai système*: "quoique l'hypothèse de Newton paroisse mieux s'accorder avec les observations, on ne sauroit s'assurer qu'elle soit le vrai système de l'univers" (OP, I, 201).

⁵²For Condillac, the distinction between the arts and sciences lies primarily in the fact that the former produce things whereas the latter explain them. See, e.g., OP, I, 207.

⁵³The artist, that is, need not know the underlying principle but can, and perhaps should, rely instead upon taste and sensibility: "Dans les beaux arts, au contraire, il n'est pas nécessaire, pour imiter la nature, de connoître le principe qui nous rend capables de cette imitation. Sans cette connoissance nous pouvons même quelquefois la surpasser" (OP, I, 212).

⁵⁴Condillac's examples will no doubt come as a surprise to the modern reader. Condillac seems to have thought they might be equally surprising to his contemporaries, though perhaps for different reasons: "On sera peut-être surpris de voir ici l'art de penser parmi les beaux arts. Il semble même qu'on s'en occupe trop peu, pour avoir songé à le mettre dans aucune classe. Quoi qu'il en soit, on ne sauroit le séparer de l'Eloquence et de la Poésie; car ces beaux arts ne sont que des branches de l'art de penser. D'ailleurs, on doit mettre au nombre des beaux arts tous ceux qui ne sont pas mécaniques" (OP, I, 213).

philosophical psychology exerted considerable influence Rousseau's reception of Rameau.⁵⁵

All human knowledge, Condillac argues following Locke, originates in sensation. The senses communicate certain basic ideas to the mind, and the mind in turn forms ever more complex ideas by connecting these original ideas together. This act of connecting ideas is, for Condillac, the basic operation on which all human knowledge depends. The first step is *perception*: from the senses, the mind receives a constant flux of stimuli, and the impressions these sensations make upon it are our first ideas (OP, I, 10-11). For reasons that lie initially beyond our control, we attend at any given moment to some of these ideas more than others (OP, I, 11-12). Ideas capturing our *attention* are retained. Without this capacity to retain our sensory impressions, knowledge would be impossible, for it is only because we can somehow hold on to ideas that we are able to forge connections between them. One of the first consequences of the fact that I attend to, and so retain, certain sensory impressions is that when a sensation recurs, I am able to recognize it as a sensation I have experienced before. I am able to recognize, for instance, that the hunger I feel now is the same sensation that I felt yesterday. I can only apprehend this identity because I can somehow hold the two sensations together and compare them, and I could not do this if I were not, in some sense, the same person from one moment to the next.⁵⁶ Thus, for Condillac, our emerging awareness of recurring patterns among our sensory perceptions bears with it an awareness of ourselves as entities to whom these sensations belong. Condillac's term for both acts of recognition—the recognition that a given sensation recurs and the self-awareness that he sees as bound up with that recognition—is *réminiscence* (OP, I, 14).

Attention alone is often enough to suggest connections between ideas. Human beings, Condillac is at pains to stress, are not disinterested observers of the world but embodied actors within it, who have needs (*besoins*) that demand fulfillment. My present hunger calls to mind my hunger yesterday, and that hunger in turn brings to mind the

⁵⁵ See below, pp. 146-56.

⁵⁶ "Lorsque les objets attirent notre attention, les perceptions qu'ils occasionnent en nous, se lient avec le sentiment de notre être et avec tout ce qui peut y avoir quelque rapport. De-là il arrive que non seulement la conscience nous donne connoissance de nos perceptions, mais encore, si elle se répètent, elle nous avertit souvent que nous les avons déjà eues, et nous les fait connoître comme étant à nous, ou comme affectant, malgré leur variété et leur succession, un être qui est constamment le même *nous*" (OP, I, 14).

food that yesterday assuaged it, and this latter in turn the place in which I found the food. In this way, one sensation calls to mind another with which it has become associated.⁵⁷ This act of reproducing a perception in the absence of its object is called *imagination* (OP, I, 14-15).

The reproduction of sensations in imagination is at first spontaneous. In its elemental form, imagining links together the sensation of a need with the idea of what satisfies it.⁵⁸ This kind of imagining occurs involuntarily, at the level of instinct, and is common both to humans and to animals (OP, I, 21). Humans, though, unlike animals, can master their attention and imagination. We acquire this control through language. The use of conventionalized signs (*signes d'institution*) allows us to direct our attention at will, since we can use the word that names a given thing to summon up its corresponding idea (21b4-49). The use of language also permits a new and potentially pernicious mental operation in which the word is called to mind in the absence of the idea it denotes. Condillac calls this last operation *mémoire* (OP, I, 15).

Through the use of signs, we bring imagination and memory under our control. To direct our attention deliberately in this way is to *reflect* (*réfléchir*; OP, I, 21-22). The power to reflect allows us to manipulate ideas by comparing, distinguishing, abstracting, composing and decomposing them (OP, I, 24-27). We can express these operations in statements that affirm or deny the identity of two ideas in some respect. This is judging (*juger*; OP, I, 27). By stringing together judgments, we engage in reasoning (OP, I, 27), and in this way, the whole of the human understanding (*entendement*) arises from the association of ideas:

<p>Nous commençons par éprouver des perceptions dont nous avons conscience. Nous formons-nous ensuite une conscience plus vive de quelques perceptions, cette conscience devient attention. Dès-lors les</p>	<p>We begin by experiencing our conscious sensations. We form a more lively awareness of some of them, and this awareness becomes attention. From that moment, our ideas are connected, and we</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

⁵⁷ "Le premier effet de l'attention . . . c'est de faire subsister dans l'esprit, en l'absence des objets, les perceptions qu'ils ont occasionnées. Elles s'y conserve même ordinairement dans le même ordre qu'elles avoient, quand les objets étoient présents. Par-là il se forme entre elles une liaison," OP, I, 14. "La liaison de plusieurs idées ne peut avoir d'autre cause que l'attention que nous leur avons donnée, quand elles se sont présentées ensemble: ainsi les choses n'attirant notre attention que par le rapport qu'elles ont à notre tempérament, à nos passions, à notre état, ou pour tout dire en un mot, à nos besoins; c'est une conséquence que la même attention embrasse tout-à-la-fois les idées des besoins et celles des choses qui s'y rapportent, et à qui elle les lie" (OP, I, 17).

⁵⁸ See, esp., OP, I, 17-18, 20.

idées se lient, nous reconnoissons en conséquence les perceptions que nous avons eues, et nous nous reconnoissons pour le même être qui les a eues: ce qui constitue la réminiscence. L'âme réveille-t-elle ses perceptions, les conserve-t-elle, ou en rapelle-t-elle seulement les signes? c'est imagination, contemplation, mémoire; et si elle dispose elle-même de son attention, c'est réflexion. Enfin, de celle-ci naissent toutes les autres. C'est proprement la réflexion qui distingue, compare, compose, décompose et analyse; puisque ce ne sont-là que différentes manières de conduire l'attention. De-là se forment, par une suite naturelle, le jugement, le raisonnement, la conception; et résulte l'entendement. (OP, I, 28)

both recognize those ideas that we have had before and recognize ourselves as the being who has had them; this constitutes reminiscence. Does the mind recall its perceptions, hold them before itself, or merely remember their signs? These are imagination, contemplation and memory. And if the mind is itself master of its own attention, this is reflection. From this last, all the others are born. It is reflection properly speaking, that distinguishes, compares, composes, decomposes and analyses, for these are nothing but different ways of conducting our attention. From there, by a natural progression, judging, reasoning and conceiving arise, and the result is the understanding.

The association of ideas is thus the fundamental operation on which human knowledge depends. Yet that act does not only produce knowledge. To the extent that the connections forged between ideas are arbitrary or idiosyncratic, the result will instead be error or delusion. Indeed madness, for Condillac, is nothing but the mind's natural associative tendency run rampant. Madness is merely a wholly unfettered and entirely idiosyncratic association of ideas.⁵⁹ Thus, the association of ideas serves as both the source of knowledge and the source of error:

Le pouvoir que nous avons de réveiller nos perceptions en l'absence des objets, nous donne celui de réunir et de lier ensemble les idées les plus étrangères . . . Rien ne paroît d'abord plus contraire à la vérité que cette manière dont l'imagination dispose de nos idées. En effet, si nous ne nous rendons pas maîtres de cette opération, elle

The power that we have of recalling our perceptions in the absence of their objects, gives us that of uniting and connecting the most heterogeneous ideas . . . Nothing seems at first more opposite to truth than this manner in which imagination plays with our ideas. In fact, if we do not become masters of this operation, it will

⁵⁹ "Le pouvoir de lier nos idées a ses inconvénients, comme ses avantages. Pour les faire apercevoir sensiblement, je suppose deux hommes; l'un chez qui les idées n'ont jamais pu se lier; l'autre, chez qui elles se lient avec tant de facilité et tant de force, qu'il n'est plus le maître de les séparer. Le premier seroit sans imagination et sans mémoire, et n'auroit, par conséquent, l'exercice d'aucune des opérations que celles-ci doivent produire. Il seroit absolument incapable de réflexion; ce seroit un imbécile. Le second auroit trop de mémoire et trop d'imagination, et cet excès produiroit presque le même effet qu'une entière privation de l'une et de l'autre. Il auroit à peine l'exercice de sa réflexion, ce seroit un fou. Les idées les plus disparates étant fortement liées dans son esprit, par la seule raison qu'elles se sont présentées ensemble, il les jugeroit naturellement liées entre elles, et les mettroit les unes à la suite des autres comme de justes conséquences" (OP, I, 18; see also, OP, I, 30-31).

nous égarera infailliblement: mais elle sera	infallibly lead us astray. But if we learn
un des principaux ressorts de nos	how to govern it, it will be one of the
connoissances, si nous savons la régler.	principle foundations of our knowledge.

(OP, I, 28)

But in fact, the association of ideas in our imagination has already led us astray, for we have imbibed since childhood all manner of ideas that we have sometimes linked together in the most peculiar ways. We receive these associations before the age of reason, from the vagaries of our own experiences, from our teachers or from books.⁶⁰ If we are not to remain their prisoners, these ideas and their interrelations must come up for conscious scrutiny. A corrective is therefore required, one that will both restrain the mind's natural associative tendency in the future and allow us to undo the damage it has already done. Condillac calls this corrective analysis.⁶¹

Traditionally, analysis stands opposed to synthesis. By the time Condillac invoked the terms, the distinction had become a kind of philosophical commonplace, and if Condillac gives a somewhat idiosyncratic sense of "analysis," he nevertheless plays on the traditional antithesis.⁶² "Synthesis," which Condillac uses in the traditional sense, is the easier notion to explain and is best approached by means of an example. To take one,

⁶⁰ "la plus part de nos idées sont à notre égard, ce que sont les machines par rapport à ceux qui n'ont aucune connoissance de la statique. Elles se sont arrangées dans notre esprit toutes faites, et telles que les circonstances, ou ceux qui ont veillé à notre éducation, nous les ont transmises" (*Traité des systèmes*, OP, I, 212).

⁶¹ "Il faut donc une autre opération, afin de diriger, de suspendre, d'arrêter l'imagination, et de prévenir les écarts et les erreurs qu'elle ne mangeroit pas d'occasionner. Cette seconde opération est l'analyse; celle-ci décompose les choses, et démêle tout ce que l'imagination y suppose sans fondement" (*Traité des systèmes*, OP, I, 205).

⁶² The terms originate in Greek geometry, with classic statements of the distinction at Euclid, *Elements*, XIII, 1, and Pappus, *Collection*, VII, 1-2. As it is usually construed, Greek analysis was a method of discovery that involves assuming the theorem one wishes to prove and then attempting to derive a known theorem. That is, if I wish to show Y, I deduce (if I can) X from it, where X is a result that I already know to be true. Assuming that each of the steps by which I deduced X from Y is "convertible" ($a \Rightarrow b$ is convertible if it is also the case that $b \Rightarrow a$), I can then reverse the sequence and so prove Y from X. This latter, the proof of Y from X, is called "synthesis." From descriptions such as those in Pappus and Euclid, Renaissance humanists concluded that the Greek geometers had had a secret method of discovery—analysis—by which they produced their results but which they chose, whether from jealousy or some other motive, to conceal. By one of those curious shifts in meaning that make the history of ideas so fascinating, they identified this secret method with algebra (hence the title of François Viète's important treatise on algebra: *In artem analyticem isagoge* [1591]). From this tradition, Condillac takes over both the opposition between analysis and synthesis and the conviction that analysis represents a method of discovery. The idea that analysis involves, as its first phase, the decomposition of something into its elements may be taken over from chemistry, as a passing remark in the *Traité des systèmes* suggests: "En vain le Chimiste se flatte d'arriver par l'analyse aux premier élémens: rien ne lui prouve que ce qu'il prend pour un element simple et homogène, ne soit pas un corps composé de principes hétérogènes, mais que la seule imperfection des instrumens ne lui permet pas de décomposer davantage" (OP, I, 197).

the anonymous author (probably Marin Mersenne) of the Second Objections (1642) to Descartes' *Mediations* concluded by urging Descartes to reformulate his work "in the geometric manner" (*more geometrico*).⁶³ Descartes responded that he had adopted the analytic, rather than synthetic, mode of presentation in his *Meditations* because he thought it better suited to instruct his readers.⁶⁴ Nonetheless, he somewhat grudgingly consented to set out his arguments for the existence of god and the distinction between body and soul synthetically at the end of the Second Replies (AT, VII, 160-70).

Synthesis, then, is argument *more geometrico*—that is, argument expounded in the manner of Euclid's *Elements*, with the full panoply of definitions, axioms and theorems that that model entails. Synthesis, it follows, is a mode of presentation, a way of compelling the reader's assent to truths that were otherwise obtained. The technique for discovering these truths, Descartes tends to imply, is analysis.

Condillac concurs. Like Descartes, he regards synthesis as a method of proof, not discovery, and like Descartes, he regards it as ultimately superfluous. Analysis itself, properly undertaken and described, is sufficient to establish the truth of a claim, for as a mode of exposition, analysis simply recapitulates the steps through which the results being expounded were actually obtained. In following along with the exposition, readers are led, so to speak, to discover its conclusions for themselves.⁶⁵ Analysis, then, is not merely a mode of presentation; it is also a method of discovery. On this point Condillac and Descartes are in agreement. Descartes, though, is reticent in revealing just what the method of analysis entails. Condillac is not:

<p>[O]n ne conçoit proprement une chose, que lorsqu'on est en état d'en faire l'analyse. Voulez-vous, par exemple, concevoir une</p>	<p>We do not properly understand something, until we are able to carry out an analysis of it. Do you want, for instance to understand</p>
------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------

⁶³ "Haec sunt (Vir Clarissime) quae abs te desideramus illustrari, ut tuarum subtilissimarum, &, ut existimamus, verarum Meditationem lectio singulis utilissima sit. Quamobrem fuerit operae pretium, si ad tuarum solutionum calcem, quibusdam definitionibus, postulatis & axiomatibus praemissis, rem totam *more geometrico*, in quo tantopere versatus es, concludas, ut unico velut intuitu lectoris cujuscunque animum expleas, ac ipso numine divino perfundas" (AT, VII, 128).

⁶⁴ "Ego verò solam Analysim, quae vera & optima via est ad docendum, in Meditationibus meis sum sequutus; sed quantum ad Synthesim, quae procul dubio ea est quam hîc a me requiritis, etsi in rebus Geometricis aptissime post Analysim ponatur, non tamen ad has Metaphysicas tam commode potest applicari" (AT, VII, 156).

⁶⁵ "Demonstrandi autem ratio duplex est, alia scilicet per analysim, alia per synthesim.

Analysis veram viam ostendit per quam res methodice & tanquam a priori inventa est, adeo ut, si lector illam sequi velit atque ad omnia satis attendere, rem non minus perfecte intelliget suamque reddet, quam si ipsemet illam inventisset" (AT, VII, 155).

machine? Décomposez la, en remarquant avec soin les rapports, où sont toutes ses parties; et à mesure que vous les séparez, avez l'attention de les arranger dans un ordre qui prévienne toute confusion. Si ensuite vous les rassemblez, en observant comment elles agissent les unes sur les autres, vous saisirez la génération de toute la machine, et vous la concevrez parfaitement. Voilà ce qu'il faut faire sur toutes les idées, qui doivent former un système. (OP, I, 212)

a machine? Take it apart, while carefully noting the disposition of all its parts; and as you separate them, take care to arrange them in an order that prevents any confusion. If you then reassemble them, noting how they act on one another, you will grasp the generation of the entire machine, and you will understand it perfectly. This is what must be done with all the ideas that are to comprise a system.

Analysis thus involves a two-fold procedure: an initial resolution of the whole into its parts, and a subsequent re-composition of the whole:

La méthode que j'emploie pour faire ces systèmes, je l'appelle *analyse*. On voit qu'elle renferme deux opérations, décomposer et composer.

I call the method that I employ in forming these systems "analysis." We see that it involves two operations: decomposition and composition.

Par la première, on sépare toutes les idées qui appartiennent à un sujet; et on les examine, jusqu'à ce qu'on ait découvert l'idée qui doit être le germe de toutes les autres. Par la seconde, on les dispose suivant l'ordre de leur génération. (OP, I, 213)

By the first, we separate out all the ideas that pertain to a subject, and we examine them until we have discovered the idea that must be the seed of all the others. By the second, we dispose them according to the order of their generation.

The systems to which Condillac refers in this passage are the three examples already introduced: his own *Essai*, Warburton's *Divine Legation* and Rameau's *Génération harmonique*. The implication, clearly, is that each was discovered by means of analysis. Condillac elaborates that claim in some detail with respect to the first example: the system of the human understanding developed in the *Essai sur l'origine des connoissances*.⁶⁶

⁶⁶ There is a slight incongruity between this retrospective account and the original procedure of the *Essai*. In the *Essai*, Condillac identifies the association of ideas (*liaison*) as the principle of human knowledge. By the standard of the *Traité*, however, according to which the principles of a system are its first parts, the principle of human knowledge should be *perception*, as Condillac here implies. This is perhaps one of the points Condillac has in mind when he remarks in the continuation of the passage: "je ne développerai point ce progrès, si je n'ai une idée nette de chaque opération; au contraire je m'embarrasserai, et je tomberai dans des méprises. Voilà, je l'avoue, ce qui m'est arrivé, lorsque j'ai traité de l'origine des connoissances humaines. Pour suivre exactement les préceptes que j'indique aujourd'hui, je ne les connoissois pas assez" (OP, I, 213). *Liaison*, rather than being a principle, is presumably something like the *règles* discussed in n.

Si je veux, par exemple, faire un système sur l'art de penser, je vois l'entendement humain comme une faculté qui reçoit des idées, et qui en fait l'objet de ses opérations. Mais je remarque sans peine que les notions de faculté, d'idée et d'opération sont abstraites. Par conséquent, aucune d'elles n'est le principe que je cherche. Je décompose donc encore, et je passe en revue toutes les opérations. La conception se présente la première, comme la plus parfaite; mais je ne conçois que parce que je juge, ou que je raisonne: je ne forme des jugemens ou des raisonnemens, que parce que je compare; je ne saurois comparer, sous tous les rapports où j'ai besoin de le faire, si je ne distinguois, composois, décomposois, et ne formois des abstractions. Tout cela demande nécessairement que je sois capable de réfléchir; la réflexion suppose de l'imagination ou de la mémoire; ces deux opérations sont évidemment l'effet de l'exercice de l'attention: celle-ci ne peut avoir lieu sans la perception: enfin la perception vient à l'occasion des sensations; et elle n'est que l'impression que chaque objet sensible fait sur moi.

Cette décomposition me conduit donc à une idée, qui n'est point abstraite; et elle m'indique dans la perception le germe de toutes les opérations de l'entendement. En effet, l'exercice de cette faculté ne sauroit être moindre que d'appercevoir, il ne sauroit commencer ni plutôt ni plus tard. C'est donc la perception qui doit devenir successivement attention, imagination, mémoire, réflexion, et enfin l'entendement même. (OP, I, 213)

If I wish, for instance, to form a system of the art of thinking, I will see the human understanding as a faculty that receives ideas, and that makes them the object of its operations. But I easily recognize that the notions of faculty, idea and operation are abstract. Consequently, none of them is the principle I am looking for. Thus, I decompose once more, and I review all the operations [of the understanding]. Conceiving presents itself first, as the most perfect operation, but I can only conceive because I judge and reason; I can form judgments and chains of reasoning only because I can compare; I would not be able to compare in all the ways I need to if I did not distinguish, compose, decompose and form abstractions. All this necessarily demands that I be capable of reflecting; reflection presupposes imagination or memory; these two operations are obviously effects of the exercise of attention; this last cannot take place without perception; finally, perception arises from sensations and is nothing but the impression that each object of sensation makes upon me.

This decomposition leads me therefore to an idea that is not in any way abstract, and it shows me that perception is the seed of all the operations of the understanding. In effect, the exercise of this faculty [i.e. the understanding] is nothing but perception; it begins neither sooner nor later. It is therefore perception that must successively become attention, imagination, memory, reflection, and finally the understanding itself.

51 above (pp. 50-51). Notice, then, how the tension between *principes* and *règles* in Condillac's account of systems in physics is here reproduced in his psychology.

The centrality of analysis in their discovery is, for Condillac, a general feature of true systems in the fine arts.⁶⁷ By implication, Rameau's system of harmony must have been discovered by means of analysis. Condillac does not himself spell out the application, but it is easy enough to see how it should proceed. To isolate the individual partials given in the resonance of the *corps sonore* is, in effect, to decompose (pitched) sound into its elemental parts: the *son fondamental* and its *sons harmoniques* together with the intervals between them. These elements turn out, in Rameau's system, to be the materials from which all musical structures are formed. The reductive step, then, isolates the third and fifth as properly harmonic intervals. The re-composition shows how these intervals structure both individual chords and harmonic progressions. The result, by implication, is the true system of harmony. At the very least, that is how Diderot presents Rameau's theory in the *mémoire* that he prepared for Rameau to read before the Académie des Sciences on November 19, 1749.

1.3. Rameau and Diderot

Rameau begins to make periodic cameos in Diderot's writings in the late 1740s, first as the composer "utremifasollasiututut" in *Les Bijoux indiscrets* (1748), then under his own name in the *Principes généraux d'acoustique* (1748).⁶⁸ By the time the latter work appeared, the abbé Raynal informs us, Diderot and Rameau were on close terms.⁶⁹ Raynal also lets slip that Diderot intended to produce a primer on Rameau's theory of harmony:

⁶⁷ Is it a feature of systems in general? Condillac does not say so explicitly in the *Traité*. What he says is this: "Les systèmes dans les beaux arts ont cela de particulier, que tout doit s'y réduire à une idée première, qui soit le germe de toutes les autres. Or nous connoissons qu'une idée est le germe d'une seconde, d'une troisième, ou d'un plus grand nombre, quand, par l'analyse, nous voyons que chaque idée engendrée n'est que la première modifiée d'une certaine manière" (OP, I, 212).

⁶⁸ Utremifasollasiututut, Diderot tells us in what surely numbers among the most insightful descriptions of Rameau's music ever penned, was the first to distinguish "les nuances délicates qui séparent le tendre du voluptueux, le voluptueux du passionné, le passionné du lascif" (OD, III, 69-72). Despite what has sometimes been claimed, the *Principes généraux d'acoustique* deal only glancingly with Rameau, the bulk of the treatise being drawn instead from Joseph Sauveur's *Système général des intervalles des sons* (1701) and Leonhard Euler's *Tentamen novae theoriae musicae* (1739). Diderot also borrows a number of notions from Rameau in a curious passage in the *Lettre sur les sourds et muets*. For comment on this last, see Christensen, *Rameau and Musical Thought*, 216-17.

⁶⁹ Raynal does not date the early installments of the *Nouvelles littéraires*. The *privilege* for Diderot's *Mémoires*, however, is dated May 1748. In the installment that follows the one in which the *Mémoires* are announced, Raynal mentions the première of Voltaire's *Sémiramis*, which took place on August 29, 1748 (CL, I, 206). The notice just quoted, then, presumably dates from late in the summer of 1748.

M. Diderot a jugé à propos de donner quelque chose sur la science qu'il sait le mieux, je veux dire les mathématiques. Il vient de publier quelques mémoires sur cela, dont quelques-uns roulent sur la musique et sont extrêmement curieux. Cet écrivain puise en bonne source: il est intime ami avec M. Rameau, dont il doit dans peu de temps publier les découvertes. Ce sublime et profond musicien a donné autrefois quelques ouvrages où il n'a pas jeté assez de clarté et d'élégance. M. Diderot remaniera ces idées, et il est très-capable de les mettre dans un beau jour. Il est seulement à souhaiter qu'il ne prodigue pas la géométrie et l'algèbre comme il a fait dans les mémoires que je vous annonce. (CL, I, 202)

M. Diderot has seen fit to issue something on the science he knows best, I mean mathematics. He has just published some memoirs on it, some of which concern music and are extremely curious. This writer draws on a good source: he is an intimate friend of M. Rameau, whose discoveries he will shortly publish. This sublime and profound musician previously issued a number of works that were insufficiently seasoned with clarity and elegance. M. Diderot will rework these ideas, and he is very capable of making them clear. It is only to be hoped that he does not burden them with as much geometry and algebra as he did the memoirs that I am announcing here.

Another reference to this same text, now as a *fait accompli*, appears in the *confession générale* that Diderot prepared for the *lieutenant-général de police* on August 10, 1749. Diderot had been arrested on July 24, largely as a result of his clandestinely circulated *Lettres sur les aveugles* (1749), and on the authority of a *lettre de cachet* issued the previous day.⁷⁰ In protestation of his innocence, he produced a *confession générale* on August 10 that detailed his literary activities. The confession contains significant lacunae—the texts that landed Diderot in prison are conspicuously absent—but the primer on Rameau appears in passing at the end of the list:

Je ne vous parlerai point d'une infinité d'autres ouvrages dont ces grandes occupations ont été coupées. J'ai donné l'exposition du système de musique de Mr. Rameau. Il y a dans les *Observations* de l'abbé Desfontaines plusieurs morceaux de ma façon. J'ai prêté ma plume et donné mon tems à tous ceux qui en ont eu besoin pour des chose utiles.⁷¹

I will not mention an infinite number of other texts interspersed among these larger occupations. I gave an exposition of M. Rameau's musical system. The abbé Desfontaines' *Observations* contain numerous pieces by me. I have loaned my pen and given my time to all those who needed it for useful things.

⁷⁰ For a lively account of Diderot's incarceration at Vincennes, see Arthur Wilson, *Diderot: The Testing Years, 1713-1759* (New York: Oxford University Press, 1957), 104-16.

⁷¹ Denis Diderot to Berryer, Lieutenant-général de Police, August 10, 1749, in *Correspondance de Diderot*, ed. George Roth (Paris: Éditions de Minuit, 1955-1970), vol. 1, 85-86.

The third and final known reference to Diderot's exposition of Rameau is due once more to Raynal, and dates from early June 1749.⁷²

Notre très-célèbre musicien, M. Rameau, pretend avoir découvert le principe de l'harmonie. M. Diderot lui a prêté sa plume pour mettre dans un beau jour cette importante découverte. Le ministère a jugé à propos que ce système fût développé par son auteur dans une assemblée de l'Académie des sciences. Le public attend avec impatience le triomphe d'un artiste qu'il adore, et qui lui procure tous les jours des plaisirs si vifs. (CL, I, 313)

Our very famous musician M. Rameau claims to have discovered the principle of harmony. M. Diderot has loaned his pen in order to make this important discovery intelligible to all. The minister has thought it appropriate that this system be presented by its author at an assembly of the Academy of Sciences. The public impatiently awaits the triumph of an artist it adores and who furnishes it each day with such lively pleasures.

The conjunction of Diderot's exposition and Rameau's presentation in Raynal's notice turns out to be significant. In the early 1990s, Thomas Christensen discovered a manuscript entitled "Mémoire où l'on expose les fondements du système de musique théorique et pratique de M. Rameau" at the Bibliothèque-Musée de l'Opéra in Paris.⁷³ The manuscript is virtually identical with the *Démonstration* up to the end of the first full paragraph of p. 19 of the published text, but diverges markedly after that point. From his study of the manuscript, Christensen concludes that it is a copy of the text that Rameau read before the Académie des Sciences on November 19, 1749.⁷⁴ He also argues, citing the passages from Raynal, Diderot's *confession générale*, and internal evidence from the text, that the "Mémoire" was either written by, or written with considerable assistance from, Diderot.⁷⁵ There is also an additional feature of the "Mémoire" that suggests

⁷² The next entry in the same installment mentions the imminent première of Voltaire's *Nanine*: "On va jouer dans trois ou quatre jours une comédie de Voltaire en trois actes et en vers. Vous connaissez le célèbre roman anglais intitulé *Paméla*; c'est de là qu'est pris le sujet de la comédie" (CL, I, 314). The première took place on June 16, 1749 at the Comédie-Française.

⁷³ Paris, Bibliothèque-Musée de l'Opéra, collection Boisselou, B 24 (8), fols. 119-128v.

⁷⁴ Thomas Christensen, "Diderot, Rameau and Resonating Strings: New Evidence of an Early Collaboration," *Studies on Voltaire and the Eighteenth Century* 323 (1994): 131-66.

⁷⁵ Even before Christensen's discovery, scholars had long speculated about Diderot's possible involvement in the composition of the *Démonstration*. Much of the text, frankly, reads far too elegantly to have issued from Rameau's pen, and the passages already quoted from Raynal's *Nouvelles littéraires* clearly point toward Diderot. Christensen's discovery, however, allows these previous suggestions to be refined. The mention, in the second of Raynal's notices, of Diderot's *précis* in conjunction with Rameau's presentation suggests that the text Diderot wrote was the one read by Rameau on November 19. The title Diderot gives in his *Confession générale*, moreover—"exposition du système de musique de Mr. Rameau"—is very close to that preserved in the Opéra manuscript.

Diderot's authorship and that is of particular relevance here: namely the unmistakably Condillacian slant that it takes on Rameau's theory.⁷⁶

The text of the "Mémoire" is an exercise in intellectual (auto)biography in which Diderot has Rameau recount—in obviously stylized form—the steps by which he purportedly discovered his theory. After a brief Cartesian false-start,⁷⁷ Diderot's Rameau turned instead to the observation of nature:

[J]e me mis à regarder autour de moi, et à chercher dans la nature ce que je ne pouvois tirer de mon propre fond, ni aussi nettement ni aussi sûrement que je le désirais. Ma recherche ne fut pas longue. Le premier son qui frappa mon oreille fut un trait de lumière. Je m'aperçus tout d'un coup qu'il n'étoit pas un, ou que l'impression qu'il faisoit sur moi étoit composée; voilà, me dis-je sur-le-champ, la différence du bruit et du son. Toute cause qui produit sur mon oreille une impression une et simple, me fait entendre du bruit; toute cause qui produit sur mon oreille une impression composée de plusieurs autres, me fait entendre du son. J'appellai le son primitif, ou générateur, son fondamental, ses concomitants sons harmoniques, et j'eus trois choses très distinguées dans la nature, indépendantes de mon organe, et très sensiblement différentes pour lui: du bruit, des sons fondamentaux, et des sons harmoniques. ("Mémoire," 156)

I set about looking around myself and searching in nature for what I could not draw from myself as clearly or as surely as I wished. My search was not long. The first sound that struck my ear was a ray of light. I perceived all at once that it was not simple, that the impression it made upon me was composite. There, I said to myself right away, is the difference between noise and pitched sound. Any cause that produces a unique and simple impression on my ear makes me hear noise; any cause that produces an impression on my ear that is composed of many others makes me hear sound. I called the basic sound, or the generator, the fundamental sound, its concomitants overtones, and I had three things very clearly distinguished in nature, independent of my organ [of hearing] and easily distinguished by it: noise, fundamental sounds and overtones.

The impression made by pitched sounds, "Rameau" discovers, is composite: any such sound consists of a *son fondamental* plus its associated *sons harmoniques*. Accordingly,

⁷⁶ The first 19 pages of the *Démonstration* excepted, this Condillacian colouring is entirely absent from Rameau's writings (and the beginning of the *Démonstration*, as noted above, is copied from the "Mémoire"). Engagement with Condillac's ideas is, however, entirely typical of Diderot's writings from the period. The *Lettre sur les aveugles* (1749), for instance, takes up the Molyneux problem treated in Condillac's *Essai sur l'origine des connoissance humaines*. Condillac's *Traité des sensations* (1754), to take another example, is a response to Diderot's charge, in the *Lettre sur les sourds et muets* (1751), that Condillac's sensationism must end up in Berkeleyan idealism. Diderot and Condillac, it is worth recalling here, met weekly in the late 1740s, together with Rousseau, at the Hôtel du Panier fleuri to discuss questions of mutual interest. The cross-fertilization of their writings (and Rousseau's) is therefore hardly surprising.

⁷⁷ See pp. 43-44 above.

“Rameau” sets out to determine the relationship between the fundamental and its overtones. These latter, it turns out, are two in number and stand a perfect twelfth and major seventeenth respectively above the fundamental; octave equivalence then allows these intervals to be reduced to their lowest terms (“Mémoire,” 157).

Thus far, “Rameau” has taken a compound sensory impression—a pitched sound—and decomposed it into its constituent parts: its partials and the intervals between them. These last, as the remainder of the “Mémoire” undertakes to show are also the materials from which scales and harmonic progressions are formed. To that end, “Rameau” begins by forming a new triad by analogy with the first, this time on the fifth above the fundamental.

La quinte du son fondamental considérée comme un son fondamental me donne des harmoniques, je dois avoir pour ces harmoniques la même préoccupation que pour les harmoniques du premier fondamental, et je vis naître un nouveau système composé de cinq sons et de leurs répliques, et rapportant ces systèmes à la gamme ou échelle de ut, j’eus ut, sol, ut, ut, mi, sol, ut; ut re mi sol ut; si ut re mi sol ut. (“Mémoire,” 158)

The fifth of the fundamental sound, considered as a fundamental, gives me certain harmonics. I must have for these harmonics the same preoccupation as for the harmonics of the first fundamental, and I see arise a new system composed from five pitches and their octaves, and relating these systems to the scale of C, I had C-G-C-C-E-G; C-D-E-G-C; B-C-D-E-G-C.

Only the subdominant and submediant degrees are missing, and so “Rameau” sets out to find them. After another abortive beginning,⁷⁸ he manages to extract them from another acoustical phenomenon, the alleged sympathetic vibration of strings tuned to the twelfth and seventeenth below the fundamental: “J’eus donc tous les systèmes et tous les intervalles dont j’avois besoin pour notre système diatonique, savoir ut sol, ut fa, ut sol re, ut sol re la, ut mi sol, ut mi fa, ut mi sol fa, &c.” (“Thus I had all the systems and all the intervals I needed for our diatonic system, namely C-G, C-F, C-G-D, C-G-D-A, C-E-G, C-E-F, C-E-G-F, and so on,” “Mémoire,” 159).

The diatonic genus in hand, “Rameau” next goes on to construct the chromatic and enharmonic genera.⁷⁹ Then comes a crucial transition: not only does nature give us melody; it also furnishes harmony:

⁷⁸ See pp. 203-205 below.

⁷⁹ See below, pp. 165-74.

[A]dmirez, Messieurs, la fécondité de la nature et de mon principe: Ce qui m'a donné les successions diatoniques, chromatiques, et enharmoniques; ce qui m'a donné les notions exactes de genres; ce qui m'a fait reconnaître les premières lois de la mélodie, va me fournir encore la définition véritable des modes et les fondements invariables de l'harmonie. ("Mémoire," 163)

Admire, Messieurs, the fecundity of nature and of my principle. That which gave me the diatonic, chromatic and enharmonic successions, which gave me exact notions of the genera, which made me recognize the first laws of melody, will now also furnish the true definition of the modes and the invariable foundations of harmony.

The derivation of harmonic progressions from the *corps sonore* proceeds as any reader of Rameau would expect:

Remarquez, Messieurs, qu'un son étant formé par la voix ou sur un instrument, il étoit naturel de passer à celui de ses harmoniques dont on étoit le plus fortement préoccupé. De cette harmonique, à celui des harmoniques de cet harmonique qui préoccupoit le plus, et ainsi de suite. ("Mémoire," 163)

Notice, Messieurs, that a sound having been formed by the voice or on an instrument, it is natural to pass to that of its harmonics with which one is most proccupied. From that harmonic, to the that of its harmonics that preoccupies us most, and so on.

Quite obviously, the line these fundamentals form is Rameau's *basse fondamentale*.

Only one problem remains:

[D]ans cette succession, tous les sons ayant les mêmes concomitants, ils n'y eut rien qui les distinguât et ils devenoient tous fondamentaux. C'étoient comme des mots qui tous portoient une idée, mais qui ne formoient ni sens, ni phrases. Rien n'en constituoit en somme la base des autres. Rien ne tendoit à nous en faire regarder le premier, par exemple, comme le chef des autres de la succession diatonique, ou chromatique, plutôt que le second ou le troisième de la même succession. ("Mémoire," 163-64)

Since all the notes in this succession have the same concomitants, there is nothing to distinguish them from one another and they are all equally tonics. They are like so many words, each of which carries an idea, but which form neither a phrase nor a sense. No one note, in sum, is the basis of the others. Nothing tends to make us regard the first, for example, as the ruler of the others in a diatonic or chromatic succession any more than the second or third of that same succession.

The solution is to add a characteristic dissonance to every chord except the tonic:

Quel remede avons nous trouvé à cela? Un fort simple.

Nous avons laissé à celui que nous avons voulu constituer comme base d'une succession diatonique ou chromatique, les

What remedy have we found? A very simple one.

To the [pitch] that we want to be the basis of a diatonic or chromatic succession, we have left the harmonics or

harmoniques ou concomitants tels qu'il les a reçus de la nature. Mais nous avons ajouté à certains autres de la même succession, des dissonances prises de l'échelle indiquée par la nature qui les fit reconnaître et qui les distinguât de la basse de l'échelle et des sons qui la représentent. Ces bases, permettez moi, Messieurs, la comparaison suivante en faveur de son exactitude: il s'agit ici moins de choses claires que de choses de goût. Ces bases, dis-je, sont précisément comme des chefs, dont les autres sons portent la livrée.

De là, Messieurs, vous voyez naître autant de modes qu'il y a de ces bases ou des ces chefs de succession, et autant de phrases harmoniques qu'il y a de manières de combiner les bases et les successions de sons qui en dépendent, les unes avec les autres, ou des bases de succession se succèdent les unes aux autres. C'est à dire ou un chant est composé de sons qui se succèdent et qui n'ont d'autre concomitants que ceux de la nature, ou ces bases qu'on appelle toniques sont séparées par des sons auxquels on a attaché un dissonant qui les rapporte à l'une de ces toniques. ("Mémoire," 164)

concomitants that it received from nature. But we have added to others in the same succession dissonances taken from the scale indicated by nature that make them recognizable and distinguish them from the bass [i.e. tonic] of the scale and the sounds that represent it. These bases [i.e. tonics], permit me, Messieurs, the following comparison because of its exactitude: for it is here less a question of things that are clear than things depending on taste. These bases, I say, are precisely like rulers, whose livery the others wear.

From there, Messieurs, you will see arise as many modes as there are bases or rulers of successions, and as many harmonic phrases as there are manners of combining the bases and the successions of sounds depending on them, the one with the other, where the bases of succession succeed one another. That is to say, either a progression is composed of pitches that succeed one another and which have no other concomitants than those [given by] nature, or these bases that we call tonics are separated by sounds to which we attach a dissonance that relates them to one of these tonics.

With that, Diderot concludes his synopsis of Rameau's system ("Voilà, Messieurs, tout l'art de la mélodie et de l'harmonie," "Mémoire," 164). His handling of that system, I have already begun to suggest, amounts to a comprehensive, Condillacian reformulation of Rameau's theory. Rameau began, in Diderot's reconstruction, by analyzing the complex sound given by the *corps sonore* into its constituent parts. These parts then turn out to be the materials from which all musical structures are formed: the triad, the diatonic scale, the chromatic and enharmonic genera, harmonic progressions of triads, and finally complete *phrases harmoniques* bound together by characteristic dissonances. Transparently, then, as Diderot would have it, Rameau discovered his system by means of analysis.

Diderot's *mémoire* proceeds by simply recounting the steps by which Rameau purportedly discovered his theory. Its mode of exposition, that is to say, is likewise

analytic. In the final chapter of his *Essai sur l'origine des connoissances humaines*, Condillac recommends the analytic order as the one most suited to expounding a subject, “car la meilleure manière d'instruire les autres, c'est de les conduire par la route qu'on a dû tenir pour s'instruire soi-même” (“for the best way to instruct others is to lead them along the route one had to follow in instructing oneself,” OP, I, 117).

Il faut, dans l'exposition, comme dans la recherche de la vérité, commencer par les idées les plus faciles, et qui viennent immédiatement des sens, et s'élever ensuite par degrés à des idées plus simples ou plus composées. Il me semble que, si l'on saisissoit bien le progrès des vérités, il seroit inutile de chercher des raisonnemens pour les démontrer, et que ce seroit assez de les énoncer; car elles se suivroient dans un tel ordre, que ce que l'une ajouteroit à celle qui l'auroit immédiatement précédée seroit trop simple pour avoir besoin de preuve. De la sorte on arriveroit aux plus compliquées, et l'on s'en assureroit mieux que par toute autre voie. (OP, I, 117)

It is necessary in the exposition as in the search for truth, to begin with the easiest ideas, those that come immediately through the senses, and to then raise oneself by degrees to more simple or more composed ideas. It seems to me that, if we properly grasp the progress of truths, it will be unnecessary to search for arguments to demonstrate them, and that it will be enough to state them, for they follow one another in such an order that what one [statement] adds to that immediately preceding it will be too simple to require proof. In that way we will arrive at the most complicated having assured ourselves of them better than in any other way.

From the fact that the proper order of exposition is analytic, it follows that it is also, in a certain sense, inherently autobiographical, since writers have simply to tell their readers how they themselves arrived at the truths they are expounding.⁸⁰

In both its argumentative structure and expository form, therefore, Diderot's “Mémoire” seeks to recast Rameau's theorizing as an exercise in Condillacian method. Rameau's theory is elaborated—and, Diderot claims, was discovered—through the decomposition of sound into its constituent parts and the subsequent re-composition of these parts into first the triad, then scales and genera, and finally complete harmonic progressions.

There is one final detail of Diderot's exposition that also deserves attention here, though its full implications will not be taken up until later.⁸¹ At one point in the course of

⁸⁰ Indeed Condillac, otherwise no great admirer of Descartes, praises him for having recorded, in his *Discours de la méthode*, “l'histoire des progrès de [son] esprit” (OP, I, 114). The account of the human understanding in the *Essai*, Condillac likewise insists, is faithfully expounded in the order through which it was discovered: “Concluons que si l'analyse est la méthode qu'on doit suivre dans la recherche de la vérité, elle est aussi la méthode dont on doit se servir pour exposer les découvertes qu'on a faites: j'ai tâché de m'y conformer” (OP, I, 117).

his exposition, Diderot has Rameau ask his audience to reflect on the relationship between the structure of his theory of harmony and the historical development of music itself:

Ce feroit, Messieurs, une chose digne de considération que la comparaison du progrès ancien de la musique, avec l'histoire que je vous fais ici de mes pensées et de mes recherches; quelle nouvelle autorité ne leur en reviendrait-il pas? Vous verriez les systèmes des anciens se composer, les tetracordes s'ajouter les uns aux autres, le système diatonique complet se former, le chromatique en résulter par partie, se compléter, donner naissance à l'enharmonique, et cela exactement dans l'ordre de mes recherches[.] ("Mémoire," 159-60)

It would be a thing worthy of consideration, Messieurs, to compare the ancient progress of music with the history that I am giving you here of my thoughts and my inquiries. What new authority would not accrue to them? You would see the systems of the ancients composed, their tetrachords added to one another, the complete diatonic system formed, and the chromatic, which results from it in part, and from the chromatic, the enharmonic, and all that exactly in the order of my investigations.

The claim is an astonishing one, to say the least: the progressive articulation of Rameau's theory, Diderot here implies, necessarily provides a map of music's own historical development. The insistence, however, is no mere idiosyncrasy of Diderot's. At least by implication, Condillac had advanced a similar claim in his *Essai sur l'origine des connoissances humaines*, when (in the treatise's second part) he briefly considered the origin and development of music:

L'ordre diatonique, c'est-à-dire, celui où les sons se succèdent par tons et demi-tons, paroît aujourd'hui si naturel, qu'on croiroit qu'il a été connu le premier; mais si nous trouvons des sons dont les rapports soient beaucoup plus sensibles, nous aurons droit d'en conclure que la succession en a été remarquée auparavant.

Puisqu'il est démontré que la progression par tierce, par quinte et par octave, tient immédiatement au principe où l'harmonie prend son origine, c'est-à-dire, à la résonance des corps sonores, et que l'ordre diatonique s'engendre de cette progression; c'est une conséquence que les rapports des sons doivent être bien plus sensibles dans la

The diatonic order, that is, the order in which the sounds proceed by tones and semitones, today seems so natural that we would readily believe it was the first to be discovered. But if we were to find other sounds whose relationship is much more easily perceptible, we would be entitled to conclude that this succession was discovered before the diatonic.

Since it has been shown that progressions by third, by fifth and by octave stem immediately from the principle from which harmony takes its origin, that is to say, the resonance of sounding bodies, and that the diatonic order is generated from that progression, it

⁸¹ See below, pp. 154-56, 245-75.

successions harmonique que dans l'ordre diatonique. Celui-ci en s'éloignant du principe de l'harmonie, ne peut conserver des rapports entre les sons, qu'autant qu'ils lui sont transmis par la succession qui l'engendre. Par exemple, *ré*, dans l'ordre diatonique, n'est lié à *ut*, que parce qu'*ut*, *ré* est produit par la progression *ut, sol*; et la liaison de ces deux derniers a son principe dans l'harmonie des corps sonores, dont ils font partie. L'oreille confirme ce raisonnement; car elle sent mieux le rapport des sons, *ut, mi, sol, ut*, que celui des sons *ut, ré, mi, fa*. Les intervalles harmoniques ont donc été remarqués les premiers.

Il y a encore ici de progrès à observer; car les sons harmoniques formant des intervalles plus ou moins faciles à entonner, et ayant des rapports plus ou moins sensibles, il n'est pas naturel qu'ils aient été aperçus et saisis aussitôt les uns que les autres. Il est donc vraisemblable qu'on n'a eu cette progression entière *ut, mi, sol, ut*, qu'après plusieurs expériences. Celle-là connue, on en fit d'autres sur le même modèle telles que *sol, si, ré, sol*. Quant à l'ordre diatonique, on ne le découvrit que peu à peu et qu'après beaucoup de tâtonnements, puisque la génération n'en a été montrée que de nos jours. (OP, I, 73)

follows that the relationships between sounds must be much more perceptible in their harmonic succession than in their diatonic order. The latter, being more distant from the principle, cannot conserve these relationships between sounds except to the extent that they are inherited from the succession that generated it. For instance, D is only linked to C in the diatonic order because C-D is produced by the progression C-G, and the connection between the latter two has its source in the harmony given by sounding bodies, in which that interval appears. The ear confirms this argument, for it senses the relationship between the sounds C-E-G-C more readily than between the sounds C-D-E-F. Harmonic intervals were therefore discovered first.

Even here, however, there is a progression to be observed, for since the overtones form intervals that are easier or harder to intone and that are more or less easily perceived, it is unlikely that they were all grasped at the same time. Most likely, the entire progression C-E-G-C was only obtained after much experimentation. Once that was known, others were formed on the same model, such as G-B-D-G. As for the diatonic order, it was only discovered little by little and after much fumbling, because its generation has only been shown in our time.

The first intervals to be discovered, Condillac assumes, were those comprising the triad—that is, the intervals given by the *corps sonore* (e.g. C-E-G-C). Once these intervals were recognized, similar triads were then formed analogously on the *sons harmoniques* of the original fundamental, for instance G-B-D-G. Condillac concludes with the suggestion that this procedure eventually gave rise to the diatonic scale. Though his discussion breaks off at this point, its implied continuation is easy enough to see. For Diderot's "Mémoire" provides it: after the diatonic genus come the chromatic and enharmonic genera, and so on until complete harmonic progressions are reached. Like Diderot's

“Mémoire,” Condillac’s *Essai* thus posits a kind of grand isomorphism between the systematic and expository order of Rameau’s theory—reconfigured, of course, to conform more exactly to Condillac’s conception of analysis—and the historical progress of music.⁸²

Diderot’s 1749 recasting of Rameau’s theory thus draws both its form and, in part, its content from Condillac’s thought. Diderot reconstitutes the material of Rameau’s *Génération harmonique* as an exercise in Condillacian analysis and in so doing takes up and amplifies the hints that Condillac himself offered in the *Essai sur l’origine des connoissances humaines* and *Traité des systèmes*. By implication, the system that results is the true system of harmony. Diderot is not explicit on this point: the “Mémoire” contains no discussion of scientific methodology, nor are such reflections characteristic of Diderot’s early writings. (For Diderot’s thoughts on science, we must await the *Pensées sur l’interprétation de la nature* [1753-54]). Still, the general inference seems safe enough: Diderot begins by analyzing a single tone into its constituent parts and then proceeds to show how these parts can be recombined and transformed to provide all the structures that Rameau’s theory describes. The complex resonance of the *corps sonore*—a well-attested fact—is the system’s principle; all the system’s remaining parts follow from it; and that, though Diderot does not use the term explicitly, is what a *vrai système* is. To confirm that verdict, however, we must turn to another text that, though not written by Diderot himself, undoubtedly reflects his public position. This text is the *Discours préliminaire* that d’Alembert wrote for the *Encyclopédie*.

1.4. Rameau and d’Alembert

D’Alembert first encountered Rameau’s system in 1749. As was its custom, the Académie des Sciences struck a committee to review the *mémoire* that Rameau had presented. D’Alembert, as its chair, was entrusted with summarizing and evaluating Rameau’s presentation. The document that he produced, and which Rameau subsequently had printed and distributed with his *Démonstration du principe de l’harmonie*, constitutes the Académie’s official response to Rameau’s *mémoire*.

⁸² See below, pp. 155-56.

The verdict is a warm one. Rameau's system, d'Alembert concludes after a brief but conscientious survey of its contours, offers the most compelling, and most scientific, account of harmony available:

Nous croyons pouvoir en conclure que la *Basse fondamentale* trouvée par l'Auteur, & puisée dans la nature même, est le principe de l'harmonie & de la mélodie; que M. RAMEAU explique avec succès, par le moyen de ce principe, les différens faits dont nous avons parlé, & que personne, avant lui, n'avoit réduit en un Système aussi lié, & aussi étendu . . . Ainsi l'harmonie assujétie communément à des loix assez arbitraires, ou suggérées par une expérience aveugle, est devenue, par le travail de M. RAMEAU, une Science plus géométrique, & à laquelle les Principes Mathématiques peuvent s'appliquer avec une utilité plus réelle & plus sensible, qu'ils ne l'ont été jusqu'ici. (CTW, III, 244-46)

We believe that we may conclude from this survey that the fundamental bass discovered by the author, and derived from nature itself, is the principle of harmony and melody; that M. Rameau successfully explains, by means of this principle, the various facts of which we have spoken, and which no one before him has reduced to so integrated and extensive a system . . . Thus harmony, commonly subjected to laws that are highly arbitrary, or suggested by blind experience, has become, thanks to the work of M. Rameau, a more geometrical science, and one to which mathematical principles can be applied with a more real and noticeable utility than they could before.

Two years later, d'Alembert reiterated that verdict in the *Discours préliminaire* (1751) to the *Encyclopédie*:

M. Rameau, en poussant la pratique de son Art à un si haut degré de perfection, est devenu tout ensemble le modele & l'objet de la jalousie d'un grand nombre d'Artistes, qui le décrient en s'efforçant de l'imiter. Mais ce qui le distingue plus particulièrement, c'est d'avoir réfléchi avec beaucoup de succès sur la théorie de ce même Art; d'avoir su trouver dans la Basse fondamentale le principe de l'harmonie & de la mélodie; d'avoir réduit par ce moyen à des lois plus certaines & plus simples, une science livrée avant lui à des regles arbitraires, ou dictées par une expérience aveugle. (I:xxxii)

M. Rameau, in raising the practice of his art to so high a degree of perfection, has at the same time become the model and object of the jealousy of a great number of artists, who denounce him while striving to imitate him. But what distinguishes him more particularly is his having reflected with great success on the theory of this same art, his having seen how to discover in the fundamental bass the principle of harmony and of melody, and his having in this way reduced a science delivered before him to arbitrary rules dictated by blind experience to simpler and more certain laws.

Neither passage, however, gives much insight into what d'Alembert means by "une science plus géométrique," and so to elucidate that conception, we must look more generally at the *Discours préliminaire*.

The *Discours* begins with a sketch of “la généologie & la filiation de nos connoissances,” which includes the following manifesto on the physical sciences:

Ce n'est . . . point par des hypothèses vagues & arbitraires que nous pouvons espérer de connoître la Nature; c'est par l'étude réfléchie des phénomènes, par la comparaison que nous ferons des uns avec les autres, par l'art de réduire, autant qu'il sera possible, un grand nombre de phénomènes à un seul qui puisse en être regardé comme le principe. En effet, plus on diminue le nombre des principes d'une science, plus on leur donne d'étendue; puisque l'objet d'une science étant nécessairement déterminé, les principes appliqués à cet objet seront d'autant plus féconds qu'ils seront en plus petit nombre. Cette réduction, qui les rend d'ailleurs plus faciles à saisir, constitue le véritable esprit systématique qu'il faut bien se garder de prendre pour l'esprit de système, avec lequel il ne se rencontre pas toujours. (I:vi)

It is . . . not through vague and arbitrary hypotheses that we can hope to know nature; it is by the reflective study of phenomena, by the comparisons that we make between them, by the art of reducing, insofar as possible, a great number of phenomena to a single one that can be regarded as the principle. The more we reduce the number of principles in a science, the greater scope we give to each, since the object of a science is necessarily determinate and the principles applied to that object will therefore be more fecund as they are few in number. This reduction, which also makes them easier to grasp, constitutes the true systematic spirit and should not be confused with the *esprit de système*, with which it does not always coincide.

Though not couched in exactly Condillac's terms, the methodological ideal that d'Alembert here espouses is obviously indebted to the *Traité des systèmes*. Like Condillac, d'Alembert holds that the physical sciences must set out from the careful observation of natural phenomena. In the course of that observation, he suggests, certain phenomena will emerge as prior to, and explanatory of, the others. These phenomena—the system's principles—should moreover be as few as possible. Clearly, the basic elements of Condillac's *vrai système* are present, though the term itself is not. Lest we miss the connection, d'Alembert makes it more explicit in the *Discours*' second part:

[L]e goût des systèmes, plus propre à flatter l'imagination qu'à éclairer la raison, est aujourd'hui presque absolument banni des bons Ouvrages. Un de nos meilleurs Philosophes semble lui avoir porté les dernier coups.⁸³ (I:xxx)

The taste for systems, better suited to flatter imagination than to enlighten reason, is today almost entirely banished from our better writings. One of our best philosophers seems to have given it a final blow.

⁸³ That the *philosophe* is Condillac (should there be any doubt) is confirmed in d'Alembert's note: “M. l'Abbé de Condillac, de l'Académie royale des Sciences de Prusse, dans son *Traité des Systèmes*.”

D'Alembert also takes the opportunity to reiterate his endorsement of Condillac's scientific methodology:

La Physique est . . . uniquement bornée aux observations & aux calculs; la Medecine à l'histoire du corps humain, de ses maladies, & de leurs remedes; l'Histoire Naturelle à la description détaillée des végétaux, des animaux, & des minéraux; la Chimie à la composition & à la décomposition expérimentale des corps: en un mot, toutes les Sciences [sont] renfermées dans les faits autant qu'il leur est possible, & dans les conséquences qu'on en peut déduire[.] (I:xxx)

Physics is uniquely confined to observation and calculation; medicine to the history of the human body, its maladies, and their remedies; natural history to the detailed description of vegetables, animals and minerals; chemistry to the composition and decomposition of bodies in experiments: in a word, all the sciences are confined to facts in so far as possible, and to the consequences that can be deduced therefrom.

For d'Alembert as for Condillac, science thus seems to be a kind of systematic taxonomy based on the diligent observation of nature.

Undoubtedly, this is a strange position for a mathematician with a penchant for towering abstraction to espouse. And in fact, d'Alembert soon adds an important proviso. There are, he clarifies, two branches of physics—experimental physics and the “physico-mathematical” sciences—and it is to the former, not the latter, that Condillac's methodological ideal rigorously applies:

Tel est le plan que nous devons suivre dans cette vaste partie de la Physique, appelée Physique générale & expérimentale. Elle differe des Sciences Physico-Mathématiques, en ce qu'elle n'est proprement qu'un recueil raisonné d'expériences & d'observations; au lieu que celles-ci par l'application des calculs mathématiques à l'expérience, déduisent quelquefois d'une seule & unique observation un grand nombre de conséquences qui tiennent de bien près par leur certitude aux vérités géométriques. Ainsi une seule expérience sur la réflexion de la lumiere donne toute la Catoptrique, ou science des propriétés des Miroirs; une seule sur la réfraction de la lumiere produit l'explication mathématique de l'Arc-en-ciel, la théorie des couleurs & toute la Dioptrique, ou science des Verres concaves

Such is the plan that we must follow in that vast part of physics called general and experimental physics. It differs from the physico-mathematical sciences, in that it is properly nothing but a ordered collection of experiments and observations; whereas the latter sometimes deduce, by the application of mathematical calculation to experience, a great number of consequences from a single and unique observation, consequences that are nearly as certain as geometric truths. Thus a single experiment on the reflection of light gives all of Catoptics, or the science of the properties of mirrors; one on the refraction of light offers the mathematical explanation of the rainbow, the theory of colours and the whole of Dioptrics, or the science of convex and concave lenses; from a single observation on the weight of

& convexes; d'une seule observation sur la pression des fluides, on tire toutes les lois de l'équilibre & du mouvement de ces corps; enfin une expérience unique sur l'accélération des corps qui tombent, fait découvrir les lois de leur chute sur des plans inclinés, & celles du mouvement des pendules. (I:vii)

fluids, all the laws of equilibrium and movement are derived; finally a single experiment on the acceleration of falling bodies allows the laws of their descent down incline planes and those of the motion of pendula to be discovered.

Thus:

[L]a seule vraie maniere de philosopher en Physique, consiste, ou dans l'application de l'analyse mathématique aux expériences, ou dans l'observation seule, éclairée par l'esprit de méthode, aidée quelquefois par des conjectures lorsqu'elles peuvent fournir des vûes, mais sévèrement dégagée de toute hypothèse arbitraire. (I:vii)

The only correct manner of philosophizing in physics consists either in the application of mathematical analysis to experiences, or in observation alone, enlightened by the spirit of method and aided every now and then by conjectures when they can offer insight, but strictly disengaged from all arbitrary hypotheses.

Condillac's account of true systems in physics, then, applies only to *la physique générale et expérimentale*, a designation that embraces such disciplines as medicine, chemistry and natural history. These sciences do indeed offer systematic catalogues of observation and experiment organized in such a way that the more complex phenomena follow upon the simpler. In the physico-mathematical sciences, however—which correspond more closely to what we now think of as physics—a single empirical starting point leads to the elaboration of a body of essentially mathematical theory.⁸⁴

Into which of these two classes—physics or physico-mathematics—does Rameau's science of harmony fall? D'Alembert frankly waffles.⁸⁵ The terms of his 1749 endorsement of Rameau's system are largely non-committal; so too are the *Discours préliminaire* and the first edition of the *Elémens de musique*.⁸⁶ At points in his later writings, d'Alembert clearly presents the theory of harmony as a physico-mathematical

⁸⁴ D'Alembert here picks up on the problem discussed in n. 50 and n. 66 above (see pp. 50-51, 57-58).

⁸⁵ Christensen lays out one side of the case "Music Theory as Scientific Propaganda." In Christensen's view, d'Alembert saw in Rameau's system an elementary instantiation of his own scientific methodology. By implication, then, the theory of harmony belongs to physico-mathematics. Christensen does not, however, consider all of the evidence adduced in n. 87 below.

⁸⁶ The *Elémens*, d'Alembert insists in the preface to the first edition, will not deal with the "principe physique de la résonnance des corps sonores," even less with the "principe métaphysique du sentiment de l'harmonie": "Il s'agit uniquement de faire voir comment on peut déduire d'un seul principe d'expérience les lois de l'harmonie, que les Artistes n'ont trouvées, pour ainsi dire, qu'à tâtons" (*Elémens*, v-vi).

science.⁸⁷ Yet such passages notwithstanding, the weight of the evidence probably suggests that he regarded harmony as a branch of physics.⁸⁸ That conclusion, moreover, is consistent with d'Alembert's procedure in the *Elémens*, for the essential difference between physics and physico-mathematics is the pivotal role that mathematics plays in the latter, and Rameau's mathematics, such as it is, is precisely what d'Alembert suppresses in the *Elémens*. Whatever conclusion one draws, however, it is clear that d'Alembert, like Diderot and Condillac himself, reads Rameau's theory through the lens of Condillac's ideas. His account of the physico-mathematical sciences is not presented as a refutation of Condillac's scientific methodology, but rather as an extension meant to accommodate his own chosen discipline. Like Diderot's and like Condillac's, d'Alembert's initial interest in Rameau's theory stemmed from its perceived congruence with Condillac's account of scientific method.

Conclusion

In their earliest engagements with Rameau's ideas, Diderot, d'Alembert and Condillac presented Rameau's system of harmony in terms borrowed both from Condillac's psychological and epistemological theory, as outlined in the *Essai sur l'origine des connoissances humaines*, and his scientific methodology, outlined in the *Traité des systèmes*. The three *philosophes'* interest in Rameau's theory, I would suggest, stems largely from its amenability to such reinterpretation. There are, of course, nuances. In the 1749 "Mémoire," Diderot concentrates on the psychological side. In particular, he presents Rameau's theory as an exercise in Condillacian analysis analogous

⁸⁷ Consider, for instance, the following remark from the *Discours préliminaire* to the second edition of d'Alembert's *Elémens*: "Dans les sciences qu'on appelle *Physico-mathématiques* (& la science des sons peut être mise de ce nombre); il en est qui ne dependent que d'une seule expérience, d'un seul principe; il en est qui en supposent nécessairement plusieurs, dont la combinaison est indispensable pour former un système exact & complet; & la Musique est peut-être dans ce dernier cas" (CTW, VI, 468). Likewise, in the *Essai sur les élémens de philosophie*, d'Alembert treats the theory of harmony in conjunction with its "analogue," optics. Since the latter, according to the *Discours préliminaire* of the *Encyclopédie* (I:vii), is a physico-mathematical science, so too, presumably, is the former. See also d'Alembert's *Encyclopédie* article PHYSICO-MATHÉMATIQUES.

⁸⁸ That, at least, is the conclusion implied in d'Alembert's last essay on the topic, the "Réflexions sur la théorie de la musique" read before the Académie des Sciences in May 1777. There, significantly, d'Alembert draws a passing parallel between the theory of harmony and botany (clearly a branch of physics, not physico-mathematics) and concludes: "L'imperfection de toutes les theories musicales vient de la même cause que la futilité de presque tous les systèmes physiques" (*Oeuvres et correspondences inédites de d'Alembert*, ed. Charles Henry [Slatkine, 1967], 140).

in its method both of discovery and mode of exposition to the psychological theory of Condillac's *Essai*. D'Alembert focuses instead, in the *Discours préliminaire* to the *Encyclopédie*, on the scientific methodology presented in the *Traité des systèmes* and implicitly presents Rameau's system as an instance of its application. Neither editor's version of Condillac, it must be admitted, is entirely orthodox. Both men were original thinkers, not mere exegetes, and they adapted Condillac's ideas to the contours of their own thought. D'Alembert, in particular, introduces a distinction between the physical and physico-mathematical sciences that is obviously designed to make room in Condillac's schema for the program of rational mechanics instantiated in d'Alembert's own scientific practice. These nuances aside, however, it remains true that both Diderot's and d'Alembert's reception of Rameau was richly coloured by Condillac's ideas. Condillac's writings offered the lens through which both men read Rameau. Their initial enthusiasm for the composer's system—an enthusiasm that manifests itself most clearly in the place accorded to Rameau's ideas in the *Encyclopédie*—becomes intelligible when their more general engagement with Condillac's scientific methodology is appreciated. In the late 1740s and early 1750s, both Diderot and d'Alembert thought, that Rameau had discovered the *vrai système de l'harmonie*, and that conviction forms the backdrop against which Rousseau's *Encyclopédie* articles demand to be approached.

Chapter Two: Rameau and Rousseau to 1749

Rousseau and Diderot were on close terms throughout the 1740s. The two men were introduced by Daniel Roguin shortly after Rousseau's arrival in Paris in 1741, and they renewed their friendship after Rousseau's return from Venice in November 1744.¹ Rousseau later claimed Durrand agreed to publish Condillac's *Essai sur l'origine des connoissances humaines* thanks to his intercession with Diderot (OC, I, 347). True or not, the negotiations around the *Essai*'s publication soon brought Diderot into contact with Condillac, and by the later 1740s, all three men were meeting each week at the Hôtel du Panier fleuri.² It was during one of these meetings that Rousseau and Diderot decided to establish a joint periodical, *Le Persifflueur*, on the model of Addison and Steele's *Spectator*, and that project led Diderot to introduce Rousseau to d'Alembert.³

If *Le Persifflueur* proved abortive, the connection to Diderot and d'Alembert was anything but:

Ces deux Auteurs venoient d'entreprendre le *Dictionnaire Encyclopédique*, que ne devait d'abord être qu'une espèce de traduction de Chambers, semblable à peu près à celle du *Dictionnaire de Medecine* de James, que Diderot venoit d'achever. Celui-ci voulut me faire entrer pour quelque chose dans cette seconde entreprise, et me proposa la partie de la musique que j'acceptai et que j'exécutai très à la hâte et très mal dans les trois mois qu'il m'avoit donnés comme à tous les Auteurs qui devoient concourir à cette entreprise[.] (OC, I, 347-348)

These two authors had just taken on the *Dictionnaire Encyclopédique*, which at first was intended to be a kind of translation of Chambers, much along the lines of the translation of James' *Dictionnaire de Medecine* that Diderot had just finished. Diderot wanted to engage me this second project, and proposed the part concerning music, which I accepted and which I executed very quickly and very badly in the three months he gave to me, as he gave to all the authors collaborating in this enterprise.

¹ See *Confessions*, OC, I, 282. On July 10, 1743, Rousseau left Paris for Venice, where he served for a year as the secretary to the French ambassador Pierre François de Montagu. Theirs was an uneasy relationship, and Rousseau left Venice on August 22, 1744.

² Rousseau probably met Condillac while in Lyons between 1740 and 1741 as the tutor to Jean-Bonnot de Mably's children (Condillac being M. de Mably's younger brother). He renewed the acquaintance when he passed through Lyons en route to Paris in the fall of 1741 (*Confessions*, OC, I, 280). The two men kept in touch in Paris: Rousseau adds later on in the *Confessions* that Condillac frequently came to dine with him while he was revising *Les Muses galantes* in 1745-46 (OC, I, 347).

³ *Confessions*, OC, I, 347. Only one issue was ever drafted, entirely by Rousseau. The manuscript is preserved at the Bibliothèque publique et universitaire de Neuchâtel and reproduced in OC, I, 1103-12.

Rousseau seems to have been Diderot's second choice. Apparently, the *Encyclopédie*'s chief editor had first tried to solicit the articles on music from Rameau.⁴ When the aging composer declined, he turned instead to Rousseau. Still, Rousseau must have seemed a good candidate in 1749. Of the men in Diderot's immediate circle, he was undoubtedly the best versed in Rameau's system, and he proved himself a capable expositor.

Rousseau first encountered Rameau's writings in the 1730s, during the period of intensive, autodidactic study that he undertook at Chambéry while lodged with his patroness Mme de Warens:

Tandis qu'on se battoit en Italie on chantoit en France. Les Opera de Rameau commençoient à faire du bruit, et relevèrent ses ouvrages theoriques que leur obscurité laissoit à la portée de peu de gens. Par hazard, j'entendis parler de son traité de l'harmonie, et je n'eus point de repos que je n'eusse acquis ce livre. Par un autre hazard, je tombai malade. La maladie étoit inflammatoire: elle fut vive et courte; mais ma convalescence fut longue, et je ne fus d'un mois en état de sortir. Durant ce tems, j'ébauchai, je devorai mon traité de l'harmonie[.]⁵ (OC, I, 184)

While they were fighting in Italy, they were singing in France. Rameau's operas were beginning to cause a stir, and so heightened the interest of his theoretical works, which were accessible to few people thanks to their obscurity. By chance, I heard his *Traité de l'harmonie* mentioned, and I did not rest until I had acquired it. By another chance, I fell ill. The illness was inflammatory: it was lively and brief, but my convalescence was long, and it was a month before I was able to go out. During that time, I took up and devoured my *Traité de l'harmonie*.

⁴ Rameau, at least, would later imply as much in his *Reponse . . . à MM. les editeurs de l'Encyclopédie sur leur dernier avertissement* of 1757: "Voilà, Messieurs, en quoi consistent, à-peu-près, les digressions qui conduisent aux vérités dont je me suis servi pour condamner les erreurs sur la Musique répandues dans votre Dictionnaire: vous auriez pû les éviter en me communiquant vos Manuscrits que je vous avois offert d'examiner, après m'être excusé de pouvoir entreprendre tout l'Ouvrage" (CTW, V, 360). He had earlier struck a similar note, writing anonymously (and therefore in the third person) in the *Suite des Erreurs sur la musique dans l'Encyclopédie* (1756): "M. Rameau, à qui j'ai communiqué ces Erreurs, & qui m'y a même aidé par ses conseils, m'a toujours recommandé d'avoir les plus grands égards pour les principaux Editeurs du Dictionnaire: ce sont des Philosophes, m'a-t-il dit, que j'estime infiniment, & que j'ose regarder comme mes amis, ayant enseigné, pendant plusieurs mois, à l'un d'eux, tout ce qu'il a désiré savoir de la Musique Théorique, lui ayant fourni des Manuscrits en grand nombre sur la Théorie & la Pratique de cet Art, & lui ayant même offert d'examiner ceux qu'on lui fourniroit d'ailleurs" (CTW, V, 330). Why Rameau declined to prepare the articles himself is a subject on which one can only speculate. A. R. Oliver assumes that Rameau was disinclined to serve as a "mere collaborator" in Diderot and d'Alembert's venture (*Encyclopaedists as Critics*, 102). Christensen suggests that Rameau may have thought (rightly) his literary abilities inadequate to the task (*Rameau and Musical Thought*, 213).

⁵ The reference to the War of the Polish Succession allows Rousseau's earliest acquaintance with Rameau's writings to be dated to approximately 1733, assuming of course that Rousseau's recollection is accurate (France and Austria went to war on October 19, 1733). If so, however, the reference to Rameau's operas (in the plural) must be a slip. Rameau's first opera, *Hyppolite et Aricie* was produced in 1733; his second, the *opéra-ballet Les Indes galantes*, was first performed in 1736.

These first exertions, however, met with little success. Rameau's *Traité*, Rousseau continues, "étoit si long, si diffus, si mal arrangé que je sentis qu'il me falloit un tems considerable pour l'étudier et le débrouiller" ("so long, so diffuse, so poorly organized that I sensed I would need a considerable time to study and disentangle it," OC, I, 184). Nonetheless, Rousseau seems to have found that time later on in his stay at Chambéry, for slightly further on in the *Confessions* (just after his abortive trip to Besançon to study with the abbé Blanchard) Rousseau remarks: "je ne laissois pas d'étudier toujours mon Rameau, et à force d'efforts je parvins enfin à l'entendre" ("I did not neglect to study my Rameau constantly, and thanks to my efforts I finally succeeded in understanding him," OC, I, 210). By the end of the fifth book, Rousseau is referring—in the plural—to the "obscurés livres de M. Rameau" (OC, I, 219).

Which of Rameau's writings Rousseau had read by that point (roughly 1735 or 1736) must unfortunately remain a matter of conjecture. Obviously, he had studied the *Traité de l'harmonie* (1722) and at least one of Rameau's other writings. In his *Dissertation sur la musique moderne* (1743), Rousseau cites both the *Traité* and the *Nouveau système* (1726) in support of the claim that the *mode mineur* "ne nous est point indiqué par la nature" ("is not indicated to us by nature," OC, V, 181).⁶ The absence of any reference to the *Génération harmonique* here (1737), where one would expect to find it, may suggest that either Rousseau had not yet read it or that he had not yet fully absorbed its contents. (By 1749, however, Rousseau had clearly filled that gap, for the *Encyclopédie* articles frequently draw on the *Génération*.) Another candidate is the *Dissertation sur les différentes méthodes d'accompagnement* (1733), on which Rousseau would later draw extensively.⁷ Given that Rousseau's early interest in Rameau's writings was largely practical—he was trying to teach himself how to compose—it is reasonable to suppose that the *Dissertation* would have attracted his attention. That work had been announced in a "Plan abrégé d'une Méthode nouvelle d'accompagnement pour le clavecin" inserted in the *Mercure de France* in March 1730, and though Rousseau would not have seen the "Plan" when it was first published, he may well have had access to

⁶ On Rousseau's *Dissertation*, see pp. 83-87 below.

⁷ Notably in the entry ACCOMPAGNEMENT, *en Musique*. See below, pp. 110-16.

back issues of the *Mercure* through M. de Conzié's library while at Chambéry.⁸ To what extent he was aware, then or later, of the polemical exchange between Rameau and an anonymous *second musicien*, usually identified as Michel-Pignolet de Montéclair, that occupied the journal's pages between 1728 and 1730 is unclear, though some of the positions that he would later take in the *Encyclopédie* are reminiscent of those advanced by Rameau's anonymous interlocutor.⁹ It is also impossible to determine what knowledge Rousseau had, in the 1730s, of the exchange between Rameau and Louis-Bertrand Castel in the *Journal des Trévoux* of 1735-1737, though again Rousseau came to know Castel personally after arriving in Paris in 1741 (OC, I, 289).

Whatever the extent of his progress in the 1730s, the decisive period in Rousseau's early reading of Rameau must surely have been his sojourn in Lyons from 1740 to 1741 as the tutor to Jean Bonnot de Mably's two sons, for it was there that Rousseau found himself in the company of musicians and men of letters interested in, and acquainted with, Rameau's ideas for the first time. By the late 1730s, Rameau's writings had attracted the attention of a number of writers affiliated with the Académie des Beaux-Arts de Lyon (Table 2.1).¹⁰ The first evidence of that interest is a *mémoire* touching on Rameau that an academician named Joanon read on June 27, 1736 (Joaanon continued his presentation on August 29). Around the same time, Jacques Mathon de la Cour addressed the Académie on the use of the harmonic proportion in Zarlino, Rameau, and others. On April 8, 1737 and March 10, 1738, he read two further texts, one on the principles of composition and the other on harmonic generation. The former is a competent, if pedestrian, summary of the basic claims of Rameau's practical theory.¹¹ The second pursues the idiosyncratic claim that all musical notes derive from a single *basse universelle*. On January 13, 1740, Louis Bollioud-Mermet read the first of his two

⁸ Marguerite Reichenburg, *Essai sur les lectures de Rousseau* (Philadelphia: n.p., 1932), 46-51.

⁹ Notably, his insistence that chords by supposition can be inverted, and his distaste for the full harmonies that resulted from Rameau's method of accompaniment.

¹⁰ See Léon Vallas, *Un Siècle de musique et de théâtre à Lyon (1688-1789)* (Lyons, 1932; reprinted Geneva: Slatkine, n.d.), 449-92.

¹¹ Mathon de la Cour runs through Rameau's basic chord types (the *accord parfait* and *accord de septième*, along with *accords par supposition* and *accords par emprunt*), considers their fundamental basses and inversions, and shows how they can be combined to form cadences (the *cadence parfaite*, *cadence irrégulière* and *cadence rompue*), and touches briefly on key (*ton*) and mode before turning to the preparation and resolution of dissonances, the prohibition of parallel fifths and octaves and some concluding remarks on modulation between keys.

mémoires on temperament, a document that provoked a furious letter from Rameau some ten months later.

Table 2.1. *Mémoires* on Harmony read at the Lyons
Académie des Beaux-Arts, 1736-1741 (after Vallas)

June 27, 1736.	Joanon, <i>Discours academique sur l'union et l'harmonie</i> (ms. 161, ff. 160-175)
July 26, 1736.	Mathon de La Cour, <i>Sur la proportion harmonique</i> (ms. 154, f. 3-6v).
August 29, 1736.	Joanon, <i>Memoire servant de Suite à la Dissertation sur l'harmonie</i> (ms. 161, f. 176-183).
April 8, 1737.	Mathon de La Cour, <i>Principes de la Composition de la musique</i> (ms. 161, f. 1-19)
March 10, 1738.	Mathon de La Cour, <i>Sur la Generation harmonique, le calcul des intervalles de la musique et la basse universelle</i> (ms. 161, f. 21-26v).
January 13, 1740.	Bollioud-Mermet, <i>Instrument pour fixer le temperament dans l'accord de l'orgue et du clavecin</i> (ms. 154, 86-87)
January 11, 1741.	Bollioud-Mermet, <i>Mémoire sur le Temperament que les voix observent dans le chant</i> (ms. 161, f. 42-47)

All of these *mémoires*, of course, were read before Rousseau's arrival in Lyons, and it is therefore debatable what knowledge he had of them.¹² Still, Rousseau undeniably moved in the relevant circles and participated in their activities to some degree. Twice each year, the Académie gave *séances publiques*, during which the *président* delivered an introductory address summarizing the Académie's activities and selected *mémoires* from the past six months were read. Three such *séances* took place while Rousseau was in Lyons: the first on May 4, 1740; second on December 7, 1740; and the last on April 19, 1741. Rousseau was demonstrably aware of the last of these, for he wrote to Mme de Warens on that date and gave the Académie's *séance* as an excuse for his neglect of one of her commissions:

Vôtre Message est venu ce Matin jour de séance publique de l'Academie des beaux Arts, ou j'avois rendévous a une conférence particulière entre quelques amis membres de cette academie qui se sont rassemblés pour examiner les mémoires qu'ils y doivent lire cet après midi. (CC, I, 128)

Your message came this morning, the day of the *séance publique* at the Académie des beaux Arts, where I attended a special meeting between several friends who are members and who assembled in order to go over the *mémoires* that they were to read there this afternoon.

¹² Certainly, he could have looked up the *mémoires* had he wanted to. It was the Académie's policy that the texts be made available upon request.

The friends that Rousseau mentions were presumably the academicians Gavinet and Soufflot who, according to the Académie's *Registres*, read *mémoires* later that afternoon (on chemistry and architecture respectively).¹³ It is not clear whether De Ruolz, then acting as president, read his address at the morning run-through, or whether Rousseau stayed to hear the public session. If Rousseau did hear it, De Ruolz's address would have drawn Rousseau's attention to Bollioud-Mermet's second *mémoire* on temperament, which was read before the Académie on January 11, 1741.¹⁴

Bollioud-Mermet's first *mémoire* had provoked a small controversy, the first part of which played out while Rousseau was in Lyons. As was its custom, the *Mercure de France* published an account of the Académie's *séance* of May 4, 1740. The account, essentially the transcript of Du Ruolz's opening address followed by short summaries of the *mémoires* read, observes that in his *mémoire* on temperament, Bollioud-Mermet "prétend que Rameau n'a rien déterminé pour en fixer la pratique" ("claims that Rameau has in no way fixed the practice [of temperament]").¹⁵ The following May, the *Mercure* published a note enjoining the Académie to publish the *mémoire* in full on behalf of "[une] Personne qui s'intéresse aux ouvrages de M. Rameau." The note ends with a scarcely veiled threat: "Ce discours est entre les mains de la même personne qui nous sollicite, et qui est résolue de la faire imprimer elle-même si la démarche que nous faisons aujourd'hui n'a pas son effet" ("This discourse is in the hands of the same person who solicits us [for its publication] and who is resolved to print it himself if the step we

¹³ The entry in the *Registres* runs as follows: "Assemblée Publique du 19^e: d'Avril 1741 | M. Pallu Directeur, M. De Ruolz, Mr L'abbé Cahier, le Chevalier Deservièrès, Gavinet, Joanon, l'abbé Dugaili, Bollioud, Alboui, de la Monce, Delorme, Le P. Béraud, le P. Tolomas, l'abbé Devalernod, Deparcieu, Soufflot, Gâcon[,] Defleurieu, Borde et Christin secrétaire. | M. Du Roulz, président en l'absence de M. Dugas, a fait l'ouverture de la Séance, par le détail des exercices de l'académie, depuis la dernière assemblée publique[.] | M. Gavinet a lu le même mémoire sur le mercure qu'il avoit donné la Séance du 18^e de May 1740. Il donne la manière la plus parfaite, pour le purifier, tant à l'égard des remèdes, qu'à l'usage qu'on en fait dans les Barmomètres; Il raporte, à cet égard, plusieurs experiences qu'il en a faites, il prouve encore l'inutilité de l'eau mercurielle. | M. Soufflot a lû le discours sur l'architecture qu'il avoit lû dans la précédente séance. Il donne un parallèle des Eglises gothiques et des modernes; Il remarque, que nous avons imité les Goths, à l'égard de la disposition. Celles des Gothes luy paroissent plus délicatement executées quoique très solidement; les nôtres sont plus régulières: mais paroissent plus lourdes. Il vient aux proportions dont il fait des parallèles" (Bibliothèque de l'Académie des Sciences, Belles-Lettres et Arts de Lyon, "Regître qui Contient le Journal des Conférences de l'Académie des Beaux Arts . . . commencé le 12 Avril 1736," p. 175).

¹⁴ *Mercure de France* (June 1741): 1183-92. The mention of Bollioud-Mermet's *mémoire* appears at pp. 1184-85.

¹⁵ *Mercure de France* (June 1740): 1555.

are taking today has no effect").¹⁶ The identity of the anonymous *personne* is unclear, though Vallas presumes him to have been Rameau.¹⁷ But the threat, in any event, had its effect, and the document was duly forwarded to the *Mercure*. Slightly later, the Académie's secretary Jean-Pierre Christin received a heated letter from Rameau, who denounced Boullioud-Mermet with his customary vigor.¹⁸

As with the earlier *mémoires*, there is no conclusive evidence that Rousseau read Boullioud-Mermet's text.¹⁹ More to the general point, it is difficult to pinpoint what influence the Académie's discussions of Rameau might have had on Rousseau: as Vallas disparagingly remarks, the majority of the *mémoires* are "d'une faiblesse extreme," the sole exception being Mathon de la Cour's "Principes de la composition."²⁰ The account of Rameau's practical theory that it offers, however, is entirely orthodox and would have given Rousseau nothing that he could not just as easily have found in the *Traité de l'harmonie*. Yet even if the current state of the evidence does not permit the extent or nature of the Lyons academicians' influence on Rousseau's musical thought to be fixed with any certainty, it is difficult to believe that, given his manifest interest in Rameau's theoretical writings and his demonstrable contacts with the Académie, Rousseau would not have taken the opportunity to discuss Rameau's ideas with men who where, if not Rameau's most accomplished exegetes, at least engaged contemporary observers.

A second, and perhaps more significant, association that Rousseau cultivated in Lyons was his friendship with the musician Jacques David. David had studied with Nicholas Bernier at Chartres from 1694 to 1698 and was briefly engaged as the music master to Phillip V of Spain (probably from 1701 to 1706) before arriving in Lyons in 1706 where he stayed with intermittent interruptions until his death.²¹ Just when David

¹⁶ *Mercure de France* (May 1741): 991.

¹⁷ Vallas, *Un siècle de musique*, 477.

¹⁸ Jean-Philippe Rameau to Jean-Pierre Christin, Secretary of the Lyons *Académie des Beaux Arts*, November 3, 1741. Bibliothèque de l'Académie des Sciences, des Belles-Lettres, et des Arts, ms. 268, vol. I, f. 159-60. A facsimile of the letter appears in Vallas, *Un siècle de Musique*, 478-80 and the letter is transcribed in CTW, VI, 186-87. On the dispute in general, see also Albert Cohen, "Rameau, Equal Temperament and the Academy of Lyon: A Controversy Revisited," in *French Musical Thought 1600-1800*, ed. Georgia Cowart (Ann Arbor: UMI, 1989), 121-27.

¹⁹ Though he did attack Rameau's account of temperament in the *Encyclopédie* and *Dictionnaire de musique*.

²⁰ Vallas, *Un siècle de musique*, 450.

²¹ Catherine Gas, *Autour de projet concernant une nouvelle notation musicale d'après Jean-Jacques Rousseau: les relations entre Jacques David et Jean-Jacques Rousseau* (Nîmes: n.p., 1989), 23-27.

and Rousseau first met is unclear, but the *Confessions* leave little doubt that the two were on close terms (OC, I, 280). David's only published work, the *Méthode nouvelle ou principes généraux pour apprendre la musique* of 1737, is a singing primer that explicitly disavows any concern with questions of harmony. In its preface, however, David claims also to be at work on a treatise on composition:

Ce Livre tend seulement à la pratique du chant qu'on appelle Mélodie, parcequ'il n'est produit que par des sons qui se succèdent les uns aux autres, au lieu que l'harmonie est composée de plusieurs sons qui se sont entendre à la fois.

Mais comme les personnes qui ont assez de pratique dans le chant, veulent connoître la composition, j'en donnerai ensuite un Traité, où je me flatte de mettre un Abregé de ce qu'en ont écrit nos plus célèbres Auteurs, en y joignant ce que l'expérience m'en a appris.²²

This book is concerned solely with the practice of singing that is called melody, which is produced by notes that succeed one another only, while harmony is composed of notes that are heard at the same time.

But since those who have acquired some ability in singing want to learn composition, I will next publish a treatise in which I intend to give an abridgement of what our most celebrated authors have written on the topic together with what I have learned from experience.

The promise to recount "ce qu'en ont écrit nos plus célèbres Auteurs" is particularly tantalizing, for it is hard to imagine that Rameau would not have figured in their number. Unfortunately, this second treatise seems never to have been published, and the only two extant manuscripts of David's are unrelated.²³ If David was indeed at work on a treatise on harmony during the year that Rousseau spent in Lyons—and a treatise touching on Rameau's ideas in particular—its effect on Rousseau's assimilation of Rameau's writings would surely have been considerable. Barring further evidence, however, the nature, scope, and indeed reality of that influence must remain a matter of speculation.²⁴

Rousseau was unhappy in Lyons, and in April of 1741 he returned to Chambéry and Mme de Warens. His stay there was brief, however, for he had decided to seek his fortune in Paris. He arrived in the capital late in the summer of 1741, or perhaps early in

²² Jacques David, *Méthode nouvelle ou principes généraux pour apprendre la musique* (Lyons: Boivin, 1737), 8.

²³ The first is the autograph of the *Méthode nouvelle*, the second an earlier work covering much the same ground entitled "Livres des Principes de la Musique" and dated, on its title page, 19 August 1717. Both manuscripts are in the Bibliothèque municipale de Lyon, as ms. 379.163 and ms. 133.645 respectively.

²⁴ Rousseau does say in the *Confessions*, however, that he did not neglect the study of music and music theory while in Lyons: "Je n'avois pas abandonné la musique en cessant de l'enseigner. Au contraire j'en avois assez étudié la théorie pour pouvoir me regarder au moins comme savant en cette partie" (OC, I, 271).

the fall, armed with letters of introduction, his comedy *Narcisse*, and the new system of musical notation that he had devised while in Lyons (OC, I, 282-83). Thanks to the intervention of René-Antoine de Réaumur, he was allowed to present the last to the Académie des Sciences on August 22, 1742. The system, however, was not especially well received, and the Académie's report concluded that Rousseau's proposal was neither new nor useful. Disappointed in his hopes for the Académie's endorsement, Rousseau decided to appeal directly to the public by recasting his presentation and publishing it as the *Dissertation sur la musique moderne* (1743).

The *Dissertation* is of interest here for the unique window it opens on Rousseau's earliest responses to Rameau's writings. Though the text touches only tangentially on Rameau's system, it nonetheless offers some intriguing anticipations of criticisms that Rousseau would later develop in the *Dictionnaire de musique*. After a short preamble on the history of notation, Rousseau introduces his new system by way of a discussion of harmonic generation:

[L]'expérience m'apprend qu'un certain son auquel on a donné le nom d'*ut*, rendu par un tuyau long de seize pieds ouvert, fait entendre assez distinctement, outre le son principal, deux autres sons plus foibles, l'un à la tierce majeure, et l'autre à la quinte, auxquels on a donné les noms de *mi* et de *sol*. (OC, V, 177)

Experience teaches me that when a certain pitch, to which we have given the name "C," is sounded on an open, sixteen-foot pipe, two other, weaker pitches, to which we have given the names "E" and "G," will be heard distinctly and in addition to the principal pitch, the one a major third above, and the other a fifth.

A footnote clarifies that the pitches in question are actually the twelfth and major seventeenth above the fundamental, and are reduced to the fifth and major third by the assumption of octave equivalence.²⁵

[C]herchant un tuyau à la quinte du premier qui rende le même son que je viens d'appeler *sol* ou son octave, j'en trouve un de dix pieds huit pouces de longueur, lequel outre le son principal *sol*, en rend aussi deux autres, mais plus foiblement; je les appelle *si* et *re*, et je trouve qu'ils sont précisément en même rapport avec le *sol* que

Searching for a pipe that sounds either the fifth, which I have just called "G," or its octave above the first, I find one ten feet, eight inches in length that, in addition to its principal sound G, also gives two others, though more weakly; I call them "B" and "D," and I find that they are in precisely the same relationship to G that G and E are to

²⁵ The note, cued to the word "quinte" reads: "C'est-à-dire, à la douzième, qui est replique de la quinte, et à la dix-septième, qui est la duplique de la tierce majeure. L'octave, et même plusieurs octaves s'entendent aussi assez distinctement, et s'entendroient bien mieux encore si l'oreille ne les confondoit quelquefois avec le son principal."

le *sol* et le *mi* l'étoient avec l'*ut*[.] (OC, V, C. 177)

Rameau is not named as yet, but Rousseau's procedure is clearly indebted to the third chapter of the *Nouveau système*, in which Rameau builds triads above successive roots that stand a fifth apart. After forming triads on C and G, Rousseau continues to the next obvious step:

Cherchant un troisième tuyau à l'unisson de la quinte *re*, je trouve qu'il rend encore deux autres sons outre le son principale *re*, et toujours en même proportion que les précédens; je les appelle *fa* [!] et *la*, et je les écris encore à la suite des précédens. (OC, V, 177)

After searching for a third pipe at the unison with the fifth D, I discover once again that this pipe sounds two pitches in addition to its principal sound D, and again in the same proportion as before; I call them "F" [!] and "A," and I write them down beside the others.

With this last step, Rousseau tries to wish away an obvious problem: namely that the third above D should be major, not minor (i.e. F#, not F♭). That he is aware of the difficulty is clear from the footnote he joins to the passage:

Le *fa* qui fait la tierce majeure du *re* se trouve, par conséquent, dièse dans cette progression, et il faut avouer qu'il n'est pas aisé de développer l'origine du *fa* naturel considéré comme quatrième note du ton: mais il y auroit là-dessus des observations à faire qui nous mèneraient loin et qui ne seroient pas propres à cet ouvrage. (OC, V, 177)

The F that forms the major third above D must, therefore, be sharpened in this progression, and it must be admitted that it is not easy to discover the origin of F♭ considered as the fourth note of the key: but the observations that are to be made about this would take us far beyond what is proper to this work.

Without treating it explicitly, Rousseau touches here on the problem of the subdominant, one of the difficulties in Rameau's system that he will probe at length in the *Dictionnaire*.²⁶

Since Rousseau now has all the pitches of the diatonic scale (leaving aside, for a moment, his clumsy slight-of-hand regarding the subdominant), he breaks off after the procedure's third iteration:

En continuant de même sur le *la*, je trouverois encore deux autres sons: mais comme j'apperois que la quinte est ce même *mi* qui a fait la tierce du premier son

Continuing in the same way from A, I would again find two additional pitches, but as I perceive that the fifth is the same E that forms the third above the first pitch C,

²⁶ See below, pp. 204-206.

ut, je m'arrête-là, et j'ai les sept noms
suivans, répondans au premier son *ut* et aux
six autres qui j'ai trouvés de deux en
deux.²⁷

(OC, V, 177)

I stop there, and I have the seven names
that follow, corresponding to the first
sound C and to the six others that I have
found two by two.

Continuing around the complete circle of fifths (again assuming some form of temperament) will of course produce the entire chromatic scale, as Rousseau shows slightly further on (OC, V, 179). As he makes clear, the choice of the frequency assigned to the starting pitch is arbitrary, but however that frequency is chosen, the procedure will produce a system of twelve tones standing a semitone apart. Each of these tones can be taken as a tonic, and so there are twelve major keys. There are also twelve minor keys, but these, unlike their corresponding majors, are not indicated by nature:

À l'égard du mode mineur, il ne nous est
point indiqué par la nature, et comme nous
ne trouvons aucun son qui en fasse
entendre les harmoniques nous pouvons
concevoir qu'il n'a point de son
fondamental absolu, et qu'il ne peut exister
qu'en vertu du rapport qu'il a avec le mode
majeur dont il est engendré, comme il est
aisé de faire voir. (OC, V, 181)

With respect to the minor mode, it is not in
any way indicated by nature, and as we do
not find any sound that would make its
harmonics heard [i.e. the overtones that
correspond to the notes comprising its tonic
triad] we can conclude that it has no
absolute fundamental, and that it exists
only in virtue of its relationship to the
major mode that generates it, as can easily
be shown.

With that, of course, Rousseau touches upon a second difficulty that Rameau notoriously struggles with, namely the problem of generating a minor third above the tonic.²⁸

The remainder of the *Dissertation* is concerned with the details of Rousseau's notational system and has no immediate bearing on Rameau's theory of harmony. Before leaving the *Dissertation*, however, one final detail deserves mention. At two points in the

²⁷ Here again, Rousseau smooths over an implicit problem: the E found by tuning a major third above C (4:5) and the E found by tuning successive fifths above C (64:81) differ by a syntonic comma (80:81). In this case, however, the feign is justifiable since Rousseau has earlier stipulated that he is assuming the tempered intervals used in musical practice: "D'abord, comme nous ne travaillons que pour la pratique, dans la recherche des sons nous ne parlerons que de ceux qui composent le système tempéré tel qu'il est universellement adopté, comptant pour rien ceux qui n'entrent point dans la pratique de notre Musique, et considérant comme juste sans exception tous les accords qui résultent du temperament. On verra bientôt que cette supposition, qui est la même qu'on admet dans la Musique ordinaire, n'ôtera rien à la variété que le système tempéré introduit dans l'effet des différentes modulations" (OC, V, 176). Rousseau is presumably assuming quarter-comma mean-tone tuning.

²⁸ See pp. 197-203 below.

text, Rousseau claims to be at work on a more extended treatise on *accompagnement* (i.e. continuo playing). The first reference comes at the end of the preface:

J'attendrai l'approbation du Public pour en donner un autre qui contiendra les principes absolus de ma méthode, tels qu'ils doivent être enseignés aux Ecoliers. J'y traiterai d'une nouvelle manière de chiffrer l'accompagnement de l'Orgue et du Clavecin entièrement différente de tout ce qui a paru jusqu'ici dans ce genre, et telle qu'avec quatre signes seulement je chiffre toute sortes de Basses continues, de manière à rendre la modulation et la Basse-fondamentale toujours parfaitement connues de l'Accompagnateur, sans qu'il lui soit possible de s'y tromper. (OC, V, 164-65)

I will await the public's approval issuing another [work] containing the absolute principles of my method such as they must be taught to students. There, I will present a manner of figuring the bass for accompanying at the organ or harpsichord that is entirely different from everything of that kind that has appeared up to now and by means of which I can figure all kinds of bass lines with only four signs in such a way that the harmonic progression and the fundamental bass are always so perfectly clear to the accompanist that it will be impossible for him to err.

Though Rousseau returns to the same theme at the end of the *Dissertation*, no other trace of the projected treatise has come down to us.²⁹

Perhaps the most significant effect of Rousseau's 1742 presentation to the Académie lies in its having precipitated his first direct encounter with Rameau. The circumstances of the meeting are obscure, and the only record of it comes from the *Confessions*. It seems, from Rousseau's account, that Rousseau had sought Rameau out in order to have his opinion on the notation system advanced in the *Projet*, and Rameau responded with genial but accurate criticisms whose force Rousseau himself was compelled to acknowledge.³⁰ If this first encounter was relatively amiable, Rousseau's next meeting with the composer was anything but. While in Venice as the secretary to the French ambassador Pierre François de Montaigne between 1743 and 1744, Rousseau

²⁹ The text of the second passage is as follows: "Je renvoie à l'ouvrage dont j'ai déjà parlé, bien des détails que je n'ai pu placer dans celui-ci. On y trouvera, outre la nouvelle méthode d'accompagnement dont j'ai parlé dans la Préface, un moyen de reconnoître au premier coup d'oeil les longues tirades de notes en montant ou en descendant afin de n'avoir besoin de faire attention qu'à la première et à la dernière; l'expression de certaines mesures syncopées qui se trouvent quelquefois dans les mouvemens vifs à trois tems; une table de tous les mots propres à exprimer les différens degres du mouvement; le moyen de trouver d'abord la plus haute et la plus basse note d'un air et de préluder en consequence; enfin, d'autres règles particulières qui toutes ne sont toujours que des développemens des principes que j'ai proposés ici; et sur-tout, un système de conduite pour les Maîtres qui enseigneront à chanter et à jouer des instrumens, bien différent dans la méthode, et j'espère dans le progrès, de celui dont on se sert aujourd'hui" (OC, V, 232).

³⁰ Rousseau's account is at *Confessions*, OC, I, 285-86.

had begun work on an *opéra-ballet* entitled *Les Muses galantes*. Upon his return, he took up his opera again and completed it. His efforts to have it performed led to a famous debacle at the home of M. de la Pouplinière, which Rousseau later narrated in one of the *Confessions*' more memorable set-pieces:

Mon Opéra fait, il s'agit d'en tirer parti: c'étoit un autre Opera bien plus difficile. On ne vient à bout de rien à Paris quand on y vit isolé. Je pensai à me faire jour par M. de la Poplinière chez qui Gauffecourt de retour de Genève m'avoit introduit. M. de la Poplinière étoit le Mecene de Rameau: Mad^e de la Poplinière étoit sa très humble écôlière. Rameau faisoit, comme on dit, la pluie et le beau tems dans cette maison. Jugeant qu'il protegeroit avec plaisir l'ouvrage d'un de ses disciples, je voulus lui montrer le mien. Il refusa de la voir, disant qu'il ne pouvoit lire des partitions, et que cela le fatiguoit trop. La Poplinière dit là-dessus qu'on pouvoit le lui faire entendre, et m'offrit de rassembler des musiciens pour en executer des morceaux: je ne demandois pas de mieux. Rameau consentit en grommelant, et répétant sans cesse que ce devoit être une belle chose que la composition d'un homme qui n'étoit pas enfant de la balle, et qui avoit appris la musique tout seul. Je me hâtai de tirer en parties cinq ou six morceaux choisis. On me donna une dizaine de symphonistes, et pour Chanteurs Albert, Berard, et M^{lle} Bourbonnois. Rameau commença dès l'ouverture à faire entendre par ses éloges outrés qu'elle ne pouvoit être de moi. Il ne laissa passer aucun morceau sans donner des signes d'impatience: mais à un air de Haute-contre dont le chant étoit male et sonore et l'accompagnement très brillant, il ne put plus se contenir. Il m'apostropha avec une brutalité qui scandalisa tout le monde, soutenant qu'une partie de ce qu'il venoit d'entendre étoit d'un homme consommé dans l'art et le reste d'un

Once my work was finished, it was time to turn it to advantage: this was another work entirely and one more difficult than the first. No one achieves anything in Paris alone. I thought to escape my isolation through M. de la Pouplinière to whom Gauffecourt, just back from Geneva, had introduced me. M. de la Pouplinière was Rameau's patron, and Mme de la Pouplinière was his humble student. Rameau caused, as they say, the sun and the rain in that house. Judging that he would be happy to defend the work of one of his disciples, I wanted to show him mine. He refused to see it, saying that he could not read scores and that it tired him to do so. La Pouplinière responded by saying that it could be played for him and offered to assemble musicians to play some extracts. I asked for nothing better. Rameau consented, grumbling, and repeating endlessly that work of a man who was not exactly young and who had learned composition by teaching himself must be a fine thing indeed. I hastened to choose five or six pieces. They gave me ten musicians, and Albert, Berard and Mlle Bourbonnois for singers. Already in the overture, Rameau began to make it understood by his exaggerated praises that the pieces could not have been by me. He let no piece go by without giving signs of impatience, but in a high-tenor air in which the vocal line was manly and sonorous and the accompaniment brilliant, he could no longer contain himself. He addressed me with a brutality that scandalized everyone, claiming that one part of what he had just heard was the work of a consummate

ignorant qui ne savoit pas même la musique . . . Rameau prétendit ne voir en moi qu'un petit pillard sans talent et sans gout.³¹ (OC, I, 333-334)

master and the rest of an ignoramus who knew nothing of music . . . Rameau claimed to see nothing in me but a little plagiarist lacking both talent and taste.

Rousseau never forgave the insult, and his keen sense of humiliation no doubt accounts for the animus that sometimes creeps into his later writing on Rameau. The disaster, however, was not total, for the duc de Richelieu heard about the work—and, no doubt, its colourful debut—and arranged to have it performed in full at the house of M. de Bonneval, then the *intendant des menus* for the King's court at Versailles. Nothing came of that performance, nor of Rousseau's subsequent attempt to have *Les Muses galantes* performed at the Opéra, but the Duc de Richelieu soon found another way to help Rousseau. In 1745, the French army won a sensational victory at Fontenoy, and as a result was able to occupy most of Flanders. The triumph was celebrated later by a variety of festivities, which included a revival of Voltaire and Rameau's *La Princesse de Navarre* under the new title *Les Fêtes de Ramire*. When Voltaire and Rameau declined to make the relevant revisions themselves, the task of doing so fell to Rousseau, thanks primarily to Richelieu's intervention. Rousseau sought Voltaire's authorization for the changes he made to the text, but dispensed with consulting Rameau. The revisions to the score were completed quickly, but the work was delayed in rehearsal when Mme de la Pouplinière raised objections to Rousseau's setting. Rousseau was instructed to seek Rameau's advice, with results that can be imagined. In the end, Rousseau's name was left off the programme, and he received none of the money that he had been promised for his work.

By the time he set to work on his articles, Rousseau was therefore armed both with deep resentment and an intimate understanding of Rameau's system. It was in virtue of that understanding, no doubt, that Diderot turned to Rousseau when Rameau rebuffed his overtures—that and the fact that Diderot wanted to involve his friend in the enterprise for personal reasons. There is, in other words, no compelling reason to dispute Rousseau's own account of how he came to write for the *Encyclopédie*. Rousseau and

³¹ As Rousseau reveals in the *Confessions* (OC, I, 333), Philidor had at least a small hand in the orchestration. The degree of his involvement is impossible to determine, however, since the score does not survive.

Diderot had been friends for nearly a decade. Diderot wanted Rousseau to participate in the *Encyclopédie* as a result, and the subject of music, given Rousseau's interests and abilities, was an obvious choice. By 1749, Rousseau had been studying Rameau's writings for some fifteen years. He had read all the major treatises that were then available, and, as the finished articles amply testify, he understood what he had read and could summarize it clearly and succinctly. One final consideration may have tipped the balance in Rousseau's favour. As we saw just above, Rousseau claimed, in the *Dissertation sur la musique moderne*, to be at work on a treatise on accompaniment and harmony. If indeed Rousseau was writing such a work, Diderot would undoubtedly have known of it, and the treatise in progress would have provided a wealth of pre-existent material that could be quickly adapted for the *Encyclopédie*.³²

Whether or not Rousseau had a working manuscript on which to draw, however, it is clear that the *Encyclopédie* articles distill many years of preparatory reading and study. Rousseau drew extensively on Rameau's major published writings: the *Traité de l'harmonie*, the *Nouveau système* and the *Dissertation sur les différens méthodes d'accompagnement*. He also seems to have had access to Rameau's manuscript treatise, the "Art de la basse fondamentale," a copy of which is preserved amongst Rousseau's papers in Geneva.³³ He drew, in addition, on the summary of *ramiste* theory that Charles-Henri de Blainville offered in his *Harmonie-théorico pratique* (1746). To a lesser degree, and where relevant, he made use of Joseph Sauveur's *Système général des sons* (1701), Jean-Jacques Dortous de Mairan's "Discours sur la propagation du son" (1737), and Diderot's *Principes généraux d'acoustique* (1748). Finally, his conception of *ramiste* theory was crucially influenced, as we will see in the following chapter, by Condillac's comments on Rameau in the *Essai sur l'origine des connoissances humaines* (1746) and by Diderot's presentation of *ramiste* theory in the *mémoire* that he wrote for Rameau to read before the Académie des Sciences in 1749. The use that Rousseau made of these sources is the subject of the following chapter.

³² The suggestion is Claude Dauphin's (personal communication).

³³ See below, p. 118n45.

Chapter Three:
The *Encyclopédie* Articles of 1749

“Un travail extraordinaire qui m’est survenu et une très mauvaise santé pour le supporter, m’ont empêché, Ma très bonne Maman, de remplir mes devoirs envers vous depuis un mois; Je me suis chargé de quelques Articles pour le grand Dictionnaire des Arts et des Sciences qu’on va mettre sous presse” (“An extraordinary commission that has fallen to me, and a very poor health in which to fulfill it, have prevented me, my dear Maman, from fulfilling my obligations to you over the past month. I have been entrusted with some articles for the great Dictionary of the Arts and Sciences that will soon be published,” CC, II, 112-13). With that, Rousseau announced his part in the *Encyclopédie* to Mme de Warens on January 27, 1749. The continuation of the letter conveys the urgency with which Rousseau set to work: “la besogne croit sous ma main, et il faut la rendre à jour nommé, de façon que surchargé de ce travail sans préjudice de mes occupations ordinaires, je suis contraint de prendre mon tems sur les heures de mon sommeil. Je suis sur les dents: mais j’ai promis, il faut tenir parole” (“The work expands as I write it, and it must be finished by the appointed day; to complete it without prejudice to my usual occupations, I am forced to steal time from my sleep. I’m at my wit’s end, but I’ve given my word, and the promise must be kept.”) In the end, Rousseau kept his word. Two months later, his articles were completed, copied and delivered. In all, Rousseau had written over four hundred entries in the astonishingly short span of three months.¹

The vicissitudes of the *Encyclopédie*’s publishing history would eventually make a mockery of his haste. Though its first seven volumes appeared at regular intervals throughout the 1750s, the work’s suppression in 1759 meant that the better part of Rousseau’s contribution languished in manuscript until the midpoint of the following

¹ The chronology presented here is assembled from a number of passages in Rousseau’s writings. In the letter just quoted, which is dated January 27, 1749, Rousseau says that he has been at work on his articles for a month. Diderot’s commission, then, presumably dates from either the end of 1748 or the beginning of 1749. In the preface to the *Dictionnaire de musique* (OC, V, 606) and again in the *Confessions* (OC, I, 347-48), Rousseau adds that he completed the articles in the three months that Diderot originally allotted. The articles, it follows, must have been delivered around the end of March 1749.

decade. This does not mean, however, that Rousseau's articles were not read. Diderot kept them for a year before passing them on to d'Alembert, and d'Alembert in turn may have allowed the texts to circulate in manuscript.²

The significant lag between composition and publication leads one naturally to ask whether Rousseau retouched his articles before they appeared in print. Rousseau says he did not, and on the whole there is little reason to doubt the spirit of his claim.³ Its letter, though, invites some qualification, for at least one passage from the articles cannot possibly date from 1749. The text in question, paragraphs 3-5 of the article DUO (*Musique*), cites Grimm's *Lettre sur Omphale*, which first appeared in 1752. These paragraphs, moreover, are a quotation from Rousseau's own *Lettre sur la musique française* of 1753.⁴ More conflicting evidence comes from a letter to d'Alembert dated June 26, 1751, which clearly indicates that Rousseau retouched at least some of his articles in the early 1750s (CC, III, 159). Still, what changes Rousseau made after 1749 must have been more stylistic than substantive, for the considerable evolution that his musical thought underwent in that period is simply not reflected in the pages of the *Encyclopédie*.

The letter to d'Alembert just mentioned opens a unique window on Rousseau's relationship with his editor. Rousseau writes as follows:

Je vous renvoie, Monsieur, la lettre C, que je n'ai pu relire plutôt, ayant toujours été malade. Je ne sais point comment on résiste à la manière dont vous m'avez fait l'honneur de m'écrire, et je serois bien fâché de le savoir. Ainsi j'entre dans toutes vos vues, et j'approuve les changemens que vous avez jugé à propos de faire; j'ai pourtant rétabli un ou deux morceaux que vous aviez supprimés, parce qu'en me

I am returning to you, Monsieur, the letter "C," which I could not reread sooner because of my illness. I do not know how anyone could resist the manner in which you have done me the honour of writing to me, and I would be very angry to learn it. Thus, I have adopted all your opinions, and I approve the changes that you have seen fit to make. I have, nonetheless, reestablished one or two of the passages that you

² On the first point, see Rousseau's *Dialogues*, OC, I, 680. In the preface to the *Dictionnaire de musique*, Rousseau insinuates that d'Alembert allowed his manuscripts to circulate (OC, V, 610).

³ *Dictionnaire de musique*, OC, V, 606.

⁴ Compare DUO (*Musique*), V:166-67; and *Lettre*, OC, V, 309-11. Still, as Michael O'Dea notes, the passage could well have been added by the editors, *Jean-Jacques Rousseau: Music, Illusion and Desire* (London: MacMillan, 1995), 219n28. Another passage that has troubled commentators is the final paragraph of the head-article MUSIQUE. Robert Wokler takes this paragraph to allude to d'Alembert's *Elémens de musique théorique et pratique* (1752) and so concludes that it must be a later addition, (*Society, Politics, Music and Language*, 279n117). The allusion, though, is not to d'Alembert's *Elémens*, but to Diderot's *Principes généraux d'acoustique* (1748).

réglant sur le principe que vous avez établi vous-même, il m'a semblé que ces morceaux faisoient à la chose, ne marquoient point d'humeur et ne disoient point d'injures. Cependant, je veux que vous soyez absolument le maître, et je soumetts le tout à votre équité et à vos lumières. (CC, III, 159)

suppressed, because, allowing myself to be guided by the principle that you yourself established, it seemed to me that these passages were to the point, were not marked by ill humour and said nothing injurious. Nonetheless, I want you to be entirely the master, and I submit the whole to your equitableness and your intelligence.

Rousseau's tone in these lines is in stark contrast to that of his earlier letter to Mme de Warens:

Je tiens au cu et aux chausses les gens qui m'ont fait du mal et la bile me donne des forces de même de l'esprit et de la science.

La colère suffit et vaut un
Apollon.

Je bouquine, j'apprens le Grec. Chacun a ses Armes; au lieu de faire des chansons à mes Ennemis, je leur fais des articles de Dictionnaires; je compte que l'un vaudra bien l'autre et durera plus longtemps. (CC, II, 113)

I've got all those who've wronged me by the balls, and my bile gives me strength as well as wit and knowledge.

Anger suffices; it is worth
an Apollo.

I pore through books, I'm learning Greek. To each his own weapons; instead of writing satires at my enemies, I'm writing dictionary articles against them. I trust that the one is as good as the other, and much more enduring

The enemy Rousseau had foremost in mind, as commentators have been quick to note, was surely Rameau.⁵ Rousseau had forgiven neither the insult at M. de la Pouplinière's nor the imbroglio surrounding *Les Fêtes de Ramire* (1745), and the letter gives the impression he is out to settle a score. Yet the articles he eventually published are untroubled by overt polemic. Their tone is tranquil, and Rameau is mentioned everywhere with respect. (No doubt it is for this reason that their critical import has so rarely been recognized.) It is difficult to avoid concluding that d'Alembert intervened to tone down Rousseau's original criticism of Rameau.⁶

Civility, though, is not docility. If d'Alembert moderated the vehemence of Rousseau's expression, he did not attenuate the substance of his criticism. Read carefully and in their entirety, Rousseau's *Encyclopédie* articles not only offer a lucid synopsis of

⁵ See, *inter alia*, R. A. Leigh's commentary in CC, III, 338; Jean Starobinski's in OC, clxvii-clxxi; and Michael O'Dea, "Rousseau contre Rameau: musique et nature dans les articles pour l'*Encyclopédie* et au-delà," *Recherches sur Diderot et sur l'Encyclopédie* 17 (1994): 134.

⁶ The suggestion can be found, for instance, in Michael O'Dea, *Music, Illusion and Desire*, 16, and John T. Scott, "The Harmony Between Rousseau's Musical Theory and his Philosophy," *Journal of the History of Ideas* 59 (1998): 290.

Rameau's theory, but also advance a number of trenchant criticisms. The present chapter provides an overview of Rousseau's account of *ramiste* theory in the *Encyclopédie*. Section 3.2 sketches its general outlines, in order refute the charge (first voiced by Rameau himself) that Rousseau misrepresented Rameau's ideas. Section 3.3 considers some of the ways in which Rousseau altered or extended Rameau's theory, while Sections 3.4 and 3.5 take up his explicit criticisms. Section 3.6 considers the implications that Rousseau initially drew from those criticisms. Bifurcating Rousseau's account of harmony, finally, is a distinction between harmony *selon les modernes*, to which Rameau's theory applies, and harmony *selon les anciens*, to which it does not. Accordingly, Section 3.7 takes up the account of Greek harmonic theory that Rousseau offers in the *Encyclopédie* with the aim of showing how it impinges upon his treatment of Rameau. Given the interpretive difficulties posed by the form of Rousseau's exposition, however, it is appropriate to begin with some preliminary observations on reading the *Encyclopédie*.

3.1 Reading the *Encyclopédie*

The *Encyclopédie*, as its editors conceived it, is at once an encyclopedia and a dictionary of the arts and sciences. This dual aspect is suggested already in the work's full title: *Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers*. In the *Discours préliminaire* that introduces the work's first volume, d'Alembert offers the following gloss on the title's significance:

L'Ouvrage dont nous donnons aujourd'hui le premier volume, a deux objets: comme *Encyclopédie*, il doit exposer autant qu'il est possible, l'ordre et l'enchaînement des connoissances humaines; comme *Dictionnaire raisonné des Sciences, des Arts & des Métiers*, il doit contenir sur chaque Science & sur chaque Art, soit libéral, soit mécanique, les principes généraux qui en sont la base, & les détails les plus essentiels qui en font le corps & la substance. (I:i)

The work whose first volume we are now issuing has two objects: as an encyclopedia, it must expose the order and interrelation of human knowledge in so far as it is possible to do so; as a reasoned dictionary of the arts, sciences and trades, it must contain, for each science and each art, whether liberal or mechanical, the general principles that are its basis and the most essential details that comprise its body and substance.

As a dictionary, the *Encyclopédie* is a reference work—a useful compendium of the arts and sciences, whose chief advantage lies in the ease with which it may be consulted on one question or another.⁷ But as an encyclopedia, the text must also make manifest the systematic interconnections that bind together the various disciplines of human knowledge. It must aim, that is, not only to survey the individual arts and sciences in a loose conglomeration of isolated articles but also to exhibit the entire system into which these particular disciplines fit.⁸

These two aspects harmonize uneasily. In particular, the alphabetical ordering adopted for the dictionary tends to militate against the systematic ordering that the encyclopedia, in principle, necessitates.⁹ Indeed, there is something almost intrinsically unsystematic about the former: the *ordre alphabétique* favours simple coordination over subordination, for the articles are arranged not according their place in the hierarchy of human knowledge but merely following the caprices of alphabetization.¹⁰ How, then, is the *ordre encyclopédique* to be preserved?

To do so, Diderot and d'Alembert develop a series of editorial devices. The first is the celebrated *arbre des connoissances* (or *système figuré*) that appears near the beginning of the *Encyclopédie*'s first volume (Fig. 3.1). The *arbre* groups the arts and sciences into three broad classes: history, philosophy and poetry. These three classes, which correspond to the three general faculties of the human mind (memory, reason and

⁷ “Ces sortes d’ouvrages sont faits pour être consultés sur quelque objet particulier: on y trouve plus commodément qu’ailleurs ce qu’on cherche, comme nous l’avons déjà dit, & c’est-là leur principale utilité” (d’Alembert, *DICTIONNAIRE DE SCIENCES*, IV:969).

⁸ “En effet, le but d’une *Encyclopédie* est de rassembler les connoissances éparées sur la surface de la terre; d’en exposer le système général aux hommes avec qui nous vivons, & de la transmettre aux hommes qui viendront après nous” (Diderot, *ENCYCLOPÉDIE [Philosoph.]*, V:635).

⁹ Alain Cernuschi, *Penser la musique dans l’Encyclopédie* (Paris: Champion, 2000), 23-53. The following paragraphs are considerably indebted to Cernuschi’s discussion. On the tension between the *ordre encyclopédique* and *ordre alphabétique*, see also: Sylvain Auroux, “Figures de l’*Encyclopédie*,” in *La Sémiotique des encyclopédistes* (Paris: Payot, 1979), pp. 313-25, and “Diderot encyclopédiste: le langage, le savoir et l’être du monde,” *Stanford French Review* 8 (1984): 175-88; George Benrekassa, “La pratique philosophique de Diderot dans l’article *ENCYCLOPÉDIE*,” *Stanford French Review* 8 (1984): 189-212; Jacques Proust, “Diderot et le système des connaissances humaines,” *Studies on Voltaire and the Eighteenth Century* 256 (1988): 117-27; Jean Starobinski, “L’Arbre du savoir et ses métamorphoses,” *Essais et notes sur l’Encyclopédie de Diderot et d’Alembert*, ed. Andrea Calzolari and Sylvie Delassus (Milan: F. M. Ricci, 1979), 285-308; Alain Cernuschi, “L’Arbre encyclopédique des connaissances: figures, opération, métamorphoses,” in *Tous les savoirs du monde: encyclopédies et bibliothèques de Sumar au XXI^e siècle*, ed. Roland Schaer (Paris: Bibliothèque nationale de France/Flammarion, 1996), 277-82.

¹⁰ “L’ordre alphabétique donneroit à tout moment des contrastes burlesques; un article de Théologie se trouveroit relégué tout au-travers des arts mécanique” (Diderot, *ENCYCLOPÉDIE*, V: 642).

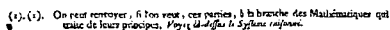
imagination), are then progressively subdivided until, at the far right of the table, the particular arts and sciences are reached. These last form the joints that link the *système figuré* to the body of the *Encyclopédie*, since each of the disciplines listed at the table's rightmost division is treated, at least in principle, in an extended article classed under the corresponding headword in the body of the text. These extended articles are the *articles généraux des sciences* that d'Alembert describes in the *Discours préliminaire* (I:xviii). The particular arts and sciences, d'Alembert remarks in a celebrated metaphor, are so many countries, each of which is surveyed in one of the *articles généraux*; the *système figuré*, in turn, is a kind of world map that shows the relative positions of the different disciplines with respect to one another and underscores their mutual interdependence.¹¹

In principle, every article in the *Encyclopédie* finds its place under one of the disciplines listed in the *système figuré*. Each article is introduced by a *headword*, which is typically followed by a grammatical indication and an italicized *encyclopedic designant* that specifies the discipline under which the article falls: e.g., DUO, s. m. (*Musique*).¹² If the article's headword is itself the name of a discipline listed in the *système figuré*, then the article is one of the *articles généraux des sciences* (or *head articles*). In such cases, the headword is followed by a *developed designant* that rehearses the entire chain that fixes that discipline's place in the *système figuré*: e.g. OPTIQUE, s. f. (*Ordre encyclop. Entendement. Raison. philosoph. ou science, Science de la nat. Mathem. Mathématiques mixtes, Optique*). The designants, whether simple or developed, are the second piece of editorial machinery that Diderot and d'Alembert introduce. Their function is to place each article within the *système figuré* and so clarify its position in the *ordre encyclopédique*.

¹¹ "Ce dernier [l'ordre encyclopédique de nos connoissances] consiste à les rassembler dans le plus petit espace possible, et à placer, pour ainsi dire, le philosophe au-dessus de ce vaste labyrinthe dans un point de vue fort élevé d'où il puisse apercevoir à la fois les sciences et les arts principaux . . . C'est une espèce de mappemonde qui doit montrer les principaux pays, leur position et leur dépendance mutuelle, le chemin en ligne droite qu'il y a de l'un à l'autre; chemin souvent coupé par mille obstacles, qui ne peuvent être connus dans chaque pays que des habitants ou des voyageurs, et qui ne sauraient être montrés que dans des cartes particulières fort détaillées. Ces cartes particulières seront les différents articles de l'Encyclopédie, et l'Arbre ou Système figuré en sera la mappemonde" (*Discours préliminaire*, I:xv).

¹² s. m.=substantif masculin. Throughout this study, I follow Cernuschi's convention of dropping the grammatical indication and citing articles by headword and designant.

ENTENDEMENT.



The third device that the editors employ is an elaborate system of cross-references (*renvois*) worked into the bodies of the articles themselves. The *renvois* play many roles in the *Encyclopédie*, but among their most significant functions that of linking the disparate articles that pertain to a given discipline together into a more or less continuous exposition.¹³ At one point in the entry *ENCYCLOPÉDIE (Philosoph.)*, Diderot goes so far as to compare the *Encyclopédie's* *renvois* to the axiomatic method of geometry:

On y est asservi, sans s'en appercevoir, à ce que la méthode des Géomètres a de plus serré & de plus précis . . . Le géometre renvoie d'un théorème ou d'un problème à un autre, & l'encyclopédiste d'un article à un autre. Et c'est ainsi que deux genres d'ouvrages, qui paroissent d'une nature très-différente, parviennent par un même moyen, à former un ensemble très-serré, & très-continu. Ce que je dis est d'une telle exactitude, que la méthode selon laquelle les Mathématiques sont traitées dans notre Dictionnaire, est la même qu'on a suivie pour les autres matieres. (V:643)

We are here subjected, without its being perceived, to what is most terse and precise in the geometrical method . . . The geometer refers from one theorem or problem to another, the encyclopedist from one article to another. And in this way, two types of works, which seem to be of a very different nature, succeed by the same means in forming a concise and continuous whole. What I say is so true that the method according to which mathematics is treated in our dictionary is the same as that we have followed for all the other subjects.

The essential purpose of all three devices—the *système figuré*, the designants and the *renvois*—is to impose systematic form on *Encyclopédie's* bulk: to reconcile, as d'Alembert puts it, the *ordre alphabétique* with the *ordre encyclopédique*.¹⁴ Rousseau was clearly impressed with both the ambition and its techniques of realization. In the laudatory note that he sent to d'Alembert upon reading the latter's *Discours préliminaire* in 1751, for instance, Rousseau singled out the *ordre encyclopédique* for particular praise:

Je ne puis assez vous remercier de votre discours préliminaire. J'ai peine à croire que vous ayez eu beaucoup plus de plaisir à

I cannot thank you enough for your preliminary discourse. I can hardly believe that you had as much pleasure in writing it

¹³ On the various other uses to which the *renvois* are put, see Diderot's celebrated discussion at *ENCYCLOPÉDIE*, V:642-43.

¹⁴ "Il nous reste à montrer comment nous avons tâché de concilier dans notre Dictionnaire l'ordre encyclopédique avec l'ordre alphabétique. Nous avons employé trois moyens, le Système figuré qui est à la tête de l'ouvrage, la Science à laquelle chaque article se rapporte, & la manière dont l'article est traité" (*Discours préliminaire*, I:xviii). "Ainsi trois choses forment l'ordre encyclopédique: le nom de la Science à laquelle l'article appartient; le rang de cette Science dans l'arbre; la liaison de l'article avec d'autres dans la même Science ou dans une Science différente; liaison indiquée par les renvois, ou facile à sentir au moyen des termes techniques expliqués suivant leur ordre alphabétique" (*ibid.*, I:xviii-xix).

le faire que moi à le lire. La chaîne encyclopédique sur-tout m'a instruit et éclairé, et je me propose de la relire plus d'une fois. (CC, II, 159-60)

as I in reading it. The encyclopedic chain in particular instructed and enlightened me, and I intend to reread it more than once.

When he set to work on his own *Dictionnaire de musique* in the mid 1750s, Rousseau consciously adopted the *Encyclopédie*'s system of *renvois*. In the preface to *Dictionnaire*, moreover, he describes their purpose explicitly and in terms that clearly echo Diderot's earlier discussion:

Mon premier projet étoit d'en traiter si relativement les articles, d'en lier si bien les suites par des renvois, que le tout, avec la commodité d'un Dictionnaire, eût l'avantage d'un Traité suivi. (OC, V, 608)

My first intention was to treat the articles so interrelatedly, and to tie them so well together by cross references, that the whole would have both the convenience of a dictionary and the advantages of a continuous treatise.

Since many of the *Dictionnaire*'s articles are taken over verbatim—their *renvois* included—from the *Encyclopédie*, there is every reason to suppose that Rousseau understood the device's function and deliberately exploited it when he first wrote his articles in 1749.¹⁵

The practical result of these considerations—of the presence of the editorial machinery and of Rousseau's deliberate exploitation of it—is to obviate the most glaring interpretive problem that Rousseau's articles would initially seem to pose. Rousseau's exposition of *ramiste* theory is dispersed across a considerable number of isolated articles, which are in turn hidden in seventeen folio volumes of text (the 53 relevant articles are listed in Table 3.1). Once the articles are located—itself a not inconsiderable chore—a further problem remains: how is the material presented in these various entries to be organized without simply resorting to interpretive *fiat* and imposing an argumentative structure extrinsically? The editorial machinery, and the *renvois* in particular, suggests a way of circumventing this difficulty. By following the *renvois* from article to article, Rousseau's discussion can in principle be read as a more or less continuous treatise.

¹⁵ The only known autograph of one of Rousseau's 1749 articles—the manuscript copy of NOTES, *en Musique* preserved at the Bibliothèque publique et universitaire (ms. R. 71, f. 3-6)—tends to confirm this claim: all the *renvois* in the printed text are found in the autograph.

Of course, matters are not quite so simple. The *Encyclopédie*'s editorial machinery is notoriously dysfunctional. As early as 1751, the abbé Raynal complained: "L'Encyclopédie commence à éprouver d'assez violentes contradictions. On y trouve souvent ce qu'on n'y cherche pas, et on y cherche souvent inutilement ce qu'on devrait y trouver" ("The *Encyclopédie* is beginning to suffer from violent contradictions. Often, one finds what one is not looking for and searches in vain for what ought to be there," CL, II, 86). Numerous *renvois* point to articles that were never written, designants are missing or inaccurate, tensions emerge between the order given in the *système figuré* and that implied by the designants, and so on.¹⁶ Indeed, it is hard to see how the result could have been otherwise, for the method places enormous demands on the editor, as Diderot recognized:

Un éditeur ne donnera jamais au tout un certain degré de perfection, s'il n'en possède les parties que successivement. Il seroit plus difficile de juger ainsi de l'ensemble d'un dictionnaire universel, que de l'ordonnance générale d'un morceau d'architecture, dont on ne verroit les différens ordres que séparés, & les uns après les autres. (ENCYCLOPÉDIE, V: 643)

An editor will never impart any degree of perfection to the whole if he only possesses the parts successively. It would be more difficult to judge the whole of a universal dictionary in that way than to judge the general arrangement of a piece of architecture, if one only saw the individual parts one after another.

What editor, though, could hold the whole of human knowledge constantly in view? The task is difficult enough in even a single discipline: in the continuation of the passage just quoted, Rousseau confesses his inability to keep even his own far more limited subject matter steadily before his eyes:

Mon premier projet étoit d'en traiter si relativement les articles, d'en lier si bien les suites par des renvois, que le tout, avec la commodité d'un Dictionnaire, eût l'avantage d'un Traité suivi; mais pour exécuter ce projet, il eût fallu me rendre sans cesse présentes toutes les parties de l'Art, et n'en traiter aucune sans me rappeler les autres; ce que le défaut de

My first intention was to treat the articles so interrelatedly, to tie them together so well by cross references, that the whole would have both the convenience of a dictionary and the advantages of a continuous treatise. But in order to execute this project, I would have had to keep all the parts of the art constantly before me and not treat a single one without

¹⁶ A significant instance for the present study is the head-article MUSIQUE: the article's developed designant—*Ordre encycl. entendem. Raison, Phil ou science de la nature, Mathématique, Math. Mixtes, Musique*—places it amongst the mixed mathematics under *Philosophie, ou science de la nature*. The *système figuré*, on the other hand, groups it with the other fine arts under *Poésie*.

ressources et mon goût attiédi m'ont bien-tôt rendu impossible, et que j'eusse eu même bien de la peine à faire, au milieu de mes premiers guides, et plein de ma première ferveur. (OC, V, 608)

constantly reminding myself of the others, something that my lack of resources and my waning inclination soon made impossible and which I would have had difficulty doing even when surrounded by my previous aids and full of my initial fervour.

Table 3.1. Rousseau's Articles on Harmonic Theory

ACCOMPAGNEMENT	ONZIEME, <i>en Musique</i>
ACCORD, <i>en Musique</i>	PARFAIT, <i>en Musique</i>
BASSE FONDAMENTALE	PHRASE, <i>en Musique</i>
CADENCE, <i>en Musique</i>	PRÉPARER, <i>en Musique</i>
CHIFFRER, <i>en Musique</i>	QUARTE DE TON, <i>Musique</i>
CHROMATIQUE, <i>en Musique</i>	QUARTE, <i>en Musique</i>
CONSONNANCE, <i>en Musique</i>	QUINTE, <i>en Musique</i>
DIATONIQUE, <i>en Musique</i>	QUINTE-FAUSSE, <i>en Musique</i>
DISSONANCE, <i>en Musique</i>	REGLE de l'octave, <i>en Musique</i>
DIX-SEPTIEME, <i>en Musique</i>	RELATION, <i>en Musique</i>
DOIGTER, <i>en Musique</i>	RENVERSEMENT, <i>en Musique</i>
DOMINANTE, <i>en Musique</i>	REPLIQUE, <i>en Musique</i>
ECHELLE, <i>en Musique</i>	RÉSONNANCE, <i>en Musique</i>
ENHARMONIQUE, <i>Musique</i>	SAUVER, <i>en Musique</i>
GAMME, <i>en Musique</i>	SECONDE, <i>Musique</i>
GENRE, <i>en Musique</i>	SEMI-TON, <i>en Musique</i>
HARMONIE	SEPTIEME, <i>en Musique</i>
HARMONIE FIGURÉE	SIXTE, <i>en Musique</i>
INTERVALLE, <i>en Musique</i>	SON, <i>en Musique</i>
LIAISON, <i>Musique</i>	SONS HARMONIQUES, ou SONS FLUTÉS
MODE, <i>en Musique</i>	SUPPOSITION, <i>en Musique</i>
MODULATION, <i>en Musique</i>	SUSPENSION, <i>en Musique</i>
MUSIQUE, <i>Ordre encycl. entendem.</i>	SYNCOPE, <i>en Musique</i>
<i>Raison, Phil ou science de la nature,</i>	SYSTEME, <i>en Musique</i>
<i>Mathématique, Math. Mixtes, Musique</i>	TONIQUE, <i>en Musique</i>
NEUVIEME, <i>en Musique</i>	TRIADÉ HARMONIQUE, <i>en Musique</i>
NOTE SENSIBLE, <i>en Musique</i>	UNISSON, <i>en Musique</i>
OCTAVE, <i>en Musique</i>	

Still, in the particular case of Rousseau's *Encyclopédie* articles, the *renvois* function relatively well. By following them from article to article—and in some cases inferring *renvois* that are missing—his exposition of *ramiste* theory can be read in more or less continuous form. The obvious place to begin is the entry HARMONIE (*Musique*).

3.2. HARMONIE, *selon les modernes*

Rousseau begins HARMONIE (*Musique.*) by distinguishing harmony *selon les modernes* from harmony in the ancient sense of the term.¹⁷ In its modern acceptance, Rousseau maintains, *harmonie* is either synonymous with *accord* or signifies “une succession régulière de plusieurs accords”—what Rameau calls a *phrase harmonique*.¹⁸ For the first sense, Rousseau refers us to the entries ACCORD, *en Musique* and CONSONNANCE, *en Musique*.

Chords




The bulk of ACCORD, *en Musique* is given over to the extended, annotated chord table reproduced as Fig. 3.2.¹⁹ In all, the table lists 30 chords, which are grouped together according to inversional equivalence. The resultant 11 types are ranged under two over-arching headings: *accords fondamentaux* and *accords par supposition*. In each case, the root position chord is given first, followed by its inversions where relevant. Of the 11 types, only the first—the *accord parfait*—is consonant; all the others are dissonant.

Fig. 3.2.

TABLE de tous les Accords reçûs dans l’Harmonie

ACCORDS FONDAMENTAUX

Accord parfait, & ses dérivés





Le son fondamental au grave	Sa tierce au grave	Sa quinte au grave
		
Accord parfait	Accord de sixte	Accord de sixte quarte

¹⁷ On the significance of these repeated distinctions see chapter 4 below.





¹⁸ “*Harmonie, selon les modernes, est proprement l’effet de plusieurs tons entendus à-la-fois, quand il en résulte un tout agréable; de sorte qu’en ce sens harmonie & accord signifient la même chose. Mais ce mot s’entend plus communément d’une succession régulière de plusieurs accords*” (HARMONIE [*Musique.*], VIII:50).

¹⁹ Fig. 3.2 incorporates the errata given in the *Encyclopédie*’s second volume and two further corrections indicated in the *Dictionnaire de musique*: (1) the missing F in the root-position *accord de onzième* is supplied; (2) the last inversion of this same chord is labeled *accord de seconde & quinte* (not *seconde & quarte*).





Accord sensible, ou dominant, & ses dérivés

Le son fondamental au grave	Sa tierce au grave	Sa quinte au grave	Sa septieme au grave
			
Accord sensible	De fausse quinte	De petite sixte majeure	De triton





Accord de septieme, & ses dérivés

Le son fondamental au grave	Sa tierce au grave	Sa quinte au grave	Sa septieme au grave
			
Accord de septieme	De grande sixte	De petite sixte	De seconde


Accord de septieme diminuée, & ses dérivés

Le son fondamental au grave	Sa tierce au grave	Sa quinte au grave	Sa septieme au grave
			
Accord de septieme diminuée	De fausse quinte & sixte maj.	De tierce min. & triton	De second superflue

Accord de sixte ajoutée, & ses dérivés





Le son fondamental au grave	Sa tierce au grave	Sa quinte au grave	Sa septieme au grave
			
Accord de sixte ajoutée	Accord ajoutée de petite sixte	Accord ajoutée de seconde	Accord ajoutée de septieme

Accord de sixte superflue



Accord de sixte superflue

ACCORDS PAR SUPPOSITION

Accord de neuvieme, & ses dérivés




Le son supposé au grave	Le son fondamental au grave	Sa tierce au grave	Sa septieme au grave
			
Accord de neuvieme	De septieme & sixte	De sixte quinte & quarte	De septieme & seconde

Accord de quinte superflue




Accord de quinte superflue

Accord de onzieme ou quarte


Le son supposé au grave	Le son fondamental au grave	Sa septieme au grave
		
Accord de neuvieme & quarte; ou deux son retranchés de quarte simplement	Accord de septieme & quarte	Accord de seconde & quarte [recte: quinte]

Accord de septieme superflue



Accord de septieme superflue

Accord de septieme superflue & sixte mineure



Accord de septieme
superflue & sixte mineure

The basic taxonomy is obviously Rameau's, and the principal theoretical notion on which it rests is Rameau's doctrine of chordal inversion, as Rousseau explains in the article BASSE FONDAMENTALE [no designant]:

[T]out accord, quoique composé de plusieurs sons, n'en a qu'un qui soit fondamental: savoir celui qui a produit cet accord, & qui lui sert de base. Or la *basse* qui regne au dessous de toutes les autres parties, n'exprime pas toujours les sons fondamentaux des accords: car entre tous les sons d'un accord, on est maître de porter à la *basse* celui qu'on croit préférable, eu égard à la marche de cette *basse*, au beau chant, ou à l'expression. Alors le vrai fondamental, au lieu d'être à sa place naturelle, qui est la *basse*, se transporte dans les autres parties, ou même ne s'exprime point de tout; & un tel accord s'appelle *accord renversé*. (II:119)

Each chord, though composed of many notes, has one that is its fundamental: namely that which produces the chord and serves as its basis. Now the bass found below all the other parts does not always express the fundamental sounds of chords: for one can put in the bass, from all the notes of a chord, the one that is best in terms of the progression of that bass, the beauty of its line or the expression. Thus the true fundamental, instead of being in its natural place, which is the bass, is transported to another part, or even not expressed at all, and such a chord is called an inverted chord.

"Celui qui a produit cet accord": the wording is not accidental. For Rameau, the *son fondamental* of a given chord is that chord's root precisely because it generates the other pitches. That claim rests on Jean-Jacques Dortous de Mairan's acoustical theory, which Rousseau summarizes in the entry SON, *en Musique*:

M. de Mairan donne une explication plus philosophique. L'air, selon lui, est divisé en particules de diverses grandeurs, dont chacune est capable d'un ton particulier, & n'est susceptible d'aucun autre. De sorte qu'à chaque *son* qui se forme, les particules qui y sont analogues s'ébranlent seules, elles & leurs harmoniques, tandis que toutes les autres restent tranquilles jusqu'à ce qu'elles soient émues à leur tour par les *sons* qui leur correspondent.²⁰ (XV: 345)

M. de Mairan gives a more philosophical explanation. The air, in his opinion, is divided into particles of different sizes, each of which vibrates to a particular pitch and no other. When a pitch is sounded, only the particles corresponding to it are moved, those and their harmonics, while all the others remain motionless until they are moved in their turn by their corresponding pitches.

²⁰ Rousseau goes on, however, to raise objections to Mairan's account: "Ce système paroît très-ingénieux; mais l'imagination a quelque peine à se prêter à l'infinité de particules d'air différentes en grandeur & en mobilité, qui devroient être répandues dans chaque point de l'espace, pour être toujours prêtes au besoin à rendre en tout lieu l'infinité de tous les sons possibles. Quand elles sont une fois arrivées au tympan de l'oreille, on conçoit encore moins comment, en les frappant plusieurs ensemble, elles peuvent y produire un ébranlement capable d'envoyer au cerveau la sensation de chacune d'elles en particulier. Il semble qu'on éloigne la difficulté plutôt qu'on ne la surmonte" (XV:345; cf. UNISSON, *en Musique*, XVII:387).

For Mairan, as we saw in Chapter 1, the particles vibrating at the fundamental frequency act on, and so set in motion, those vibrating at the upper partials.²¹ For this reason, the *son fondamentale* is the efficient cause of its *sons harmoniques*. A second phenomenon—sympathetic vibration—is intimately related. Mairan explains it by the action of the vibrating air particles on nearby strings. These two phenomena—overtones and sympathetic vibration—are of course the two *expériences* on which Rameau, following Mairan, claimed to found his theory in the *Génération harmonique*. Rousseau evokes both in another central passage in the same entry SON:

Si l'on racle une des plus grosses cordes d'une viole ou d'un violoncelle: ce qui se doit faire plutôt avec douceur qu'avec force, & un peu plus près du chevalet qu'à l'ordinaire; en prêtant une attention suffisante, une oreille exercée entendra distinctement, outre le *son* de la corde entière, au-moins celui de son octave, de l'octave de sa quinte, & la double octave de sa tierce: on verra même frémir, & on entendra résonner toutes les cordes montées à l'unisson de ces *sons-là*. Ces *sons* accessoires accompagnent toujours un *son* principal quelconque: mais quand ce *son* est aigu, ils y sont moins sensibles. On appelle ces *sons* les *harmoniques du son principal*; c'est par eux que M. Rameau prétend que tout *son* est appréciable, & c'est en eux qu'il a cherché le principe physique de toute l'harmonie. (XV:345-346)

If one draws the bow across one of the larger strings of a viol or a cello, something that should be done gently rather than with force and slightly closer to the bridge than is usual, a trained ear can, with sufficient attention, hear the at least the pitch of its octave, the octave of its fifth and the double octave of its third in addition to the pitch of the entire string. One even sees any other strings tuned to these same pitches tremble and hears them sound. These accessory sounds always accompany any principal sound, but when the principle sound is high they are less perceptible. These accessory sounds are called the overtones of the principal sound. It is through their agency, M. Rameau claims, that the principle sound is audible, and it is in them that he has sought the physical principle of harmony.

The *son fondamentale* taken together with its accompanying *sons harmoniques* gives the triad (*accord parfait*). The position in which the triad is generated—i.e. that in which the *son fondamentale* appears in the bass—is the chord's root position; the other two positions are its inversions.

Rousseau also evokes Marain's analogy between sound and light under CONSONNANCE, *en Musique*, IV: 50.

²¹ See Mairan, "Discours," 13-14.

Dissonant chords are formed by adding pitches to triads.²² In the entry DISSONANCE, *en Musique*, Rousseau constructs the seventh chord and added-sixth chord by adding the appropriate pitches to the *accord parfait*:

Prenons l'accord parfait, *sol, si, ré, sol*, & voyons en quel lieu de cet accord nous pourrions placer une *dissonance*, c'est-à-dire une seconde, pour la rendre le moins choquante à l'oreille qu'il est possible. Sur le *la* entre le *sol* & le *si*, elle feroit seconde avec l'une & avec l'autre, & par conséquent *dissonneroit* doublement. Il en seroit de même entre le *si* & le *ré*, comme entre tout intervalle de tierce; reste l'intervalle de quarte entre le *ré* & le *sol*. Ici l'on peut introduire un nouveau son de deux manières. 1°. On peut ajouter la note *fa* qui fera seconde avec le *sol*, & tierce avec le *ré*. 2°. Ou la note *mi* qui fera seconde avec le *ré*, & tierce avec le *sol*. Il est évident qu'on aura de chacune de ces deux manières, la *dissonance* la moins dure qu'on puisse trouver; car elle ne *dissonnera* qu'avec un seul son, & elle engendrera une nouvelle tierce, qui, aussi bien que les deux précédentes, contribuera à la douceur de l'accord total. D'un côté, nous aurons l'accord de septieme, & de l'autre, l'accord de sixte ajoutée, comme l'appelle M. Rameau.²³ (IV:1049-50)

Let us take the triad G-B-D-G and see where in this chord we can place a dissonance, i.e. a second, so that it gives the least possible shock to the ear. Placed on the A between G and B, it would make a second with both the one and the other and so form a double dissonance. The same would occur [if it were placed] between B and D, as between any third. Only the fourth between D and G remains. Here, it can be placed in two ways. (1) We can add an F, which makes a second with G and a third with D. (2) Alternately, an E will form a second with D and a third with G. It is clear that these two possibilities give the least harsh dissonance that can be found, for [the added note] forms a dissonance only with one pitch and with the other a new third that, just like the first two, contributes to the sweetness of the entire chord. In the first case, we will have the seventh chord, in the second that which M. Rameau calls the added-sixth chord.

These newly formed chords, just like the original triad, can be inverted. Like the triad, a seventh chords and added-sixth chords are in root position when their roots lie in the bass and are inverted otherwise. In general, then, "toutes fois . . . que la basse fondamentale se fait entendre dans la partie la plus grave . . . l'harmonie est directe; dès que cet ordre est changé, ou que le son fondamental n'étant pas au grave, se fait entendre dans quelque autre partie, l'harmonie est renversée" ("any time . . . the fundamental bass is heard in the lowest part . . . the harmony is direct; as soon as this order is altered, with

²² See, for instance, Rameau, *Traité de l'harmonie*, CTW, I, 59-71.

²³ Bouvier's assumption that this procedure is an innovation of Rousseau's is mistaken ("Rousseau et la théorie ramiste," OC, V, 1687): Rousseau is following Rameau, *Nouveau système*, CTW, II, 67-68; and *Génération harmonique*, CTW, III, 69-71.

the fundamental sound being no longer in the bass but rather in some other part, the harmony is inverted," RENVERSEMENT, *en Musique*, XIV:122).

As Rousseau is quick to acknowledge, the notion of chordal inversion allows Rameau to effect an impressive simplification of the classificatory schemes that he inherited from his predecessors:

Dans le fond, un accord renversé ne diffère point de l'accord direct qui l'a produit; car ce sont toujours les mêmes sons: mais ces sons formant des combinaisons différentes, on a long-tems pris ces combinaisons pour autant d'accords fondamentaux, & on leur a donné différens noms, qu'on peut voir au mot *accord*, & qui ont achevé de les distinguer; comme si la différence des noms en produisoient réellement dans les choses. M. Rameau a fait voir dans son *traité de l'Harmonie*, que plusieurs de ces prétendus accords n'étoient que des renversemens d'un seul. Ainsi l'accord de sixte n'est que l'accord parfait dont la tierce est transportée à la basse: en y portant la quinte, on aura l'accord de sixte quarte. Voilà donc trois combinaisons d'un accord qui n'a que trois sons; ceux qui en ont quatre, sont susceptibles de quatre combinaisons; car chacun des sons peut être porté à la basse: mais en portant au-dessous de celle-ci une autre basse, qui sous toutes les combinaisons d'un même accord, présente toujours le son fondamental, il est évident qu'on réduit au tiers le nombre d'accords consonans, & au quart le nombre des accords dissonans. Ajoûtez à cela tous les accords par supposition, qui se réduisent encore aux mêmes fondamentaux; vous trouverez l'harmonie simplifiée à un point qu'on n'eût jamais espéré de l'état de confusion où étoient ses regles jusqu'au tems de M. Rameau. (BASSE FONDAMENTALE, II:119)

An inverted chord is not fundamentally different from the chord that produces it, for the pitches are the same. But since the arrangement of the pitches differs, these various combinations were for a long time taken for so many different chords, and they were given different names, which can be found under the word *accord*, and which had the effect of differentiating them, as if the difference in names produced a difference in things. M. Rameau showed in his *Traité de l'harmonie* that many of these ostensibly different chords were merely inversions of a single one. Thus, the *accord de sixte* is nothing but a triad whose third is placed in the bass; if the fifth is placed there, the *accord de sixte quarte* results. In this way, there are three inversions of a chord having three pitches. Those having four appear in four arrangements, since each of the pitches may be placed in the bass. But by placing below that bass another one that, in all the arrangements of a single chord, always represents the fundamental sound, it is clear that we reduce the number of consonant chords by a third and the number of dissonant chords by a fourth. Add to these the various chords by supposition, which can also be reduced to the same fundamentals, and you will find harmony simplified to a degree that one would never have expected, given the state of confusion in which its rules were found until the time of M. Rameau.

In addition to the chords already described, Rousseau's table also includes the *accord de septieme diminuée* and *accord de sixte superflue*, together with a full repertoire of *accords par supposition*. Rousseau's handling of these chords—like his treatment of the *accord de sixte ajoutée*—is unorthodox in a number of respects. A full consideration of the significance of these changes, though, is impossible without first considering the account that Rousseau gives of harmonic succession.

Chord Progressions

The entry ACCORD presents chords as a series of isolated sonorities. All discussion of the ways in which these chords combine to form harmonic progressions—the second sense of *harmonie*—is deferred to elsewhere in the *Encyclopédie*: “Nous parlerons aux mots *Harmonie, Basse fondamentale, Modulation, Composition, Dissonance*, de la maniere d'employer tous ces accords pour en former une harmonie réguliere” (I:79). Of these various articles, it is HARMONIE that offers the most synoptic discussion of harmonic progressions. Indeed, the bulk of the article is devoted entirely to that topic.

In the course of his discussion, Rousseau stipulates three basic conditions that any *phrase harmonique* (i.e. any well-formed harmonic progression) must meet:

1. The roots of any two successive chords must stand either a third or a fifth apart: “La basse fondamentale ne doit marcher que par intervalles consonnans, car l'accord parfait n'en produit que de tels” (“The fundamental bass must move exclusively by consonant intervals, for the triad produces no others,” VIII:50).
2. Any two adjacent chords must share at least one common tone: “Tant que dure la phrase, on y doit observer la liaison harmonique, c'est-à-dire qu'il faut tellement diriger la succession de l'*harmonie*, qu'au-moins un son de chaque accord soit prolongé dans l'accord suivant” (“Throughout the phrase, harmonic *liaison* must be observed, that is to say that the succession of harmonies must be so managed that at least one pitch of each chord is repeated in the following chord,” VIII:51).
3. Each chord but the last must contain a dissonance that its successor resolves:

Une suite d'accords parfaits, même bien liés, ne suffit pas encore pour constituer une phrase harmonique; car si la liaison

A succession of chords, even if connected by common tones, does not by itself form a *phrase harmonique*, for although common-

suffit pour faire admettre sans répugnance un accord à la suite d'un autre, elle ne l'annonce point, elle ne le fait point désirer, & n'oblige point l'oreille pleinement satisfaite à chacun des accords, de prolonger son attention sur celui qui le suit. Il faut nécessairement quelque chose qui unisse tous ces accords, & qui annonce chacun d'eux comme partie d'un plus grand tout que l'oreille puisse saisir, & qu'elle desire d'entendre en son entier. Il faut un sens, il faut de la liaison dans la Musique, comme dans le langage; c'est l'effet de la dissonance; c'est par elle que l'oreille entend le discours harmonique, & qu'elle distingue ses phrases, ses repos, son commencement & sa fin (VIII:51)

tone connections are enough to allow one chord to follow another without offense, they do not announce the second chord, or make us desire it, or oblige the ear—which is fully satisfied at each chord—to prolong its attention and await the next. Something is required to unite these chords together, something to signal that each of them is part of a greater whole that the ear should seize upon and desire to hear in its entirety. A sense is required, a connection, in music as in language. Dissonance creates this effect. It is through it that the ear understands the discourse of harmony and distinguishes its phrases, its pauses, its beginning and its end.

A *phrase harmonique*, then, is a harmonic progression in which each pair of adjacent chords is linked by a consonant fundamental-bass progression, by the preservation of at least one common tone, and by the presence, in the first chord, of a characteristic dissonance that the second resolves. The first condition is, of course, the fundamental postulate of Rameau's theory: the claim that the *basse fondamentale* moves by the same intervals that comprise the triad; the second is what Rameau calls *liaison*; and the third echoes Rameau's notorious insistence that all scale degrees except the tonic must bear dissonant chords.

Rousseau's discussion in HARMONIE remains entirely at this level of abstraction. Other articles, though, are far more concrete. In the entry ACCOMPAGNEMENT [no designant], Rousseau introduces three basic classes of harmonic progressions (*textures de phrases harmoniques*) borrowed from Rameau's *Dissertation sur les différents méthodes d'accompagnement*. Progressions in the first class, it will be recalled, involve consonant chords only; those in the second consist only of dissonant chords; and the third class is comprised of progressions in which consonant and dissonant chords intermingle.

Voilà donc trois textures différentes de phrases harmoniques: des toniques qui se succèdent & qui font changer de ton: des

Thus there are three different classes of *phrases harmoniques*: triads that succeed one another and which involve a change of

consonances [recte: dissonances²⁴] qui se succèdent ordinairement dans le même ton: & des consonances & des dissonances qui s'entrelacent, & où la consonance est, selon M. Rameau, nécessairement précédée de la septième de la dominante, ou de la sixte-quinze de la souâdominante. (I:76)

key, dissonances that follow one another in the same key, and consonances and dissonances that intermingle, and where the consonance is, according to M. Rameau, necessarily preceded by a seventh chord on the dominant or the six-five chord on the subdominant.

The first class of progressions consists of successions of triads linked by consonant fundamental-bass motions.²⁵ Since Rameau's theory treats any triad as, in principle, a tonic, such progressions present a series of isolated tonics, each belonging to a different key: "L'accord consonant parfait ne convenant qu'à la tonique, la succession des accords consonans fournit autant de toniques, & par conséquent de changemens de ton" ("Since the consonant triad only appears on the tonic, the succession of consonant chords furnishes so many tonics and consequently so many changes of key," I:76). The second class consists, first and foremost, of sequences of seventh chords arranged by descending fifth or descending third.²⁶ Progressions of this kind, Rousseau adds, typically remain within the same key, though they may also be used to modulate between keys if appropriate accidentals are introduced.²⁷ Cadences, finally, provide the third and last *texture des phrases harmoniques*, in which consonant and dissonant chords intermingle.²⁸

As we saw in Chapter 1, this third class of progressions—cadences—provides the key to understanding Rameau's conception of harmonic succession. Rousseau's brief discussion in *ACCOMPAGNEMENT* is amplified in the entry *CADENCE, en Musique*. A cadence, Rousseau explains, involves exactly two chords, the first of which is necessarily

²⁴ The correction, which the context requires in the *Encyclopédie*, appears in the corresponding passage from the *Dictionnaire de musique* (OC, V, 622).

²⁵ "La succession fondamentale par quintes ou par tierces, tant en montant qu'en descendant, donne la première texture de phrases harmoniques toute composée d'accords consonans" (I:76).

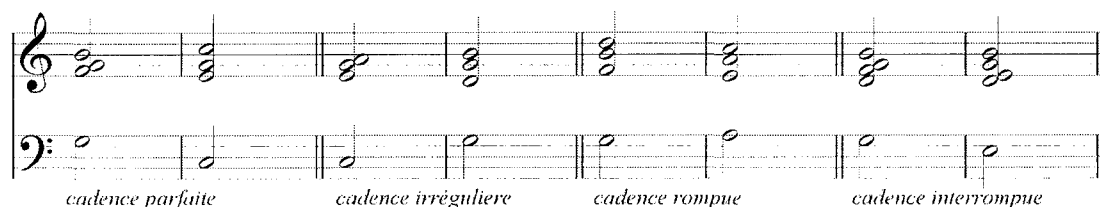
²⁶ "La succession fondamentale par tierces ou par quintes en descendant, donne la seconde texture, composée d'accords dissonans, savoir des accords de septième, & cette succession donne l'harmonie descendante" (I:76).

²⁷ "Les accords dissonans se succèdent ordinairement dans un même ton. La dissonance lie le sens harmonique. Un accord y fait souhaiter l'autre, & fait sentir en même tems que la phrase n'est pas finie. Si le ton change dans cette succession, ce changement est toujours annoncé par un dièse ou par un bémol" (I:76).

²⁸ "Les cadences fondamentales donnent la [troisième] texture, où les consonances & les dissonances s'entrelacent" (I:76).

dissonant, while the second may be either consonant or dissonant.²⁹ If the former, the cadence is full (*pleine*); if the latter, it is evaded (*évitée*).³⁰ Following Rameau, Rousseau identifies four distinct cadence types: the *cadence parfaite*, *cadence irrégulière*, *cadence rompue* and *cadence interrompue* (Ex. 3.1). The distinction between these four cadences lies both in the types of chords they involve and in the relationship between those chords. In the *cadence parfaite*, a *dominante-tonique* resolves to a *tonique* by a descending-fifth motion in the fundamental bass; the seventh of the *dominante-tonique* moves to the third of the *tonique*, and its third (the *note sensible*) to the root.³¹ The *cadence rompue* and *cadence interrompue* are, so to speak, interrupted forms of the *cadence parfaite*: instead of descending by a fifth, the fundamental bass moves either up a second or down a third.³² Finally, in the *cadence irrégulière*, an *accord de sixte ajoutée* resolves to a triad by an ascending fifth motion in the fundamental bass, the dissonant sixth resolving upward to the triad's third.³³

Ex. 3.1. Cadence Types, after Rousseau, *CADENCE, en Musique*



²⁹ “Ce qu’on appelle *acte de cadence* résulte toujours de deux sons fondamentaux, dont l’un annonce la *cadence*, & l’autre la termine” (*CADENCE, en Musique*, II:513). “Pour faire sentir agréablement le repos, il faut qu’il soit précédé de quelque chose qui le fasse désirer, & ce quelque chose ne peut être que la dissonance: autrement les deux accords étant également parfaits, on pourroit se reposer sur le premier; le second ne s’annonceroit point, & ne seroit pas nécessaire: l’accord formé sur le premier son d’une *cadence*, doit donc toujours être dissonant” (II:513).

³⁰ “l’accord formé sur le premier son d’une *cadence*, doit donc toujours être dissonant. A l’égard du second, il peut être consonant ou dissonant, selon qu’on veut établir ou éluder le repos. S’il est consonant, la *cadence* est pleine: s’il est dissonant, c’est une *cadence évitée*” (II:513).

³¹ “Toutes les fois qu’après un accord de septieme, la basse fondamentale descend de quinte sur un accord parfait, c’est une *cadence parfaite* plein, qui procède toujours d’une dominante à une tonique” (II:513).

³² “Si la basse fondamentale descend seulement de tierce, au lieu de descendre de quinte après un accord de septieme, la *cadence* s’appelle *interrompue*” (II:513); “*Cadence rompue* est celle où la basse fondamentale, au lieu de monter de quarte après un accord de septieme, comme dans la *cadence parfaite*, monte seulement d’un degré” (II:514).

³³ “Quand la basse descend de quinte de la dominante sur la tonique, c’est, comme je l’ai dit, un acte de *cadence parfaite*: si au contraire, la basse monte de quinte de la tonique sur la dominante, c’est un acte de *cadence irrégulière*, selon M. Rameau, ou de *cadence imparfaite*, selon la dénomination commune. Pour l’annoncer on ajoute une sixte à l’accord de la tonique, d’où cet accord prend le nom de *sixte ajoutée* . . . La *cadence irrégulière* se prend aussi de la sous-dominante à la tonique” (II:514).

Of the cadences shown in Ex. 3.1, the first three are full cadences.³⁴ Each cadence, though, can also be evaded. For instance, if a dissonant seventh is added to the second chord in a *cadence parfaite*, the result is a *cadence parfaite évitée*. Naturally, this new dissonance must in turn be resolved:

[S]i la *cadence* est évitée par une dissonance ajoutée à la seconde note, elle peut se faire derechef sur cette seconde note, & se continuer autant qu'on veut en montant de quarte, ou descendant de quinte sur toutes les cordes du ton, & cela forme une succession de *cadences parfaites évitées*. (II:513)

If the cadence is evaded by a dissonance added to the second note, it can nonetheless be made on this second note, and [the progression] may be continued for as long as one wants, rising by fourth or falling by fifth through all the notes of a key, and the result is a succession of evaded perfect cadences.

By linking together evaded cadences in this way, extended harmonic progressions can be formed. The first half of Ex. 3.2 shows the paradigmatic example: a sequence of seventh chords arranged by descending fifth, understood as a series of interlocking evaded *cadences parfaites*. A similar progression may be formed analogously by linking together evaded *cadences interrompues* to form a descending-third sequence (Ex. 3.2; second half). These two sequences are of course the two progressions Rousseau classed, in ACCOMPAGNEMENT, under the second *texture des phrases harmoniques*. Yet another sequence, finally, can be formed by linking together evaded *cadences irrégulières* (Ex. 3.3).³⁵ All these progressions meet the three conditions that Rousseau stipulates in HARMONIE: (1) the fundamental bass moves by consonant intervals; (2) each chord is linked to the next by at least one common tone; and (3) each chord but the last bears a characteristic dissonance.

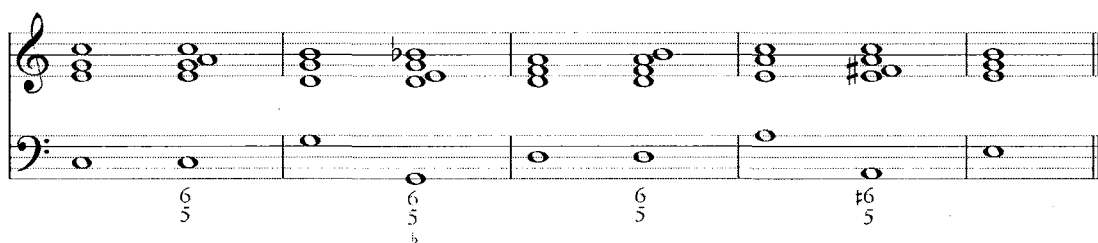
³⁴ “[L]a *cadence interrompue*,” Rousseau maintains, “ne peut jamais être pleine” (II:513).

³⁵ Since Rousseau gives no example of this progression in the *Encyclopédie*’s plates, I borrow the relevant example from Rameau’s *Code de musique pratique*. Rousseau claims, in both ACCOMPAGNEMENT (I:76) and CADENCE (II:514), to be the first writer to describe this progression. Unfortunately for Rousseau, the claim is false, as d’Alembert points out in an addendum to Rousseau’s article (II:515): Rameau had described the progression in the *Nouveau système* (CTW, II, 79) and the *Génération harmonique* (CTW, III, 115-16). In the *Dictionnaire de musique*, Rousseau corrects the error under “Cadence” (OC, V, 677) but not under “Accompagnement” (OC, V, 622-23). The inconsistency is presumably an oversight.

Ex. 3.2: *Encyclopédie, Planches de Musique*, I, fig. 1-2



Ex. 3.3: Rameau, *Code de musique pratique*, ex. I



Because extended harmonic progressions are formed by linking together evaded cadences, cadences come, in Rameau's theory, to form the model for harmonic succession *tout court*. Thus Rousseau can write near the beginning of CADENCE that "toute l'harmonie n'est proprement qu'une suite de *cadences*" ("all of harmony, properly speaking, is nothing but a succession of cadences," II:513).³⁶ As a result, however, the distinction between the second and third *textures de phrases harmoniques* that Rousseau draws in ACCOMPAGNEMENT tends to collapse.³⁷ Since the successions of dissonant chords that Rousseau describes under the second *texture* consist entirely of interlocking evaded cadences, the two categories are, in the end, less than perfectly distinct. As for the first class—successions of triads—in a certain sense, these are not harmonic progressions at all. Since they contain no dissonances, they violate one of the principal criteria for harmonic succession. For the same reason—namely, the absence of characteristic dissonances—they cannot be explained as sequences of cadences, whether

³⁶ Cf. HARMONIE (*Musique*), VIII: 51.

³⁷ As it does in Rousseau's source, the *Dissertation sur les différentes méthodes d'accompagnement*. See pp. 28-29 above.

full or evaded. There is thus a certain discord between the sense of *phrase harmonique* that Rousseau assumes in ACCOMPAGNEMENT and the one that he develops in HARMONIE. This discord can be clarified, if not resolved, by simply noting that Rousseau uses this term in two different senses: *lato sensu*, a *phrase harmonique* is any succession of chords (as in ACCOMPAGNEMENT); *stricto sensu*, it is a harmonic progression that meets the three criteria developed in HARMONIE.³⁸ On the whole, Rousseau prefers the second, strict sense. Indeed, the entry ACCOMPAGNEMENT is the only place the more general sense is found, and it occurs there simply because Rousseau is paraphrasing Rameau's *Dissertation*. In general, then, a *phrase harmonique* is a chord progression in which the fundamental bass moves by third or fifth and adjacent chords are connected by common tones and dissonances. Such a progression moves through a series of interlocking evaded cadences until it comes to rest, with a full cadence, on a triad:

PHRASE, s. f. *en Musique*, est une suite de chant ou d'harmonie, qui forme un sens plus ou moins achevé, & qui se termine sur un repos par une cadence plus ou moins parfaite.

.....

Dans l'harmonie, la *phrase* est une suite régulière d'accords, tous liés entr'eux par des dissonances exprimées ou sousentendues. Cette suite se résout sur une cadence, & selon l'espece de cette cadence, selon que le sens est plus ou moins achevé, le repos est aussi plus ou moins parfait. (XII:529)

PHRASE, feminine noun, *in music*, is a melodic or harmonic succession that forms a more or less completed sense and concludes with a cadence whose degree of perfection may vary.

.....

In harmony, a phrase is a regular succession of chords, all of which are connected to one another by dissonances that are expressed or understood. Such a succession ends with a cadence and, according to the type of that cadence (that is, whether the sense is more or less completed), the conclusion is more or less perfect.

The descending fifth, ascending fifth and descending third sequences introduced in ACCOMPAGNEMENT and CADENCE function, therefore, as a set of model *phrases harmoniques*. Of course, these three model sequences are far from exhausting the range

³⁸ Rameau decries this equivocation at *Erreurs*, CTW, V, 243-44. The complaint seems more than a little disingenuous, though, given that Rousseau takes the ambiguity over from Rameau's own writings. For all that Rameau insists on the strict sense of the term in the *Erreurs*, the one passage in which Rousseau employs the broad sense—namely when he counts successions of triads as *phrases harmoniques* in ACCOMPAGNEMENT—follows Rameau's usage in the *Dissertation sur les différentes méthodes d'accompagnement* (CTW, V, 32-37).

of progressions that Rameau's theory treats. Rousseau's handling of these additional progressions, which is often considerably more unorthodox, is the subject of the following section.

3.3. Revisions and Extensions to Rameau

Thus far, Rousseau has faithfully reproduced the basic outline of Rameau's theory. Harmony consists of two fundamental chords: the consonant triad and the dissonant seventh chord. Cadences—and the *cadence parfaite* in particular—specify the basic relationship between these two chords. More extended harmonic progressions are formed by linking together evaded cadences. To the extent that they are well formed, such progressions fulfill three basic conditions: adjacent chords are linked by a consonant root progression, the preservation of common tones, and the introduction and resolution of a characteristic dissonance. In order to concentrate on this outline, however, I have passed over a number of idiosyncrasies in Rousseau's presentation. It is now time to return to them.

As I indicated above, the general taxonomy of chord types that Rousseau provides is essentially Rameau's. Nonetheless, the chord table that Rousseau gives in *ACCORD* includes a number of significant departures: 1) the diminished seventh chord G#-B-D-F is taken as a root-position chord, with G# as its root; 2) the *accord de sixte ajoutée* appears in all three of its possible inversions, including the last in which the dissonant sixth appears in the bass; 3) the augmented-sixth chord is included as a fundamental chord; and finally—and most strikingly—4) Rousseau allows chords by supposition to be inverted in certain cases.

The Diminished Seventh Chord

In his *Traité de l'harmonie*, Rameau derived the diminished seventh chord from the *dominante-tonique* by an operation he called “borrowing” (*emprunter*).³⁹ G#-B-D-F, to take the example Rousseau gives in his table, is derived from E-G#-B-D by replacing the root (E) of the latter chord with the note a semi-tone above. Yet despite this substitution, E remains the effective root of the newly formed chord. As Rameau puts it,

³⁹ *Traité*, CTW, I, 71-74, 109-11.

“il faut absolument que ce Son grave & fondamental [i.e. E] puisse être sous-entendu dans le Son qu’on luy subroge icy [F], pour que le principe subsiste” (“It is absolutely necessary that this lowest, fundamental sound be understood in the pitch that is substituted for it here, so that the principle subsists,” 43). The diminished seventh chord, in other words, borrows its root from its associated *dominante-tonique*, even though that root is not literally present in the chord; the root of the *dominante-tonique* is somehow “understood” in the lowered sixth degree that replaces it. In the *Traité*, as a result, Rameau takes the *accord de seconde superflue* (e.g. F- G#-B-D) as the root position chord and regards the *accord de septieme diminuée* (G#-B-D-F) as its inversion.⁴⁰ In the *Génération harmonique*, though, he recants.⁴¹ The *accord de septieme diminuée* is now a root-position chord, and its lowest pitch G#, to continue with the same example, is the apparent fundamental (*censée fondamentale*). The connection between diminished seventh and *dominante-tonique*, though, is not in any way attenuated: “la Note sensible [G#] est censée fondamentale, quoiqu’elle y emprunte tous ses droits de la Dominante dont elle dérive” (“the leading tone is the apparent fundamental, for all that it borrows all its rights from the dominant [note] from which it derives,” CTW, III, 90).⁴² For all that G# may act like the root, the chord’s real root is still ultimately E.⁴³

Rousseau abandons these subtleties and simply takes G# as the root of the chord G#-B-D-F.⁴⁴ He has a precedent for this revision in Rameau’s manuscript treatise “L’Art de la basse fondamentale,” a copy of which is preserved amongst his papers in Geneva.⁴⁵

⁴⁰ “[C]’est veritablement le Son fondamental de l’*accord de la Septième* qui se prête à celui qui occupe le grave dans cet *accord de la Seconde-superflue*, & l’aigu dans l’*accord de la Septième-diminuée*” (*Traité*, CTW, I, 74).

⁴¹ *Génération*, CTW, III, 89-92, esp. the following: “nous avons attribué cet emprunt à la Sudominante dans le *Traité de l’Harmonie*, parce qu’elle y est pour lors substituée à la Dominante; mais quant au Son fondamental qui y donne la loi, cela n’appartient qu’à la Note sensible” (CTW, III, 90).

⁴² Rameau’s formulation is ambiguous at first glance: “dominante” can mean either “seventh chord” or “fifth scale degree.” However, a moment’s reflection shows that only the second interpretation can make sense of Rameau’s claim. The *note sensible* is not derived from the *dominante-tonique*, of which it is a part, but rather from the dominant note, by which it is generated.

⁴³ It must be admitted, though, that the *Génération* is not totally consistent on this point. Despite the discussion just alluded to, in one of his musical examples (ex. 25), Rameau gives D# as the root of the chord D#-F#-A-C.

⁴⁴ Cf. ENHARMONIQUE (*Musique.*), V:688: “le son fondamental de l’*accord de septieme diminuée* est toujours une note sensible[.]”

⁴⁵ Bibliothèque publique et universitaire de Genève, ms. fr. 230. The manuscript was long misattributed to Rousseau under the spurious title “Leçons de musique.” See Albert Jansen, *Jean-Jacques Rousseau als*

In that text, significantly a practical composition treatise rather than a speculative work, Rameau consistently takes the *note sensible*, rather than the fifth scale degree, as the root of the leading-tone seventh chord:

L'accord de la *septieme diminuée* est composé de quatre notes divis[é]es par tierces. Dans l'entendue de l'octave de la Basse fond.^{le} comme les autres accords de *septieme* excepté que toutes les tierces en sont *mineur[e]s*: par exemple dans le ton mineur de *la* cet accord est composé des notes *sol dieze*. Si. *ré. fa* ou la note sensible *sol Dieze* est basse fond.^{le} et ou la soudominante *fa* forme Sa *septieme* diminuee.⁴⁶

The diminished seventh chord is composed of four notes arranged in thirds in the span of the octave above the fundamental bass, like all the other seventh chords, except that all the thirds are minor: in A minor, for instance, the chord is composed of the notes G#-B-D-F, where the note G# is the fundamental bass and where the subdominant F forms its diminished seventh

As we will see more fully in Section 3.4, however, the change will cause problems for Rameau's account of harmonic succession, since the resolution of the leading-tone seventh chord to the tonic now involves a stepwise motion in the fundamental bass.

The Added-Sixth Chord

Rousseau's second departure from Rameau comes in his handling of the *accord de sixte ajoutée*. The chord in question is a triad (major or minor) with an added major sixth. As such, it obviously resembles the *accord de grande sixte* (i.e. first inversion seventh chord). Rameau, however, resists equating the two. The primary distinction between the two chords lies in the ways they are resolved: the *accord de sixte ajoutée* resolves to a *tonique*, whereas the *accord de grande sixte* resolves to a *dominante*-

Musiker (Berlin: G. Riemer, 1884), 63; Henri Kling, "Jean-Jacques Rousseau et ses études sur l'harmonie et le contrepoint," *Rivista musicale italiana* 12 (1905): 40-62; and Julien Tiersot, "Les 'Leçons de musique' de Jean-Jacques Rousseau," *Sammelbände der internationalen Musikgesellschaft* 14 (1913): 253-77. The manuscript is actually a copy of Rameau's unpublished treatise, "L'Art de la basse fondamentale," the other known copy of which is preserved amongst d'Alembert's papers at the Bibliothèque de l'Institut de France, ms. 2474. Thomas Christensen studies the Paris copy in his article on "Rameau's 'L'Art de la Basse Fondamentale,'" *Music Theory Spectrum* 9 (1987): 18-41. The Geneva manuscript was first correctly identified by Claude Knepper in 1987, who nonetheless has never published the fact; Knepper's discovery was first announced in Isabelle Rouard, "Art de la basse fondamentale de J.-Ph. Rameau: édition scientifique et critique, commentaire musicologique et mise en perspective théorique et pratique," 7 vols., (Ph.D diss., Paris IV Sorbonne, 2001).

⁴⁶ Bibliothèque de l'Institut de France, collection d'Alembert, ms. 2474, f. 110r. The relevant section of the "Art" is missing from the Geneva manuscript, much of which went missing in the nineteenth century.

tonique.⁴⁷ A secondary difference, upon which Rameau also insists, is that the *accord de sixte ajoutée* cannot appear with the added sixth in the bass.⁴⁸ Rousseau, in contrast, presents all four inversion of the *accord de sixte ajoutée* in his chord table (see Ex. 3.1 above). His comment on the example in the entry ACCORD alludes directly to Rameau's prohibition:

Ce dernier renversement qui porte le nom d'*accord ajouté de septieme*, est très bon, & pratiqué par les meilleurs musiciens, meme par tel qui le desaprouve; mais ce n'est pas ici le lieu de m'étendre sur ce sujet. (I:78)

This last inversion, which is called the *accord ajouté de septieme*, is very good and is used by the best musicians, even by those who disapprove of it. But this is not the place to make myself understood on this subject.

Rousseau's decision to admit the third-inversion *accord de sixte ajoutée* is part of an attempt to accommodate two progressions that Rameau himself regards as licenses. The first is the *cadence rompue évitée*.⁴⁹ In the *cadence rompue*, it will be recalled, a

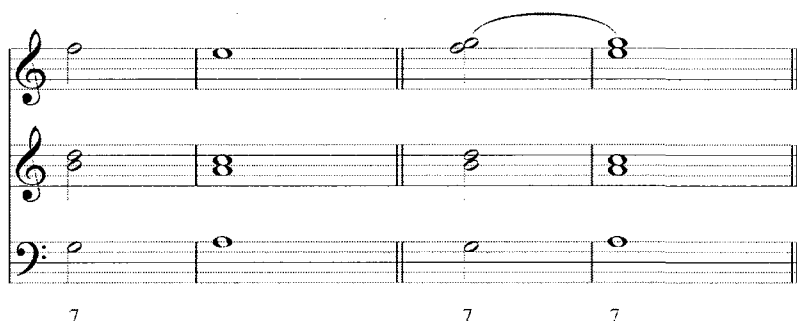
⁴⁷ "Ces Accords *Ut. Mi. Sol. La*, ou *Mi. Sol. La. Ut*, peuvent naître aussi-bien de l'une des Combinaisons d'un *Accord de Septième*, que de celui où la *Sixte* est ajoutée; & ce n'est que par le progrès fondamental qu'on peut s'en appercevoir" (*Nouveau système*, CTW, II, 82). Cf. Rousseau: "Enfin, le cinquieme [accord de sixte] est l'accord de *sixte* ajoutée, qui est un accord fondamental composé, ainsi que celui de grande *sixte*, de tierce, quinte, *sixte* majeure, & octave, & qui se place de même sur la tonique, ou sur la quatrième note du ton. On ne peut donc distinguer ces deux accords que par la maniere de les résoudre sur l'accord suivant; car si la quinte descend, & que la *sixte* reste en place, c'est l'accord de grande *sixte*, & la basse fondamentale fait une cadence parfaite. Mais si la quinte reste & que la *sixte* monte, c'est l'accord de *sixte* ajoutée, & la basse fondamentale fait une cadence irrégulière. Or, comme après avoir frappé cet accord, on est maître de le sauver de l'une de ces deux manieres; cela tient l'auditeur en suspens sur le vrai fondement de l'accord jusqu'à ce que la suite l'ait déterminé; & c'est cette liberté de choisir que M. Rameau appelle *double emploi*" (SIXTE, *en Musique*, XV:235).

⁴⁸ Rameau introduces the *accord de sixte ajoutée* in the second book of his *Traité*, in the course of his discussion of the *cadence irrégulière*. In that passage, Rameau seems to equate the chord with the seventh chord: "s'il semble que nous nous contredisions en cette occasion, vû que nous avons avancé que la septième étoit la source de toutes les dissonances; l'on verra néanmoins que l'Accord dissonant formé de cette *Sixte* ajoutée à l'Accord parfait, n'est autre que celui de la grande *Sixte* renversée de celui de la *Septième*" (*Traité*, CTW, I, 94). Elsewhere in the *Traité*, however, Rameau limits the possible inversions of the added-sixth chord: "cette *Sixte* ajoutée dans la *Cadence irrégulière*, ne faisant point Dissonance avec la Basse, on ne doit jamais renverser l'Accord qui en est formé; de façon que la dissonance que cette *Sixte* fait avec la Quinte, devienne-t-elle contre la Basse" (*Traité*, CTW, I, 147). He reiterates the distinction in the *Nouveau système*: "un Accord où la *Sixte* est ajoutée ne doit jamais être réduit en une Combinaison où la *Septième* s'entende au-dessus de la Basse; parce que l'Accord de la *Septième* étant premier dans son espece, ne peut être reproduit par celui qui en est produit luy-même. Ainsi, cet Accord *Ut. Mi. Sol. La* reconnu pour celui où la *Sixte* est ajoutée, ne peut souffrir que ces autre Combinaisons *Mi. Sol. La. Ut.* & *Sol. La. Ut. Mi.* au lieu que l'Accord de la *Septième* peut se combiner de toutes les façons" (*Nouveau système*, CTW, II, 82).

⁴⁹ Rameau first introduced the *cadence rompue* in the second book of his *Traité de l'harmonie* (CTW, I, 91-93). His discussion there, however, is marked by considerable indecision: indeed, he offers two competing analyses. Rameau's example is the progression from G⁷ to A minor. In a manner that anticipates his later notion of *double emploi*, the first analysis takes A as the root of the second chord, the second takes C. In the first case, the fundamental bass must be allowed to move by step; in the second, the concluding

dominante-tonique resolves to the *tonique* whose root lies a whole-step above. The resulting progression involves a stepwise fundamental bass motion between two chords having no common tones. As such, the *cadence rompue* must be regarded as a license.⁵⁰ The missing *liaison* is supplied, however, when the *cadence rompue* is evaded (Ex. 3.3).

Ex. 3.3. *Encyclopédie, Planches de Musique*, Pl. I, Fig. 3



Rousseau clarifies the context in which this progression typically occurs in the article *REGLE de l'octave, en Musique*. The *règle*, which was introduced into France by François Campion's *Traité d'accompagnement et de composition selon la règle des octaves de musique* (1716), is a method for learning to accompany from unfigured bass lines.⁵¹ The method offers a paradigmatic harmonization of the ascending and descending scale in both the major and minor modes, which the student is to practise in all keys until the association between bass scale degree and accompanying chord has become automatic. Rousseau devotes considerable attention to the *règle*'s harmonization of the sixth degree of the ascending scale. In Campion's version, the fifth, sixth and

harmony must be analyzed, not as a root-position A minor chord, but as some kind of inverted sixth chord. Both explanations are obviously problematic, and in the end, Rameau dismisses the question with the remark that "cette dernière cadence ne puisse être admise que par licence, parce que, où l'accord n'y est plus fondamental, ou la progression de la Basse n'y est plus engendrée des consonances" (*Traité*, CTW, I, 92). Later, in the *Génération harmonique*, Rameau unequivocally adopts the first interpretation: the *cadence rompue* links a *dominante-tonique* to the triad whose root lies a whole-step above and so involves an irregular, stepwise motion in the fundamental bass (*Génération*, CTW, III, 92-93).

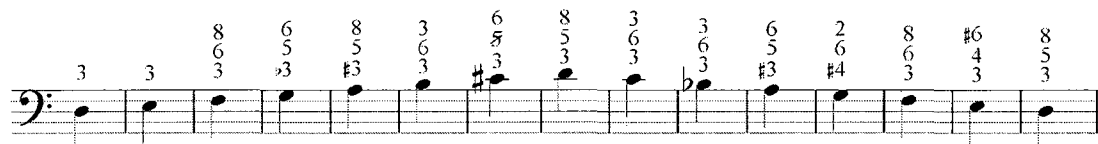
⁵⁰ "Cette *cadence* s'évite le plus souvent par une septième sur la seconde note: il est certain qu'on ne peut la faire pleine que par licence, car alors il y a nécessairement défaut de *liaison*" (*CADENCE, en Musique*, II:514).

⁵¹ On the *règle*, see Thomas Christensen, "The *Règle de l'Octave* in Thorough-Bass Theory and Practice," *Acta Musicologica* 64 (1992): 91-117.

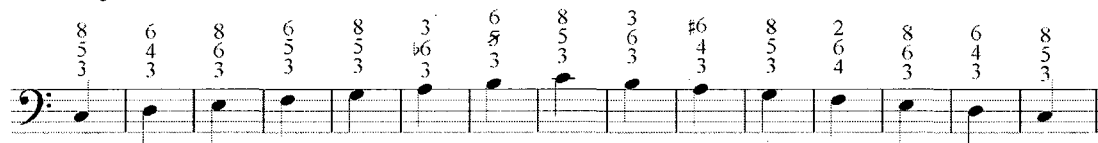
seventh degrees are respectively figured $\frac{5}{3}$, $\frac{6}{3}$, and $\frac{6}{5}$ (Ex. 3.4).⁵² As a result, the progression from the fifth scale degree to the sixth, like that from the sixth to seventh, involves chords containing no common tones that are connected by stepwise root motions.

Ex. 3.4. François Campion's *Règle de l'octave*

Ton Mineur



Ton Majeur



To alleviate these difficulties, Rousseau proposes to amend the *règle* by substituting a root position seventh chord for the $\frac{6}{3}$ chord on the sixth scale degree. The step from the fifth degree to the sixth, in other words, is now harmonized as an evaded *cadence rompue* (Ex. 3.5). The change, however, causes a new problem, since the newly-minted *dominante* on the sixth degree does not resolve as it should. Rather than moving to the *dominante* whose root lies a fifth below (as in an evaded *cadence parfaite*) the chord instead moves directly to the *dominante-tonique* that harmonizes the seventh degree in the bass. (This irregular succession is the second of the two licenses alluded to above.) Rameau, in fact, had described precisely this progression in the *Traité de l'harmonie*, in the course of a chapter entitled “Des Licences tirées de la Cadence rompue” (“On the licenses derived from the *Cadence rompue*”).⁵³ The progression poses two problems: first, the fundamental bass descends by step, and second, the seventh above the first chord fails to resolve as it should.

⁵² The version of the *règle* that Rousseau describes is that given by Campion, though Rousseau attributes it instead to Denis Delaire (XIV:22). Delaire's *Traité d'accompagnement pour le théorbe, et le clavessin* (Paris: n.p., 1690), however, contains no trace of the *règle*.

⁵³ *Traité*, CTW, I, 143-48.

Ex. 3.5. After Rousseau, *REGLE de l'octave*

B.C. 7 7 6
5

B.F. 7 6
5 7

Rousseau's solution to both problems is to reinterpret the apparent A^7 chord in m. 2 of Ex. 3.5 as an added-sixth chord on C—a reinterpretation that his admission of the third-inversion *accord de sixte ajoutée* makes possible. In this way, the initial motion from G^7 to A^7 can be construed as a kind of evaded *cadence parfaite*, and that from A^7 back to G^7 as an evaded *cadence irrégulière*.⁵⁴ The fundamental bass is thus shown to move by fifth in both cases. The dissonant note in m. 2, moreover, is not G but A, which—as a *sixte ajoutée*—resolves upwards as expected to the next chord's third.

Rousseau explicitly raises the issue of the third-inversion added-sixth chord at one point in the entry CADENCE:

M. Rameau qui a parlé le premier de cette *cadence* [la *cadence irrégulière évitée*], & qui en a admis plusieurs renversemens, nous défend dans son *traité de l'Harmonie*, pag. 117. d'admettre celui où le son ajouté est au grave, portant un accord de septieme. Il a pris cet accord de septieme pour fondamental, de sorte qu'il fait sauver une septieme par une autre septieme, une dissonance par une autre dissonance, par mouvement semblable sur la basse fondamentale. Voyez *fig. 4* [Ex. 3.6] Mais

M. Rameau, who was the first to speak of this cadence [the evaded *cadence irrégulière*] and who admits many inversions of it, forbids us in his *Traité de l'harmonie*, p. 117, to admit that inversion in which the added sound appears in the bass bearing a seventh chord. He takes that seventh chord as a fundamental chord, so that he resolves one seventh by another, one dissonance by another, by a similar [i.e. stepwise] movement in the fundamental bass. See *fig. 4* [Ex. 3.6]. But

⁵⁴ “Je tiens donc pour une chose certaine, que l'accord de sixte, dont on accompagne la sixieme note du ton en montant, est une faute qu'on doit corriger, & que pour accompagner régulièrement cette note, comme il convient dans une formule, il n'y a qu'un seul accord à lui donner, qui est celui de septieme; non une septieme fondamentale, qui ne pouvant se sauver que d'une autre septieme, seroit une faute dans cet endroit: mais une septieme renversée d'un accord de sixte ajoutée sur la tonique” (*REGLE de l'octave, en Musique*, XIV:22). The grain of the idea can be found in Rameau's *Traité*, in the first, abortive analysis of the *cadence rompue*, according to which the progression's second chord is analyzed as an *accord de sixte* substituted for the *tonique* that would appear in a *cadence parfaite* (see above, p. 119n49). In no later treatise, though, did Rameau resuscitate this interpretation, and if Rousseau seems to consider it for the *cadence rompue évitée*, he never applies it to the *cadence rompue* itself.

l'harmonie sous laquelle cet auteur a mis une telle basse fondamentale, est visiblement reversée d'une *cadence irrégulière* évitée par une septime ajoutée sur la second note, *même figure*; & cela est si vrai, que la basse continue qui frappe la dissonance, est nécessairement obligée de monter diatoniquement pour la sauver, autrement le passage ne vaudrait rien. D'ailleurs M. Rameau donne dans le même ouvrage, pag. 272. un exemple d'un passage semblable avec la vraie basse fondamentale: on peut remarquer encore que dans un ouvrage postérieur, (*Gener. Harm.* pag. 186.) le même auteur semble reconnoître le véritable fondement de ce passage à la faveur de ce qu'il appelle le *double emploi*.⁵⁵ (II:514)

the harmony under which he puts such a fundamental bass is clearly an inversion of an evaded *cadence irrégulière*, (same figure), and this is so true that the *basse continue*, which strikes the dissonance, is necessarily obliged to ascend diatonically in order to resolve it, otherwise the progression is worthless. Moreover, in the same work, M. Rameau gives, on p. 272, an example of a similar passage with the correct fundamental bass. One can also note that in a later work (*Génération harmonique*, p. 186) the same writer seems to recognize the true foundation of this passage thanks to what he calls *double emploi*.

Ex. 3.6. *Planches de Musique*, Pl. I, Fig. 4

B.-F. de M. Rameau Vritable B.-F.

⁵⁵ Rousseau's reading of Rameau in this passage is essentially accurate, *pace* Sydney Kleinmann, *Le Solmisation mobile de Jean-Jacques Rousseau à John Curwen* (Paris: Heugel, 1974), 50-58. Just before the first passage Rousseau cites, Rameau discusses the resolution, *par licence*, of a seventh chord to another seventh chord by a descending step in the fundamental bass and gives a musical example equivalent to the first half of Ex. 3.6 (*Traité*, CTW, I, 145). In this passage, he analyses the second and third chords as A⁷ and G⁷ respectively, and while he notes the resemblance of the progression to an evaded *cadence irrégulière*, he rejects that analysis because he does not allow the *accord de sixte ajoutée* to appear with its added-sixth in the bass (*Traité*, CTW, I, 146-47). In the second passage, Rameau gives a musical example approximately equivalent to the second half of Ex. 3.6. Nevertheless, Rameau insists that when the bass ascends stepwise from G through A and B to C (as in Ex. 3.6), the step from A to B cannot be analyzed as an evaded *cadence irrégulière*, since doing so would mean admitting an added-sixth chord with the added sixth in the bass. Finally, in the *Génération harmonique*, Rameau shows both fundamental basses in his Ex. 29 (CTW, III, 108). As Rousseau claims, Rameau invokes the *double emploi* in this last passage.

The Augmented-Sixth Chord

Rousseau's third departure from Rameau is his inclusion of the *accord de sixte superflue* among the *accords fondamentaux*.⁵⁶ The chord would subsequently play a role in the quarrel between Rameau and d'Alembert, and it proves illuminating briefly to consider that posterity.⁵⁷ In his article FONDAMENTALE, *Musique moderne*, which appeared in 1757, d'Alembert draws particular attention to the appearance of the augmented-sixth chord in Rousseau's *Table de tous les accords*:

M. Rousseau, *au mot Accord*, a eu très-grande raison de placer parmi les accords fondamentaux, cet accord de sixte superflue, dont les autres auteurs françois n'avoient point fait mention, au moins que je sache, & dont j'avoue que j'ignorois l'existence, quand je composai mes élémens de musique, quoique M. Rousseau en eût déjà parlé. M. de Bethizy, dans un ouvrage sur la théorie & la pratique de la Musique, publié en 1754, dit qu'il ne se souvient point que M. Rameau ait parl[é] de cet accord dans ses ouvrages, quoiqu'il l'ait employé quelquefois, par exemple dans un chœur du premier acte de *Castor & Pollux*. (VII:57)

M. Rousseau includes the augmented-sixth chord among the fundamental chords with good reason under the word *accord*. No other French writer mentions this chord, at least so far as I know, and I avow that I myself did not know about it when I wrote my *Élémens de musique*, even though M. Rousseau had already spoken of it. M. de Béthizy, in a work on the theory and practice of music published in 1754, says that he does not remember M. Rameau having spoken of this chord in his writings, though he has sometimes employed it, for instance in a chorus from the first act of *Castor et Pollux*.

The chorus from *Castor et Pollux* is "Que l'enfer applaudisse," which occurs near the end of the first act of the 1737 version of the opera (Ex. 3.7). The treatise that d'Alembert cites is Jean-Laurent de Béthizy's *Exposition de la théorie et la pratique de la musique suivant les nouvelles découvertes* (1754). Béthizy's discussion is sufficiently interesting to warrant being quoted in full:

Il manqueroit quelque chose à ce que j'ai dit des accords dans le Chapitre précédent & dans celui-ci, si je ne parlois à présent d'un accord fort singulier, qui semble être un accord renversé, qui ne vient néanmoins d'aucun accord direct, & qui n'a point par conséquent de B[asse] F[ondamentale]. Il

Something would be missing from what I said about chords in the preceding chapter and in this one, if I did not speak of a very strange chord that seems to be an inverted chord but that nonetheless derives from no root-position chord and so has no fundamental bass. It is called the

⁵⁶ Michael O'Dea notes this departure in "Consonances et dissonances," 116.

⁵⁷ On the role of the augmented-sixth chord in Rameau's dispute with d'Alembert, see Jonathan Bernard, "The Principle and the Elements: Rameau's Controversy with d'Alembert," *Journal of Music Theory* 24 (1980): 53.

s'appelle *accord de sixte superflue* ou de *sixte Italienne*. Il est composé d'une note, de sa tierce majeure, de sa quarte superflue, qu'on regarde comme quarte juste, & de sa sixte superflue, c'est-à-dire, d'une note plus haute d'un demi-ton mineur que la sixte majeure de cette première note. Entre tous les accords, il n'y en a point dont il approche autant que de celui de petite sixte qui est formé par le renversement d'une accord de septième porté par la dominante simple des modes mineurs. Voy. l'ex. 134 [Ex. 3.8]. Il vous présente cet accord sur les trois *fa* de la B[asse] C[ontinue]. Le premier *fa* le porte après celui de petite sixte, le second & le troisième le portent à la place de celui de petite sixte, qu'ils devroient naturellement porter. J'ai dit que cet accord extraordinaire ne venoit d'aucun accord direct, & n'avoit point de B. F. En effet si l'accord *fa la si re#* venoit de quelqu'accord direct, & s'il avoit une B. F. cet accord direct seroit *si re# fa la*, & la B. F. *si*. Or les notes *si re# fa la* ainsi rangées ne forment point un accord, parce qu'il se trouve entre *re#* & *fa* un intervalle de tierce diminuée, intervalle que l'oreille ne souffre point entre deux notes; & par conséquent un *si* fondamental ne peut porter au-dessus de lui *re# fa la*. L'accord de sixte superflue ne vient donc d'aucun accord direct & n'a point de B. F. Je ne me souviens d'aucun endroit où M. Rameau fasse mention de cet accord. Il l'a néanmoins employé. Vous le trouverez dans un chœur de premier Acte de *Castor & Pollux*.⁵⁸

augmented, or Italian sixth chord. It is composed of a note, its major third its augmented fourth, which is treated as a perfect fourth, and its augmented sixth, that is to say, the note one semitone above the major sixth of the first note. Of all chords, it most resembles the *petite sixte* formed by inverting the supertonic seventh chord in the minor mode. See ex. 134 [Ex. 3.8]. The example presents the chord on the three F's in the *basse continue*. On the first F it follows the *accord de petite sixte*. On the second and third, it substitutes for the *petite sixte* that the note would usually bear. I have said that this extraordinary chord does not derive from any root-position chord and has no fundamental bass. If the chord F-A-B-D# did indeed derive from some root-position chord and if it had a fundamental bass, that root position chord would be B-D#-F-A and the fundamental would be B. But the notes B-D#-F-A thus arranged do not form a chord, because the interval from D# to F is a diminished third, which interval the ear does not allow between two notes, and so consequentially, B cannot be the root of D#-F-A. Thus, the augmented-sixth chord has no root position and no fundamental. I do not remember any place where M. Rameau mentions the chord. Nonetheless he has employed it. You will find it in a chorus in the first act of *Castor et Pollux*.

⁵⁸ Jean Laurent de Béthizy, *Exposition de la théorie et de la pratique de la musique, suivant les nouvelles découvertes* (Paris: Michel Lambert, 1754), 205-206.

Ex. 3.7. Rameau, *Castor et Pollux*, Act I, scene iv,
 “Que l’enfer applaudisse,” mm. 16-19

The musical score is for a vocal line with a keyboard accompaniment. It is divided into two sections: 'Lent' (measures 16-18) and 'Vite' (measure 19). The key signature has two flats (B-flat and E-flat). The time signature is 6/4. The lyrics are: 'Qu'une ombre plaintive en jouisse!'. The score shows a transition from a slow tempo to a fast tempo.

Béthizy’s second-last claim—that Rameau had neglected to mention to augmented-sixth chord—is almost correct. In fact, the chord appears twice in Rameau’s writings before 1754: it is listed in the table of dissonant figured-bass signatures given at the beginning of the *Dissertation sur les différentes méthodes d’accompagnement* and is also mentioned in the announcement of that work that Rameau published in the *Mercure de France* in 1730.⁵⁹ Still, in neither place does Rameau make any attempt to explain the chord, and indeed he would not do so until 1758, in an open letter written in response to d’Alembert’s 1757 article.⁶⁰

In truth, Rameau had good reason to be evasive. As Béthizy’s discussion suggests, the augmented-sixth chord is difficult to rationalize within the framework of *ramiste* theory. The particular chord with which Rousseau, d’Alembert, Béthizy and Rameau are concerned is the so-called “French-sixth” chord, which occurs over the sixth scale degree and contains, in addition, the major third, augmented fourth and augmented sixth above the bass. The chord poses two problems for Rameau: first, it cannot be written as a series of stacked major or minor thirds, and second, its root is ambiguous. Nineteenth and twentieth-century theorists, confronted with the chord F-A-B-D#, variously take F, D#, or B as the root. Béthizy briefly considers the last possibility, a choice that serves to emphasize the relationship he notes between the French sixth and the second-inversion supertonic seventh chord. In the end, however, he rejects this analysis and concludes instead that the augmented-sixth chord has no root at all. In his

⁵⁹ *Dissertation*, CTW, V, 8; “Observations sur la méthode d’accompagnement pour le clavecin qui est en usage, & qu’on appelle echelle ou regle de l’octave” (*Mercure de France* [February 1730]: 254).

⁶⁰ Jean-Philippe Rameau, *Lettre à M. d’Alembert, sur ses opinions en musique, insérées dans les articles FONDAMENTAL & GAMME de l’Encyclopédie* (1758).

musical example, he expresses this conclusion by leaving the fundamental bass blank under each augmented-sixth chord (Ex. 3.8).

Ex. 3.8. Béthizy, *Exposition de la théorie et la pratique de la musique*, ex. 134

The musical score for Ex. 3.8 consists of two systems, each with two staves. The top staff of each system is in treble clef and contains augmented-sixth chords. The bottom staff is in bass clef and contains notes and figured bass. The first system's bottom staff is labeled 'B. C.' and 'B. F.' and includes figures: 5, 7, 6, 4, 3, #6, #. The second system's bottom staff includes figures: 6, #6, #, 6, 7, #6, #, and 7.

Béthizy's preferred analysis is also the interpretation that Rameau adopted in his 1758 response to d'Alembert:

[P]our ce qui est de la *sixte superflue* . . . un pareil intervalle n'est de mise que dans un seul cas, & ne doit pas se confondre avec ce qu'on appelle accord; il n'est susceptible de *B. F.* ni de renversement, le goût seul l'autorise en faveur des droits que la note sensible a dans l'harmonie. (CTW, IV, [6-7])

As for the augmented sixth . . . such an interval is only used in one case, and must not be confounded with what one would call a chord; it has no fundamental bass nor any inversions, and taste alone authorizes it thanks to the rights enjoyed by the leading tone in harmony.

In the context of Rameau's theorizing, though, this explanation is curious. Rameau, after all, assigns a fundamental bass to almost every other sonority, and his failure to do so here seems oddly expedient, as d'Alembert was quick to rejoin.⁶¹ Rameau must have

⁶¹ "[I]l est vrai que pour lever la difficulté, vous dites que cet accord n'en est pas un; quel est-il donc? & pouvez-vous croire que personne se paye de cette défaite, lorsque vous donnez une basse fondamentale à

been equally dissatisfied with the explanation, for two years later he changed his mind. In the *Code de musique pratique*, he revives Béthizy's abortive analysis of the augmented-sixth chord as a modified supertonic seventh chord. Thus, in the *Code*, the chord F-A-B-D# is an inverted form of B-D#-F-A, and the chord's root is B (Ex. 3.9).⁶²

Ex. 3.9. Rameau, *Code de musique pratique*, ex. L

The musical notation consists of three staves. The top staff is a treble clef with a 3/4 time signature, containing three chords: F-A-B-D# (first inversion), B-D#-F-A (second inversion), and F-A-B-D# (first inversion). The middle staff is a bass clef with a 3/4 time signature, containing three chords: B-C (first inversion), F-A-B-D# (first inversion), and B-D#-F-A (second inversion). The bottom staff is a bass clef with a 3/4 time signature, containing three chords: B-F (first inversion), F-A-B-D# (first inversion), and B-D#-F-A (second inversion).

Curiously enough, this is precisely the analysis of the augmented-sixth chord that Rousseau gave five years earlier in 1749. Rousseau's example is Bb-D-E-G#. In the entry ACCORD, he comments: "Cet accord ne se renverse point, & aucune de ses sons ne peut s'altérer. Ce n'est proprement qu'un accord de petite sixte majeure, diésée par accident" ("This chord cannot be inverted and none of its sounds may be altered. It is properly nothing but an *accord de petite sixte majeur*, with an accidental sharp," I:78). In the article SIXTE, *en Musique*, Rousseau elaborates:

Enfin, le cinquieme [*recte*: sixieme] accord de *sixte*, est celui de *sixte* superflue; c'est une espece de petite *sixte*, qui ne se pratique jamais que sur la sixieme note d'un ton mineur, descendant sur la dominante; comme alors la *sixte* de cette sixieme note est naturellement majeure, on la rend quelquefois superflue en y ajoutant encore un dièse. (XV:235)

Finally, the sixth [type of] *accord de sixte* is the augmented sixth chord; it is a kind of *petite sixte*, which only occurs in the minor mode when the sixth degree resolves to the dominant [note]; since the sixth of this sixth degree is naturally majeur, one sometimes makes it augmented by adding a sharp.

tous les autres accords?" (Jean le Rond d'Alembert, "Réponse de M. d'Alembert à une Lettre imprimée de M. Rameau," *Mercure de France* [March 1762], 142-43).

⁶² "De cette dernière communauté d'accords suit la possibilité d'une *sixte superflue*, en diésant également la quarte de la tonique d'un *Ton mineur* dans son accord de *seconde*, lorsque la B. C. descend d'un demi-ton sur sa dominante-tonique; ce qui se pratique volontiers lorsqu'on veut faire sentir un repos absolu sur cette dominante-tonique" (*Code*, IV, 80). Is Béthizy Rameau's source? The similarity between their musical examples, in any case, is striking.

An *accord de petite sixte*, in Rameau's theoretical vocabulary, is simply any second-inversion seventh chord.⁶³ The particular seventh chord in question here, as the passage from SIXTE makes clear, is that on the second scale degree. Rousseau's discussion implies, therefore, that the augmented-sixth chord Bb-D-E-G# in his example is an altered and inverted form of the supertonic seventh chord E-G♯-Bb-D.

Rousseau would, of course, have been familiar with the augmented-sixth chord from its various appearances in the repertoire with which he was familiar. The recitative "Pour arrêter cette inhumaine," from Louis Clérambault's *Alphée et Arethuse*, furnishes one such example (Ex. 3.10). The cantata is from Clérambault's second (1713) book — the one book, Rousseau relates in the *Confessions*, that he took with him when he entered the Lazarist seminary at Annecy (OC, I, 117-18).

Ex. 3.10. Clérambault, *Alphée et Arethuse*,
"Pour arrêter cette inhumaine," mm. 1-4

If Rousseau's acquaintance with the chord is easily explained, the source of his theoretical explanation is less obvious. D'Alembert's claim that no French theorist before Rousseau discussed the chord may be summarily dismissed: it is treated, for one, in François Campion's *Traité d'accompagnement*. Campion introduces the augmented-sixth chord as a possible substitution for the $\frac{4}{3}$ chord that his *règle* prescribes for the sixth degree of the descending minor scale:

Sur cette sixième du ton, la 6^{te} est naturellement majeure, j'ay cependant mis un diéze à costé pour la diézer, & elle s'appelle ainsi 6^{te} superfluë, c'est un accord extraordinaire. Les Italiens la chiffrent d'un 7. avec un b mol à costé, & nos

On the sixth degree, the sixth is naturally major. I have nonetheless put a sharp beside it in order to raise it. This is an extraordinary chord. The Italians figure it by a 7 with a flat beside and we French with a sharp beside the 6 as I have done.

⁶³ For instance, see Rameau, *Traité*, CTW, I, 68-73.

⁶⁴ François Campion, *Traité d'accompagnement et de composition selon la règle des octaves de musique* (Paris: G. Adam, 1716), 12-13.

François d'un diéze auprès de la 6^{te}. ainsi que je l'ay mise. Son degré est 7^{me} mineure.

Cet accord n'est pas goûté des Anciens, qui ne l'ont point pratiqué, c'est à mon avis un accord excellent, quand on le sçait placer à propos, & qu'on n'en use point trop souvent.

Le fa qui tient lieu de bémol dans l'octave du là, est notte sensible; le ré diéze qui fait sixte superfluë, est là en quelque façon notte sensible du mi, où se termine extrêmement bien l'harmonie.⁶⁴

Its degree is a minor seventh.

This chord was not to the taste of the ancients, who did not use it. In my opinion it is an excellent chord, when one knows how to place it well and does not use it too often.

The F that takes the place of a flat in A minor is a *note sensible*. The D# that forms the augmented sixth is in a certain sense the *note sensible* of E, to which the harmony resolves most satisfactorily.

Campion's remarks, the reader will have noticed, are strikingly similar to those Rousseau ventures in the entry SIXTE. Given the resemblance between the analyses, and the fact that Rousseau cites Champion's treatise explicitly in the article ACCOMPAGNEMENT (I:75), it is tempting to surmise that Champion is Rousseau's source. Of course, the idea that the chord is related to the supertonic seventh chord—that it is a *petite sixte* in Rousseau's sense—is foreign to Champion, depending as it does on a notion of chordal inversion first introduced by Rameau. Rousseau's analysis, which as we have seen is equivalent to that adopted by Rameau in the *Code de musique pratique*, effectively treats the augmented sixth chord as a kind of modified *dominante*. To return to the example from Clérambault, the augmented-sixth chord Bb-D-E-G# (m. 3) has E as its root. When this chord resolves on the downbeat of m. 4, that root passes by a falling fifth to A. The resolution of the augmented-sixth chord to the triad on the dominant thus forms a kind of modified *cadence parfaite*.

Supposition

A final respect in which Rousseau departs from Rameau is his handling of supposition. All of the *accords par supposition* listed in the chord table that Rousseau provides in ACCORD are formed by placing an additional note (*note par supposition*) below a *dominante*, a *dominante-tonique* or an *accord de septième diminuée*. The added bass note, though, is a non-harmonic tone that does not fundamentally alter the identity of the chord to which it has been joined. The newly-formed chords, that is to say, inherit their roots from their corresponding seventh chords. Thus, taking Rousseau's examples,

the root of the *accord de neuvième* F-A-C-E-G, is A, not F; similarly, that of the *accord de onzième* C-G-B-D-F is G.

The basic classification of chords by supposition reflected in Rousseau's table is familiar from Rameau's writings.⁶⁵ There are two fundamental *accords par supposition*: the *accord de neuvième* and the *accord de onzième* (See Fig. 3.2 above). The *accord de quinte superflue* is a particular kind of *accord de neuvième* in which the fifth above the sounding bass is augmented.⁶⁶ Similarly, the *accord de septième superflue* is an *accord de onzième* with an augmented seventh above the sounding bass. The *accord de septième superflue et sixte mineure*, finally, is best understood as an *accord de septieme superflue* with an *accord de septieme diminuée* replacing the *dominante-tonique* as its upper part (e.g. A-G#-B-D-F in place of A-E-G#-B-D).

Where Rousseau departs strikingly from Rameau is in allowing the *accord de neuvième* and *accord de onzième* to be inverted. Rameau objected strenuously in his *Erreurs sur la musique dans l'Encyclopédie* (1755), where he portrayed Rousseau's inverted ninth and eleventh chords as proof of the latter's total incompetence:

Malgré la voix de la nature, malgré l'oreille son fidèle interprète en Musique, malgré ce que M. Rameau a pû tirer de l'une & de l'autre pour constater la *supposition*, malgré les moyens les plus simples qui ont dû se présenter à M. Rousseau pour lui désillier les yeux sur ses erreurs à ce sujet, que dis-je, malgré sa décision même sur la génération de la dissonance, décision absolument opposée à ce qu'on va lire, il attribué à cette supposition un droit de renversement qui ne peut appartenir qu'à l'harmonie fondamentale. (CTW, V, 233)

Despite the voice of nature, despite the ear, its faithful interpreter in music, despite what M. Rameau has derived from the one and the other to establish supposition, despite the most simple means that must have presented themselves to M. Rousseau to open his eyes to his errors on the subject, I say, despite even his opinion on the generation of dissonance, an opinion absolutely opposed to what we are about to read, he attributes to this supposition a possibility of inversion that can only pertain to fundamental harmonies.

Rameau's essential charge is that Rousseau has grouped together, as ostensible inversions of one and the same harmony, chords that are in fact entirely unrelated.

⁶⁵ See, in particular, *Traité*, CTW, I, 303-17.




⁶⁶ The chord appears in minor modes on the mediant and typically resolves by a descending-third skip in the bass. It is one of the most characteristic sonorities of French Baroque music. For a concise discussion with numerous examples, see James R. Anthony, *French Baroque Music from Beaujoyeulx to Rameau*, revised and expanded ed. (Portland: Amadeus Press, 1997), 235-36, 240, and 261-62. An exhaustive treatment may be found in Charles Jay Moomaw, "Augmented Mediant Chords in French Baroque Music" (Ph.D. diss., University of Cincinnati, 1985).


According to Rameau, Rousseau's *accord de onzième* and its two purported inversions are in fact so many iterations of the same chord transposed to different degrees (Ex. 3.11). In each case, Rameau takes the chord in Rousseau's example as an *accord de onzième* with the *note par supposition* in the bass. Accordingly, the fifth above the apparent bass is in each case the root, and the fourth above the sounding bass (really the seventh over the *basse fondamentale*) is the dissonant note. Thus, the first chord is a *dominante-tonique* on G with a supposed C, the second is a *simple dominante* on D with a supposed G, and the third a *dominante-tonique* on C with a supposed F (CTW, V, 239-40). According to Rameau, Rousseau obscures the identity of the last two chords by omitting some of their pitches. Had he supplied these—as Rameau claims to do—the real relationship between the chords would have been made clear. Adding the missing pitches, moreover, clarifies the context in which the chords appear. The first chord resolves to a *tonique* on C, and the second to a *dominante-tonique* on G and the third to a *tonique* on F. Since they resolve to different harmonies, the latter two chords cannot *pace* Rousseau, be inversions of the first.⁶⁷

Rousseau's inverted ninth chords, Rameau's indictment continues, are equally ill-conceived, though the particular error differs. The *accord de septième & sixte*, which Rousseau presents as a first-inversion *accord de neuvième*, is in fact a passing dissonance that does not affect the underlying harmony. The A in the bass, which Rousseau takes as the chord's fundamental, is merely a passing tone connecting G and B, and the effective harmony throughout the entire progression is G⁷ (Ex. 3.12; CTW, V, 236-37). Similarly, Rameau implies, the *accord de sixte quinte & quarte* and *accord de septième & seconde* are passing sonorities that Rousseau has mistaken for fundamental harmonies.

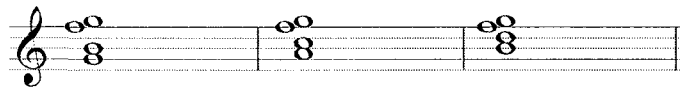
⁶⁷ “La même harmonie qui précède & suit un Accord fondamental doit également précéder & suivre ses dérivés” (*Erreurs*, CTW, V, 234). Rousseau, though, clearly understood this: “Par-tout où un accord sera bien placé, tous les *renversements* de cet accord seront bien placé aussi; car c’est toujours la même succession fondamentale” (RENVERSEMENT, *en Musique*, XIV:122).

Ex. 3.11. After Rameau, *Erreurs*, pp. 84-87.

<p>Le son supposé au grave</p> 	<p>Le son fondamental au grave</p> 	<p>Sa septieme au grave</p> 
<p>Accord de neuvieme & quarte; ou deux son retranchés de quarte simplement</p>	<p>Accord de septieme & quarte</p>	<p>Accord de seconde & quarte [recte: quinte]</p>



Ex. 3.12. After Rameau, *Erreurs*, pp. 79-81



Rameau's general charge, therefore, is that Rousseau has misunderstood both the substance and the purpose of his doctrine of supposition. Yet nothing could be further from the truth. As the entries *SUPPOSITION, en Musique* and *SUSPENSION, en Musique* testify, Rousseau understood Rameau's doctrine perfectly well. What his inverted ninth and eleventh chords are meant to do is to expand that doctrine so as to account for sonorities that Rameau himself would have had to class as licenses.

This last point emerges more clearly from Rousseau's probable source: Henri de Blainville's *Harmonie théorico-pratique* (1746), which likewise allows certain inversions of the *accord de neuvième* and *accord de onzième*. "Quoique la Neuvième & la Onzième soient des Accords par supposition," Blainville writes, "ils peuvent cependant se renverser" ("Although the ninth and the eleventh are chords by supposition . . . they may nonetheless be inverted"):

Ainsi la Neuvième sur la Tonique,
accompagnée seulement de Tierce &
Quinte, donnera par son renversement, (A)
la Septième avec Sixte & Tierce sur la

Thus the ninth on the tonic, accompanied
only by the third and the fifth, will give as
its inversion: (A) the seventh with the sixth
and the third on the mediant, the six-five-

Mediante: la Sixte, Quinte & Quarte sur la Dominante: et la Septième Seconde & Quinte sur la seconde Note.

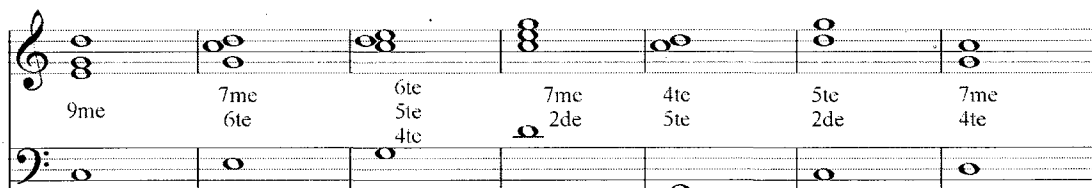
La Onzième sur la Dominante accompagnée seulement de Quinte & Octave donnera par son renversement la Seconde & Quinte sur la Tonique, la Septième & Quarte sur la seconde Note; (B) ce qui se fait également dans le Mode-mineur, comme dans le Mode-majeur.⁶⁸

four on the dominant, and the seven-five-two on the second note.

The eleventh on the dominant accompanied solely by the fifth and octave will give as its inversion: (B) the five-two on the tonic, and the seven-four on the second note, which appears in both the minor and the major mode.

The musical example that accompanies Blainville's discussion is reproduced as Ex. 3.13. Clearly, each chord from Rousseau's table has its correlate in Blainville's example. The *accord de septième et sixte*, *accord de sixte, quinte et quarte*, and *accord de septième et seconde* all appear as inversions of the *accord de neuvième*. Similarly, the *accord de quinte et seconde* and *accord de quarte* figure as inversions of the *accord de quinte et quarte* (that is, the *accord de onzième*).

Ex. 3.13. Blainville, *Harmonie théorico-pratique*, p. 7



Later on in his treatise, however, Blainville provides a detail that Rousseau neglects, namely a set of musical examples clarifying the contexts in which the inverted chords by supposition appear (Ex. 3.14). The *accord de sixte, quinte et quarte* appears in m. 3, the *accord de septième et seconde* in m. 5 and the *accord de septième et sixte* in m. 7. In each case, the chord resolves like the *accord de neuvième* in m. 1. The dissonant note is D, the seventh above the chord root E, and the added C is a *note par supposition* (or rather superposition in the inverted chords). Similarly, the *accord de quinte et seconde* appears in m. 13, and the *accord de septième et quarte* in m. 15. Both resolve like the *accord de quinte et quarte* in m. 11: the dissonant seventh is C, D the root, with G supposed. Whether or not these analyses are particularly salutary, their purpose is

⁶⁸ Charles Henri de Blainville, *Harmonie théorico-pratique* (Paris: Ballard, 1746), 7.

clear: they are meant to bring certain kinds of passing dissonances under the rubric of Rameau's theory of supposition, and they do so by loosening Rameau's strictures regarding the inversion of ninth and eleventh chords.

Ex. 3.14. Blainville, *Harmonie théorico-pratique*, p. 31

accord renversez de la 9eme

9-8 7 6
5
4 6
4 3 6 7
2 6 7 6
6

8 *de 4te 5ie*

8 4 3 5
2 8 6 7
4 6

In sum, Rousseau's *Encyclopédie* articles both alter and extend Rameau's theory of harmony in a number of respects. Some of Rousseau's extensions allow Rameau's system to cover additional progressions encountered in practice. Such extensions are presumably meant to enlarge the theory's explanatory scope by bringing apparently anomalous progressions within its compass. Rousseau's admission of all possible inversions of the *accord de sixte ajoutée*, for instance, allows him to normalize both the evaded *cadence rompue* and the progression from vi^7 to V^7 . His inclusion of inverted ninth and eleventh chords likewise serves to bring certain kinds of passing dissonances into theoretical fold of Rameau's system. Not all anomalous progressions, however, can be rationalized in this way, and indeed one of Rousseau's revisions has a far more critical import. This last is Rousseau's handling of the diminished seventh chord, which raises a number of problems for Rameau's account of harmonic succession. As such, this

particular revision deserves to be numbered among the challenges that Rousseau directs at the empirical adequacy of Rameau's theory, and so demands to be considered alongside Rousseau's other empirical criticisms in the following section.

3.3. Empirical Inadequacies in Rameau's Theory

In the course of his exposition, Rousseau identifies a number of harmonic progressions that violate some or all of Rameau's strictures. Chief among these is the *cadence rompue*. Rameau's model of harmonic succession, of course, insists that adjacent chords be bound together by consonant root motions, common-tones and characteristic dissonances. The *cadence rompue* clearly violates the first two conditions: the fundamental bass ascends by step and the two chords comprising the cadence have no notes in common. Moreover, unlike the *cadence rompue évitée*, which can be reinterpreted as a kind of evaded perfect cadence,⁶⁹ the full *cadence rompue* cannot be normalized. It remains a license: "Cette *cadence* s'évite le plus souvent par une septieme sur la seconde note," Rousseau observes in *CADENCE, en Musique*, "il est certain qu'on ne peut la faire pleine que par licence" ("This cadence is usually evaded by a seventh added to the second note: in any case, it can only be given full by license," II:514).

The *cadence rompue*, however, is not the only such anomaly. On a number of occasions, Rousseau insists that the same problem beset the resolution of the *accord de septième diminuée*. The particular chord in question, to recall, is the leading-tone seventh chord. In both the *Traité de l'harmonie* and the *Génération harmonique*, Rameau maintains that the leading-tone diminished seventh chord borrows its fundamental bass from the *dominante-tonique* on the fifth degree. For this reason, he regards its resolution to the tonic as a modified *cadence parfaite*. When, however, in the "Art de la basse fondamentale," Rameau instead takes the leading tone as the root of the chord, this connection to the *cadence parfaite* is lost. Accordingly, near the end of the entry *CADENCE*, Rousseau introduces a fifth cadence type (which has no name) to cover this progression:

Il y a encore une autre espece de *cadence* There is also another species of cadence

⁶⁹ As d'Alembert would later do at *Elémens*, 82-84.

que les Musiciens ne regardent point comme telle, & qui, selon la définition, en est pourtant une véritable; c'est le passage de l'accord de septieme diminuée de la note sensible, à l'accord de la tonique[.] (II:515)

that musicians do not treat as such but that is one nonetheless, according to the definition. This is the resolution of the diminished seventh chord on the leading tone to the tonic.

As in the *cadence rompue*, the two chords involved have no common tones: "dans ce passage il ne se trouve aucune liaison harmonique, & c'est le second exemple de ce défaut dans ce qu'on appelle *cadence*" ("In this progression, there is no harmonic *liaison*, and this is the second example of this fault that one finds among the cadences," II:515). Furthermore, and again as in the *cadence rompue*, the fundamental bass ascends by step between the chords:

Bien moduler & observer la liaison, sont les deux plus importantes regles de la *basse fondamentale* . . . et la principale regle mécanique qui en découle, est de ne faire marcher la *basse fondamentale* que par intervalles consonans, si ce n'est seulement dans un acte de cadence rompue, ou après un accord de septieme diminuée, qu'elle monte diatoniquement. (BASSE FONDAMENTALE, II:119)

To modulate well and to observe *liaison* are the two most important rules for the fundamental bass . . . and the principle mechanical rule that results is that the fundamental bass must move by consonant intervals, except in a *cadence rompue* or after a diminished seventh chord, in which case it ascends diatonically

Rousseau reiterates the point under the word LIAISON, *en Musique*:

Bien lier l'harmonie, est une des grandes regles de la composition, & celle à laquelle on doit avoir le plus d'égard dans la marche de la basse fondamentale . . . Il n'y a qu'un seul mouvement permis sur lequel elle ne puisse se pratiquer; c'est lorsque cette basse monte diatoniquement sur un accord parfait: aussi de tels passages ne doivent-ils être employés que sobrement, seulement pour rompre une cadence, ou pour sauver une septieme diminuée. (IX:455)

To connect the chords [by common tones] is one of the principal rules of composition, and the one that must be most carefully observed with respect to the progression of the fundamental bass . . . There is only one succession in which it cannot be done; this is when the fundamental bass ascends diatonically: such a progression must be used sparingly, only for a *cadence rompue* or the resolution of a diminished seventh chord.

To the three anomalous progressions just listed, Rousseau sometimes seems ready to add a fourth: namely, the resolution of the augmented-sixth chord.

M. Rameau . . . prononce en générale, qu'un accord consonant ne peut être précédé d'un autre dissonant que de celui

M. Rameau . . . maintains in general that the only dissonant chords that can precede a triad are the seventh on the dominant and

de septieme de la dominante, ou celui de sixte-quinete de la soûddominante, excepté dans la cadence rompue & dans les suspensions; encore prétend-il qu'il n'y a pas d'exception quant au fond. Il nous paroît que l'accord parfait peut encore être précédé de l'accord de septieme diminuée, & même de celui de sixte superflue; deux accords originaux, dont le dernier ne se renverse point. (ACCOMPAGNEMENT, I:76)

the six-five on the subdominant, except in the case of suspensions or a *cadence rompue*. He even claims that there are fundamentally no exceptions. It seems to me that the triad can also be preceded by the diminished seventh chord, and even the augmented-sixth chord, two fundamental chords, the second of which cannot be inverted.

Rousseau's own analysis of the *accord de sixte superflue*, though, tends to reconcile its behaviour with Rameau's strictures. That analysis, we have seen, implies that the augmented-sixth chord is properly an *accord de petite sixte* (i.e. second-inversion *dominante*) in which the sixth is raised by an accidental. This description implies that the chord is really an altered *dominante* on the second scale degree, whose resolution to the triad or *dominante-tonique* on the fifth degree forms a modified *cadence parfaite*.

In the *Erreurs*, in the course of a series of objections to Rousseau's article ACCOMPAGNEMENT, Rameau made essentially this point, and he extended the same complaint to Rousseau's treatment of the diminished seventh chord:

[C]'est manquer de connoissance & de l'oreille, que de ne pas reconnoître l'Accord sensible, seul annexé à toute Dominante qui précède un Accord consonnant, dans les Accords de septième diminuée & de sixte superfluë, qui annoncent toujours, de même que le sensible, une Cadence parfaite, plus ou moins absoluë, en quoi consiste toute leur différence. (CTW, V, 201-202)

One must be both ignorant and deaf not to recognize the *accord sensible* [=dominante-tonique]—the only one that can precede a triad—in the diminished seventh and augmented-sixth chords, which, just like the *accord sensible*, always announce a *cadence parfaite* of greater or lesser completeness, in which degree lies the only difference.

The issue, though, obviously hangs on whether one takes the fifth or the seventh scale degree as the root of the leading-tone seventh chord. If, as Rameau maintains in the *Traité* and that *Génération*, the fifth degree is the root, then the analogy with the *cadence parfaite* must be granted. But if, as he says in the "Art de la basse fondamentale," the leading tone is the chord's root, then Rameau no longer has a way of expressing the

connection between *accord de septième diminuée* on the seventh degree and the *dominante-tonique* on the fifth.⁷⁰

In addition to the progressions already considered, Rousseau also identifies a succession that violates all three of the conditions outlined in HARMONIE: “On se permet aussi quelquefois,” he observes in the entry LIAISON, *en Musique*, “deux accords parfaits de suite, la basse descendant diatoniquement, mais c’est une grande licence qui ne sauroit se tolérer qu’à faveur du renversement” (“One sometimes allows two triads in succession, with the [fundamental] bass descending diatonically, but this is a great license and can only be tolerated when the chords are inverted,” IX:455). The succession Rousseau describes is the so-called *faux-bourdon* progression, which presents a series of six-three chords descending in parallel (Ex. 3.18). In such progressions, not only does the fundamental bass move by step between chords having no common tones, but the progression also consists exclusively of triads. Since no characteristic dissonances distinguish the final tonic from the preceding chords, the progression consists, in principle, of so many tonics, each belonging to a different key.⁷¹

Rameau, of course, was well aware of the problems the *faux-bourdon* progression presents. In the *Traité de l’harmonie*, he attempted to rationalize the progression by invoking the *cadence rompue*.⁷² Ex. 3.19 reproduces his musical example. The first chord, Rameau claims, is not in fact a first-inversion F major triad, but rather an incomplete, inverted seventh chord on D. As such, its resolution to the following E minor triad forms an inverted *cadence rompue*. Rameau analyzes the next measure analogously: the first harmony is an incomplete B⁷ chord, which forms an evaded *cadence irrégulière* with the E minor triad that precedes it and an evaded *cadence rompue* with the following C major triad. Continuing in this way, Rameau interprets the entire passage as a series of alternating *cadences rompues* and *cadences irrégulières*.

⁷⁰ Even if both progressions—the resolution of the leading-tone seventh chord to the tonic and that of the augmented-sixth chord to the triad or seventh chord on the dominant—are accepted as modified *cadences parfaites*, the two chords still pose a problem for Rameau’s account of the generation of chords. As Rousseau explains in the entry DISSONANCE, Rameau constructs dissonant chords by adding additional thirds to major and minor triads. Neither the diminished seventh chord nor the augmented-sixth chord, however, can be constructed in that way.

⁷¹ The *faux-bourdon* progression, it is worth noting in passing, is the only example Rousseau gives of the first texture of *phrases harmoniques* he described in ACCOMPAGNEMENT.

⁷² *Traité*, CTW, I, 142-43.

Ex. 3.18. Arcangelo Corelli, Sonata Op. 5, No. 7, II, mm. 60-67

Ex. 3.19. Rameau, *Traité de l'harmonie*, p. 112

In his next treatise, the *Nouveau système*, Rameau offers a different take on the *faux-bourdon* progression. At one point in his celebrated criticism of Corelli's Op. 5 Sonatas, he construes the passage quoted in Ex. 3.18 as a descending-fifth sequence by means of various interpolated bass notes (Ex. 3.20; CTW, II, [100-102]). In the first measure, Rameau introduces a G^7 chord following the initial D minor triad, in the second an F^7 chord after the C major triad, and so on. In this way, he transforms the passage into a regular sequence of seventh chords arranged in a series of interlocking evaded *cadences parfaites*. The intent, as in the *Traité*, is obviously to bring an apparently divergent progression into the normative framework of his theory by supplying it with a more regular fundamental-bass progression, a series of characteristic dissonances, and—in the second analysis—a network of common tones.

In describing the *faux-bourdon* progression as a series of parallel first-inversion triads, Rousseau implicitly rejects both of Rameau's attempts. The progression, as

Rousseau interprets it, violates all three of Rameau's conditions for harmonic succession. As such, it takes its place alongside the resolution of the leading-tone seventh chord and the *cadence rompue* as an exception to Rameau's strictures on harmonic progressions. From the perspective of Rameau's system, the three progressions that Rousseau identifies are anomalies, recalcitrant phenomena that resist subsumption under the normative framework of the theory. The existence of such progressions suggests that Rameau's synthesis, for all that it offers an unprecedented simplification and rationalization of thorough-bass theory, remains incomplete. A consideration of musical practice, Rousseau's discussion implies, reveals a number of common progressions for which Rameau is simply unable to account.⁷³

Ex. 3.20. Rameau, *Nouveau système*, p. 101

3.4. Rameau's Logical Failings

The identification of empirical inadequacies in Rameau's theory, however, is not the only kind of criticism in which Rousseau engages in the *Encyclopédie*. Nor, indeed, is it the most penetrating or most damaging. Far more serious in its implications is a second general line of criticism in which Rousseau openly disputes Rameau's claim to derive his theory of harmony from the resonance of the *corps sonore*. In particular,

⁷³ At least one of Rousseau's early readers caught the general implication of Rousseau's discussion. In an addendum to Rousseau's article BASSE FONDAMENTALE, d'Alembert concedes "la *basse fondamentale* prend quelquefois des licences; on peut mettre de ce nombre les accords de septieme diminuée, & les cadences rompues" (II:120). The continuation of d'Alembert's sentence reads "dont on peut cependant donner la raison. Voyez Septieme diminuée & Cadence." This explanation, however, is not forthcoming; the *Encyclopédie* contains no entry for "Septieme diminuée," and d'Alembert's additions to CADENCE and SEPTIEME, *en Musique* do not offer the promised explanations.

Rousseau asks whether Rameau's *principe* can explain the introduction of dissonances into harmony and whether it can account for harmonic succession.

The first issue is raised in a crucial passage in the article *DISSONANCE*, *en Musique*.⁷⁴ While Rousseau is prepared to grant, in the *Encyclopédie* at least, that the triad is derived from the *corps sonore*, the same does not hold for dissonant chords:

Le principe physique de l'harmonie se trouve dans la production de l'accord parfait par un son quelconque. Toutes les consonnances en naissent, & c'est la nature même qui les fournit. Il n'est pas ainsi de la *dissonance*. Nous trouvons bien, si l'on veut, sa génération dans les différences des consonnances, mais nous n'apercevons point de raison physique qui nous autorise à les introduire dans le corps même de l'harmonie . . . M. Rameau dit en termes formels que la *dissonance* n'est pas naturelle à l'harmonie, & qu'elle n'y peut être employée que par le secours de l'art. Cependant dans un autre ouvrage, il essaie d'en trouver le principe dans les rapports des nombres & les proportions harmonique & arithmétique. Mais après avoir bien épuisé des analogies, après bien des métamorphoses de ces diverses proportions les unes dans les autres, après bien des opérations, après bien des calculs, il finit par établir sur de légers convenances les *dissonances* qu'il s'est tant fatigué à chercher. Ainsi, parce que dans l'ordre des sons harmoniques la proportion arithmétique lui donne, à ce qu'il prétend, une tierce mineure au grave; il ajoute au grave de la sou-dominante une nouvelle tierce mineure: la proportion harmonique lui donne la tierce mineure à l'aigu, & il ajoute à l'aigu une nouvelle tierce mineure. Ces tierces ajoutées ne sont point, il est

The physical principle of harmony is found in the production of the triad by a given sound. All of the consonances result in this way, and it is nature herself who furnishes them. The same is not true of dissonance. We can find, if we like, its generation in the differences between consonances, but we perceive no physical ground that authorizes us to introduce them into the very body of harmony . . . M. Rameau formally declares that dissonance is not natural to harmony, and that it is only introduced through artifice. Nonetheless, in another work, he tries to find its principle in number ratios and in the harmonic and arithmetic progressions. But after having exhausted these analogies, after so many transformations of these progressions the one into the other, after a great many operations, a great many calculations, he ends up establishing the dissonances that he searched for so exhaustingly on nothing but the airiest of conveniences. Because in the order of harmonic sounds the arithmetic progression gives him, so he claims, a minor third below, he adds a new minor third below the subdominant. The harmonic progression gives him a minor third above, and so he adds a new minor third above [the dominant]. Now these new thirds, it is true, are not in proportion with the others; even their ratios are altered. But M.

⁷⁴ The passage is discussed in Béatrice Didier, "La Réflexion sur la dissonance chez les écrivains du XVIII^e siècle: d'Alembert, Diderot, Rousseau," *Revue des sciences humaines* 76 (1987): 15; Geselle, "Institutionalization of Music Theory," 34; and O'Dea, "Consonances et dissonances," 115. O'Dea, though, conflates the issue with the problem of generating the minor third. Curiously enough, Rousseau does not raise the problem of the minor mode in the *Encyclopédie*, though he was clearly aware of it, since he had mentioned it previously in the *Dissertation sur la musique moderne*. See p. 86 above.

vrai, de proportion avec les rapports précédens; les rapports mêmes qu'elles devroient avoir se trouvent altérés. Mais M. Rameau croit pouvoir tout concilier: la proportion lui sert pour introduire la *dissonance*, & le défaut de proportion lui sert pour la faire sentir. (V:1049)

Rameau thinks he can resolve everything. Proportion lets him introduce dissonance, and lack of proportion serves him by allowing it to be felt.

Rousseau's discussion requires some elucidation:

Nous trouvons . . . sa génération dans les différences des consonnances. In the *Traité*'s first book, Rameau constructs dissonant intervals by adding and subtracting consonances (CTW, I, 52-58). The (major) whole tone (9:8), for instance, is the difference between a perfect fourth (4:3) and perfect fifth (3:2), the major semi-tone (16:15) that between the perfect fourth and major third (5:4), and so on. Of course, the dissonant interval that is primarily of interest to Rameau is the seventh. In the *Traité*, Rameau constructs the major seventh by adding a major third to the perfect fifth and so obtains the ratio 8:15; the minor seventh he constructs in two different ways: either by adding a minor third to the fifth, which gives the ratio 5:9, or by adding together two fourths, which gives 9:16.

M. Rameau dit en terms formels que la dissonance n'est pas naturel. The manipulations that Rameau offers in the *Traité*, as Rousseau observes, in no way derive from the his account of harmonic generation. Accordingly, Rameau concedes in the *Nouveau système* that dissonances are introduced by artifice: "Si l'on n'entend point de *Dissonances* dans la resonance d'un corps Sonore; cela prouve qu'elles ne sont pas naturelles dans l'Harmonie; & par consequent elles ne peuvent y être introduit que par le secours de l'Art" ("Since we do not hear any dissonances in the resonance of a sounding body, it follows that dissonances are not natural to harmony, and thus that they can only be introduced through artifice," CTW, II, 65). Such a concession, though, is obviously inimical to a theorist of Rameau's bent, and it is surely no surprise to find Rameau recanting in the *Génération harmonique*.

Cependant dans un autre ouvrage, il essaie d'en trouver le principe dans les rapports des nombres & les proportions harmoniques & arithmétiques. The discussion comes in the ninth chapter of Rameau's *Génération harmonique* (CTW, III, 68-70). Rameau argues there that both the *dominante-tonique* and *soudominante* require a characteristic dissonance to distinguish them from the *tonique*. Since Rameau has previously insisted that any allowable chord can be arranged as a series of stacked thirds, he stipulates that this dissonance must consist in a new third added either above or below the triad. Only the position of the third and its species remain to be decided. Rameau has previously explained that the major triad is given directly by the overtones of any the *corps sonore*, and he has also insisted, mistakenly, that a vibrating string causes strings tuned a twelfth and major fifteenth below its frequency to vibrate sympathetically along their entire length (CTW, III, 16-19). These two series of pitches can be described, respectively, by harmonic progression 1:1/3:1/5 and the arithmetic progression 1:3:5 (CTW, III, 29-30). If the first two terms of each series are separated from their respective progressions and combined, the result will be the *progression triple*, which Rameau takes to model the relationship between the tonic and its dominant and subdominant degrees. This last progression can be extended in both directions to form a complete circle of fifths. Rameau labels the ascending-fifth direction "harmonique" and the descending-fifth direction "arithmétique." Since the dominant note appears in the "upward" (harmonique) direction, Rameau concludes, the additional, dissonant third should be added above the triad on the dominant note. Similarly, since the subdominant note appears in the "downward" (arithmétique) series, the third should be added below the triad on the subdominant. Finally, in order to conform to the mode, both thirds should be minor.

The manipulations just discussed are the *legères convenances* to which Rousseau refers, and Rousseau is surely right to insist that, whatever Rameau's discussion might prove, it hardly establishes that the dissonant seventh and added sixth derive from the *corps*

sonore.⁷⁵ Rousseau's criticism, on this particular point, goes right to the heart of Rameau's system. If the two dissonances that Rameau requires—the seventh and the added sixth—are not generated by the *corps sonore*, then it follows that of the eleven chord types Rousseau lists in ACCORD, only one—the *accord parfait*—can really be said to derive from Rameau's *principe*. There is a further consequence as well. If dissonances do not result from the *corps sonore*, it is difficult to see how the third criterion for harmonic succession that Rousseau introduces in HARMONIE—namely the demand that each intermediate chord be bound to its successor by a characteristic dissonance—can result from Rameau's *principe*.⁷⁶

In fact, Rousseau goes further. When he introduces Rameau's three criteria for harmonic succession in HARMONIE, he explicitly states that none of them can be derived from the *corps sonore*:

<p>Le principe physique qui nous apprend à former des accords parfaits, ne nous montre pas de même à en établir la succession, une succession régulière & pourtant nécessaire. (VIII:50)</p>	<p>The physical principle that teaches us to form triads in no way shows us how to establish their succession, a succession that is both regular and necessary.</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

With that single sentence, Rousseau rejects the entire program of the *Génération harmonique*. The point is worth emphasizing, for the passage goes by with so little fanfare, that its full implication can perhaps be missed. Rameau, of course, had claimed to derive both chords and chord progressions from the *corps sonore*. The first half of that program is by and large untenable, as Rousseau's arguments in DISSONANCE imply. As for the second half, Rousseau here repudiates it entirely. The theory presented in the

⁷⁵ In an addition appended to Rousseau's article, d'Alembert concedes the point unequivocally: "tout ceci," he writes, "n'est point une explication physique de l'addition de la *dissonance* à l'harmonie; addition qui, selon M. Rameau, est l'ouvrage de l'art, & non de la nature" (V:1050).

⁷⁶ In fact, Rameau is caught here on the horns of a dilemma of his own making. Clearly, he cannot do without dissonance. We have seen in the preceding chapter how his accounts of both harmonic succession and of mode depend upon it. But in fact the dilemma is even more acute. For Rameau, the triad is consonant precisely because it is generated by the *corps sonore*. Rameau conceives of the seventh and added sixth as foreign, destabilizing tones added to the triad to disrupt its inherent repose. If, that is to say, Rameau did succeed in deriving the seventh and added sixth from the *corps sonore*, he would risk losing the distinction between these dissonant intervals and the consonant fifth and third. At the same time, however, failing to generate dissonances from the *corps sonore* threatens Rameau's claim to have derived all of harmony from a single natural principle. After all, "un principe qui ne donne pas tout, mérite-t'il ce titre, en est-il un effectivement?" (*Génération*, CTW, III, 16).

Génération harmonique, it would seem to follow, is by no means the science of harmony that the *Encyclopédie*'s editors assumed it to be.

To what extent had Rousseau consistently drawn this conclusion already in 1749? Certainly, the position he takes three years later in the *Lettre à Grimm* (1752) is unequivocal. Near the end of that text, Rousseau sets himself the task of fixing "l'idée qu'un homme raisonnable et impartial doit avoir des ouvrages de M. Rameau" ("the opinion that a reasonable and impartial man should have concerning M. Rameau's works," OC, V, 270). Rameau's writings, he concludes, "ne renferment rien de neuf ni d'utile que le principe de la Basse fondamentale" ("contain nothing new or useful except the principle of the fundamental bass," OC, V, 270). A pointed footnote adds: "Ce n'est point par oubli que je ne dis rien ici du prétendu principe physique de l'harmonie" ("It is not from forgetfulness that I say nothing of the alleged physical principle of harmony").⁷⁷ In the *Encyclopédie*, though, Rousseau's position is far more ambiguous. Though he criticizes Rameau's theory for its empirical shortcomings and rejects, almost in its entirety, Rameau's claim have derived that theory from the physics of sound, nowhere in his articles does Rousseau explicitly draw the conclusion to which these arguments tend.

One way in which this reticence might be interpreted is to assume that Rousseau had privately drawn out the full implication of his arguments but that he refrained from articulating it, perhaps because d'Alembert restrained him. In that case, the *Lettre à Grimm* would deserve to be read as the missing peroration to Rousseau's articles. The extent to which this interpretation can be sustained is the subject of the following section.

3.6. Implications: The *philosophes*' Condillacian Appropriation of Rameau

If, in the *Encyclopédie* itself, the conclusion that Rousseau draws from his rejection of the *Génération harmonique*'s program is ambiguous, the fact of that rejection is entirely unequivocal. The question, then, is whether Rousseau thinks that Rameau's science of harmony can be somehow salvaged. The crucial passage comes in the entry

⁷⁷ It is worth emphasizing, though, that Rousseau is far from dismissing the theory *tout court*. After all, he continues: "ce n'est pas peu de chose que d'avoir donné un principe, fût-il même arbitraire, à un art qui sembloit n'en avoir point, et d'en avoir tellement facilité les règles, que l'étude de la composition qui étoit autrefois une affaire de vingt années, est à présent celle de quelques mois" (*Lettre à Grimm*, OC, V, 270-71).

HARMONIE and has already been quoted in part just above. It is now time to consider the text in its entirety:

Le principe physique qui nous apprend à former des accords parfaits, ne nous montre pas de même à en établir la succession, une succession régulière & pourtant nécessaire. Un dictionnaire de mots élégans n'est pas une harangue, ni un recueil d'accords harmonieux une pièce de musique. Il faut un sens, il faut de la liaison dans la Musique comme dans le langage; mais où prendra-t-on tout cela, si ce n'est dans les idées mêmes que le sujet doit fournir?

Toutes les idées que peut produire l'accord parfait se réduisent à celle des sons qui le composent & des intervalles qu'ils forment entre eux: ce n'est donc que par l'analogie des intervalles & par le rapport des sons qu'on peut établir la liaison dont il s'agit; & c'est-là le vrai & l'unique principe d'où découlent toutes les lois de l'*harmonie*, de la modulation, & même de la mélodie. (VIII:50)

The physical principle that teaches us to form triads in no way shows us how to establish their succession, a succession that is regular and indeed is necessary. A dictionary of fine words is not a speech, nor is a collection of harmonious chords a piece of music. A sense is required—a connection—in music as in language. But where is that connection to be found if not in the ideas furnished by the subject itself.

The ideas offered by the triad can be reduced to those of the pitches that comprise it and the intervals between them. Thus it is only by the analogy of intervals and the conformity of pitches that the requisite connection can be established. And there lies the true and unique principle from which all the laws of harmony, of modulation and even of melody result.

Rousseau's train of thought in this passage is far from self explanatory, and some careful interpretation will therefore be required. Rousseau begins, as we have seen, by baldly rejecting Rameau's attempt to derive criteria for harmonic succession from the *corps sonore*. Nevertheless, a theory of harmony must obviously account not only for chords, but also for harmonic progressions. Such a theory, Rousseau insists, must find a way of establishing regular connections (*liaisons*) between successive chords; otherwise, it will have no way of distinguishing between syntactically well-formed progressions and musical nonsense. Rather than assuming its technical sense (i.e. the preservation of common tones), the word *liaison* here stands as a general term for the requisite connection between chords. Like the individual words in a sentence, the chords comprising a *phrase harmonique* must be connected (*liés*) in such a way that they form an interdependent whole.⁷⁸

⁷⁸ Rousseau has borrowed the analogy, it turns out, from a passage in Rameau: "Nous pouvons encore tirer avantage de la comparaison . . . entre les différentes *Modulations* & les différentes Phrases d'un discours; en ce que, si cette comparaison est juste, il faut qu'il se trouve entre tous les Accords successifs d'une

But how is this *liaison* to be established? Rousseau tells us that the requisite connection between chords is to be sought in the “ideas” furnished by the *accord parfait*. These ideas are of two kinds: of the individual pitches comprising the triad, and of the intervals between these pitches. From the latter, Rousseau derives a condition he calls the “*analogie des intervalles*,” from the former, one called the “*rapport des sons*.” These two conditions, he implies, establish the necessary *liaison* between chords. The remainder of the article lets us gloss the two terms. By “*rapport de sons*,” Rousseau refers to *liaison* in its technical sense: the preservation of common tones between adjacent chords. The “*analogie des intervalles*” covers the fundamental postulate of Rameau’s theory: the claim that the fundamental bass moves by the same intervals that comprise the triad. These two conditions, taken together, establish the requisite connection between chords—*liaison* in the general sense. And this general *liaison* is “le vrai & l’unique principe d’où découlent toutes les loix de l’*harmonie*.” In effect, then, Rousseau tries to derive Rameau’s first two conditions on harmonic succession—namely consonant fundamental-bass motion and *liaison* (in the technical sense)—from the structure of the triad.

But why must the conditions governing harmonic succession be sought in the “ideas” furnished by the triad? That question cannot be answered on the basis of Rousseau’s *Encyclopédie* articles alone. Rousseau’s procedure, though, is reminiscent of that sketched by Diderot in his 1749 “*Mémoire*” and by Condillac in the *Essai sur l’origine des connoissances humaines*. Much like Diderot, in particular, Rousseau begins by decomposing the triad into its constituent parts; he then uses those parts—the notes of the triad and the intervals between them—to fix the conditions that any allowable harmonic progression must satisfy. What Rousseau has offered is a miniature essay in Condillacian analysis.⁷⁹

Modulation, la même *Liaison* qu’on remarque entre tous les mots qui composent une Phrase; *Liaison* également nécessaire pour rendre intelligible le sens de cette Phrase, & pour entretenir l’idée de cette *Modulation*” (*Nouveau système*, CTW, II, 66).

⁷⁹ I discuss Condillac’s conception of analysis on pp. 55-59 above. On the basis of a similar reconstruction of Rousseau’s reasoning, Alain Cernuschi has characterized Rousseau’s article, and by extension his *Encyclopédie* articles as a whole, as an attempt to reformulate Rameau’s theory of harmony in Condillacian terms. See Cernuschi, *Penser la musique*, 541-63, esp. 549-50. Without meaning to dispute Cernuschi’s general claim, I do wish to add two provisos. First, as I hope I have shown in the preceding sections of this chapter, Rousseau’s exposition of Rameau is far more critical than Cernuschi acknowledges, and it is not

There are, however, some salient differences between Diderot's procedure and Rousseau's. Rousseau begins, for one, with the triad, not the *corps sonore*. Unlike Diderot and Condillac, moreover, Rousseau characterizes the fundamental postulate of Rameau's theory—the claim that the fundamental bass moves by the same intervals that comprise the triad—as an *analogie*: “La basse fondamentale ne doit marcher que par intervalles consonnans, car l'accord parfait n'en produit que de tels: l'analogie est manifest” (“The fundamental bass must move only by consonant intervals, for the triad produces no others: the analogy is obvious,” VIII:50). A good deal obviously hangs on precisely what Rousseau meant by “analogie.”

Unfortunately, Rousseau's *Encyclopédie* articles offer little assistance on this point.⁸⁰ We must therefore look elsewhere in attempting to unravel it. Luckily, there is help to be found amongst the papers preserved at the Bibliothèque publique et universitaire de Neuchâtel: the reverse sides of folios 6-9 of “Du Principe de la mélodie,” contain a fragmentary but continuous draft that runs parallel to Rousseau's discussion in

clear how this Condillacian reinterpretation can circumvent the other problems that Rousseau has identified (perhaps that is one of the reasons he subsequently abandoned it). Second, as I have already tried to suggest, it is by no means clear that the idea is properly Rousseau's. Indisputably, the *philosophes* were engaged in a kind of Condillacian appropriation of Rameau's ideas in the late 1740s. But that reformulation had begun already in 1746 in Condillac's *Essai sur l'origine des connoissances humaines* and appears equally, and in more developed form, in Diderot's 1749 “Mémoire.” Rousseau certainly knew the former and was presumably familiar with at least the contents of the latter. (The late 1740s were, it is worth recalling, the period in which Diderot, Condillac and Rousseau met weekly at the Hôtel du Panier Fleuri.) Given the well-documented engagement of all three men with Rameau's writings, it is difficult to imagine that the composer's theory was not among the topics discussed, and it is tempting to surmise that the Condillacian reinterpretation of Rameau was one of the things that Rousseau took away from those discussions.

⁸⁰ In his *Dissertation sur la musique moderne* (1743), the word appears in the sense of “similarity” or “resemblance,” with no insinuation that that resemblance is false or deceptive (OC, V, 170, 183, 191, 214, 225). Rousseau uses the word most frequently in reference to octave equivalence: the notes and intervals of one octave are “analogous” to the other. For example: “N'est-ce pas un défaut terrible dans la Musique de ne pouvoir rien conserver, dans l'expression des octaves, de l'analogie qu'elles ont entre elles?” (OC, I, 225). The word sometimes appears in the *Encyclopédie* in the same sense: the minor mode is “analogous” to the major (MODE, *en Musique*, X:596), as are the related keys—the dominant, subdominant, relative minor or major, and so on—to the tonic (MODULATION, *en Musique*, X:602-604). Elsewhere in the *Encyclopédie*, though, Rousseau uses the word in a decidedly pejorative sense. “Après avoir bien épuisé des analogies,” we saw Rousseau write in the article DISSONANCE, Rameau ends up establishing the dissonances he requires “sur de legeres convenances” (IV:1049). In the highly revised entry HARMONIE that Rousseau eventually published in his *Dictionnaire de musique*, we will see more exhaustively in the following chapter, it is this latter, negative sense of the word that comes to predominate. See pp. 221-27 below.

HARMONIE.⁸¹ The draft begins with a brief description of the resonance of the *corps sonore* and the injunction: “C’est au physiciens d’expliquer s’ils peut [*sic*] ce phénomène, c’est au Musicien d’y chercher le principe de l’harmonie et de s’efforcer d’en déduire comme d’une cause naturelle toutes les règles de son art” (“It is for physicists to explain this phenomenon if they can; it is for musicians to search in it for the principle of harmony and to try to deduce all the rules of their art from it as from a natural cause,” ms. R. 60, f. 6v). Rousseau then proceeds to a more detailed description of the overtone series:

Toutes les aliquotes possibles se trouvent dans la série naturelle des nombres mise en fractions. Ainsi, l’unité représentant la corde entière, tous les sons qui accompagnent naturellement le sien et qu’on appelle ses harmoniques sont exprimés par cette progression.

$\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6} \frac{1}{7}$, &.⁸² (ms. R. 60, f. 6v)

All possible aliquot [parts] are found in the series of natural numbers put in fractions [i.e. the harmonic series]. Thus, with 1 representing the [length of the] entire string, all of the sounds that naturally accompany it and which are called its overtones are expressed by this

progression: $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6} \frac{1}{7}$, etc.

The overtone series—drawn from the analysis of the sound of the entire string into its constituent parts—is thus the phenomenon from which the theory of harmony must set out:

Il est clair que si nous voulons suivre les directions de la nature la série des Intervalles précédens ou ceux qu’on en peut composer seront les seuls élémens de tout le système harmonique et même de la mélodie et du chant car s’il peut y avoir

It is clear that if we want to follow nature’s lead, the preceding series of intervals, or those that we can compose from them, will be the sole elements of the entire system of harmony and even of melody and song, for if there can be some natural analogy

⁸¹ Bibliothèque publique et universitaire de Neuchâtel, ms. R. 60. The fragment is presumably contemporary with the main body of that text, but its contents are unrelated. It is transcribed in OC, V, 1512-15.

⁸² The explicit inclusion of the seventh partial (an implicitly of partials beyond the seventh) is perhaps significant for dating the fragment. As I argue in Chapter 4, Rousseau learned of the existence of upper partials from Jean-Adam Serre’s *Essais sur le principe de l’harmonie* (1753). This would seem to place the fragment between 1753 and 1755, assuming it was written before “Du Principe de la mélodie” and the paper then reused for the latter text. This assumption seems reasonable for two reasons: first, the remainder of the “Principe” is written continuously over the recto and verso of each leaf—why would Rousseau have skipped over ff. 6v, 7v, 8v, 9v if not because they were already occupied?—second, the text is part of a fragment of a longer discussion, a fact most easily explained by assuming that Rousseau, having discarded the earlier text, pressed some of its unused leaves into service for other writings. The remainder of the text is not, to my knowledge, extant. The contents of the surviving fragment, however, are similar to a passage from the revised article “Dissonance” published in the *Dictionnaire de musique*. The latter passage is quoted in part on pp. 232-33.

quelque analogie naturelle entre un son quelconque et ceux qui lui succèdent elle doit être tirée de l'analyse de ce premier son de sorte que les sons dont il est accompagné le lient à ceux dont il est suivi. (ms. R. 60, f. 8v, 9v)

between a given sound and those that follow it, [this analogy] must be drawn from the analysis of the first sound so that the sounds by which it is accompanied [i.e. the *sons harmoniques*] bind it to those that follow it.

We have seen, in considering Rousseau's entry HARMONIE and Diderot's *mémoire*, how this analysis is to take place. A single pitch (or the triad in HARMONIE) is decomposed into its parts—its partials and the intervals between them—and from these parts arise two basic requirements on harmonic succession, namely the principles of consonant fundamental-bass motion and common-tone preservation.

Read in conjunction with HARMONIE, the draft preserved in ms. R. 60 suggests that Rousseau initially conceived of the Condillacian reinterpretation of Rameau's system as a means of legitimizing *ramiste* theory. If Rameau's attempt to ground his theory of harmony in physical acoustics alone had failed, perhaps the theory could be salvaged when reconfigured in Condillacian terms.⁸³ If that endeavour is to succeed, however, the analogy between the structure of the triad and the motion of the fundamental bass on which Rameau's system fundamentally depends must be an "analogie naturelle."

The manuscript contains a significant elaboration of that point, which Rousseau subsequently struck out, and it is therefore worth transcribing the passage more exactly, including all of Rousseau's corrections and alterations:

il est clair que si nous voulons suivre les directions de la nature les <la serie des> intervalles précédens, <ou ceux qu'on en peut composer> seront les <seuls> élémens de tout le système harmonique et qu'aussitôt que nous tenterons de'en ajouter ou substituer d'autres chacun pourra chercher à son gré des analogies arbitraire <abstraites> metaphysiques que celui qui aura le plus d'imagination en pourra trouver d'avantage et batira dans sa tête un [illegible] qui n'aura d'autre

It is clear that if we want to follow nature's lead, the preceding series of intervals, or those that we can compose from them, will be the sole elements of the entire system of harmony and as soon as we try to add or substitute others any one can search out arbitrary <abstract> metaphysical analogies at will [and] that he who has the most imagination will be able to find more and will build in his head a [illegible: se. system?] that will have no foundation other than purely arbitrary relations [and] that

⁸³ Echoes of the idea can still be heard in the *Dictionnaire de musique*. In the entry "Mélodie," for instance, Rousseau remarks: "c'est une analyse harmonique qui donne les Degrés de la Gamme, les Cordes du Mode, et les loix de la Modulation, unique élémens du Chant" (OC, V, 884). Similarly, the entry "Mode" asserts at one point that *mode* is "donné par l'analyse de trois Accords" (OC, V, 899).

~~fondement que des rapports [illegible]~~
~~purement arbitraires qu'un autre <rapports>~~
~~qu'avec plus d'esprit encore un autre pourra~~
~~changer à son fantaisie~~ et même de la
 mélodie et du chant car s'il peut y avoir
 quelque analogie naturelle entre un son
 quelconque et ceux qui lui succèdent elle
 doit être tirée de l'analyse de ce premier
 son de sorte que les sons dont il est
 accompagné le lient à ceux dont il est suivi.
 (ms. R. 60, f. 8v)

~~another <relations> that another having~~
~~even more esprit can change again at his~~
 fancy and even of melody and song, for if
 there can be some natural analogy between
 a given sound and those that follow it, [this
 analogy] must be drawn from the analysis
 of the first sound so that the sounds by
 which it is accompanied [i.e. the *sons*
harmoniques] bind it to those that follow it.

The key is the distinction between *analogies naturelles*, which have a legitimate role in the articulation of valid theories, and *analogies arbitraire*, *analogies abstraites*, or *analogies metaphysiques* (in Rousseau's successive formulations), which do not. These latter will seduce the would-be system-builder into error and delusion. When he wrote HARMONIE in 1749, Rousseau seems to have thought that the analogy that he had identified at the heart of Rameau's theory was, or could be made into an *analogie naturelle*, and that Rameau's theory could therefore be legitimated.⁸⁴

In general, then, it seems appropriate to see the exposition of *ramiste* theory that Rousseau gives in the *Encyclopédie* against the horizon of the *philosophes'* Condillacian appropriation of Rameau. Rousseau's version, though, is more radical than Condillac's, Diderot's or d'Alembert's. Unlike d'Alembert, in particular, Rousseau flatly rejects the program of the *Génération harmonique*: the theory of harmony is not merely a corollary to the physics of sound; physical acoustics alone provides an insufficient foundation for harmony because it cannot account for harmonic progressions.⁸⁵ But such progressions might instead be seen to possess a psychological foundation. Unlike the triad, harmonic progressions are not simply given by nature in the resonance of the *corps sonore*. Instead, their generation requires the intervention of human agency. But in constructing harmonic progressions that agency exploits the "natural analogy" between the structure of the triad and the motion of the fundamental bass. Harmonic progressions are in this

⁸⁴ It is only a short distance, thanks to the changeable word *analogie*, from that stance to the whole-sale dismissal of Rameau's system as a *système abstrait* founded upon *mere* analogy that sometimes appears in Rousseau's later writings. See pp. 221-27 below.

⁸⁵ Rousseau is thus closer to the psychologized version of *ramiste* theory that Diderot presents in the 1749 "Mémoire." See above, pp. 62-69.

sense constructed on the model of the *corps sonore*, even though they are not immediately given by it.

Rousseau implies in HARMONIE that this reformulation allows two basic conditions on harmonic succession—namely the principles of consonant fundamental-bass motion and common-tone preservation—to be derived from the triad, itself given directly by the *corps sonore*. The details of that derivation remain admittedly vague, but the intent seems clear enough. There is, however, a significant obstacle to Rousseau's reformulation of *ramiste* theory, for as Rousseau goes on to acknowledge, Rameau also requires that any well-formed *phrase harmonique* must be bound together by means of characteristic dissonances:

Une suite d'accords parfaits, même bien liés, ne suffit pas encore pour constituer une phrase harmonique; car si la liaison suffit pour faire admettre sans répugnance un accord à la suite d'un autre, elle ne l'annonce point, elle ne le fait point désirer, & n'oblige point l'oreille pleinement satisfaite à chacun des accords, de prolonger son attention sur celui qui le suit. Il faut nécessairement quelque chose qui unisse tous ces accords, & qui annonce chacun d'eux comme partie d'un plus grand tout que l'oreille puisse saisir, & qu'elle desire d'entendre en son entier. Il faut un sens, il faut de la liaison dans la Musique, comme dans le langage; c'est l'effet de la dissonance; c'est par elle que l'oreille entend le discours harmonique, & qu'elle distingue ses phrases, ses repos, son commencement & sa fin.⁸⁶ (VIII:51)

A succession of chords, even if connected by common tones, does not by itself form a *phrase harmonique*, for although common-tone connections are enough to allow one chord to follow another without offense, they do not announce the second chord, or make us desire it, or oblige the ear—which is fully satisfied at each chord—to prolong its attention and await the next. Something is required to unite these chords together, something to signal that each of them is part of a greater whole that the ear should seize upon and desire to hear in its entirety. A sense is required, a connection, in music as in language. Dissonance creates this effect. It is through it that the ear understands the discourse of harmony and distinguishes its phrases, its pauses, its beginning and its end.

In the succession of third and fifth related triads derived through the analysis of the sound given by the *corps sonore*, nothing subordinates any one chord to any other. To distinguish the intermediate chords in a *phrase harmonique* from the tonic, and to subordinate them to it, certain characteristic dissonances must be introduced. We have already seen Rousseau argue (in the entry DISSONANCE) that Rameau has failed to

⁸⁶ Once again, Rousseau's exposition closely parallels Diderot's "Mémoire." Compare the passage quoted on p. 65 above.

derive these dissonances directly from the *corps sonore*. In this respect, the third condition is like the first two, and it is for this reason that Rousseau can present the program of the *Génération harmonique* as a failure: “Le principe physique qui nous apprend a former des accords parfaits, ne nous montre pas de même à en établir la succession” (VIII:50). To his own apparent satisfaction, however, Rousseau goes on to deduce the first two conditions—consonant fundamental-bass motion and common-tone preservation—from the analysis of the triad, itself derived from the resonance *corps sonore*. The requirement that intermediate chords should bear characteristic dissonances, however, provides a stumbling block, for Rousseau’s article offers no attempt to relate this last requirement back to the analysis of the triad.

Rousseau seems subsequently to have recognized this failure, for he acknowledges in a draft of the revised entry “Dissonance” that he prepared for the *Dictionnaire de musique*: “De[s] grands Musiciens avoit cherché l’origine de la dissonance par synthèse, je la cherchois par voye d’analyse, et à parler franchement nous avons sù ni les uns ni les autres ce que nous disions” (“There are great musicians who have looked for the origin of dissonance by [means of] synthesis; I looked for it by the way of analysis, and to speak frankly none of us knew what we were talking about”).⁸⁷

Rousseau’s Condillacian regrounding of *ramiste* theory is thus at best only a partial success. It is moreover at odds with other, more critical, aspects of Rousseau’s exposition. Is far from obvious, for instance, how the anomalous progressions that Rousseau has elsewhere catalogued could be any better accommodated by the revised, psychologized version of *ramiste* theory that Rousseau entertains in HARMONIE. There is also a more fundamental incompatibility. If, as Rameau presumes in the *Génération harmonique*, the laws of harmony are founded on the physics of sound, then these laws must be no more variable than the acoustical substratum on which they depend. Assuming this latter to vary only negligibly across time and place, it follows that the laws Rameau’s theory stipulates are binding for all musical cultures past and present. Rameau’s conception of harmonic theory, that is to say, implies that its dictates must be universal in scope. The Condillacian reformulation of Rameau that Rousseau essays in

⁸⁷ The remark appears in the version of “Dissonance” preserved in the Neuchâtel manuscript of the *Dictionnaire de musique*, Bibliothèque publique et universitaire de Neuchâtel, ms. R. 55, f. 131r. For details on that manuscript, and others pertaining to the *Dictionnaire* see below, pp. 182-84, 260-62.

HARMONIE carries this same implication, for the account of the human understanding that Condillac gives in the *Essai sur l'origine des connoissances* is no less universal than the laws of physics: it applies, in Condillac's view, to every individual. To the extent, however, that the account is a developmental one, it can to a degree be historicized. The progression from perception through memory and imagination to reasoning and understanding is, in Condillac's view, a progression that any human mind undergoes as it matures. But it is also a progression undergone by a kind of collective *esprit* over the course of human civilization's development. Condillac's psychology, that is to say, is both an account of individual mental development and a kind of *tableau générale du progrès de l'esprit humaine*, and indeed, Condillac sees a grand isomorphism between the two.⁸⁸ Because this developmentalism operates on both individual and collective levels, there is room in Condillac's account for a limited amount of historical and cultural relativism. Just as children and "imbeciles" find themselves further down the developmental ladder than adults, "savage" peoples might, in Condillac's schema, be arrested at earlier developmental stages than eighteenth-century Frenchmen.

We saw in Chapter 1 how these general features of Condillac's thought inscribe themselves on Diderot's and Condillac's appropriations of Rameau. The logical and expository order of Rameau's theory, once recast in the appropriate analytical terms, provides, for both Diderot and Condillac, a tableau of the historical development of music itself. If there are differences between musical cultures that are historically or geographically distinct, these differences must nonetheless fit onto the historical continuum derived from Rameau's system. The most complex musical structures described in Rameau's system—the chromatic or enharmonic genera, for instance—represent, if not the apex of music's potential development, at least the furthest point of its actual progress. The musical practices of earlier periods in Western music history—the middle ages, for instance, or classical antiquity—must have been confined to more basic musical structures, and extra-European musical practices must likewise be accommodated somewhere along this same continuum. What cannot appear, within the horizon traced by Diderot and Condillac, are musical structures inimical to Rameau's

⁸⁸ Ontogeny, that is to say, recapitulates phylogeny (or more accurately, vice versa). This is not an explicit claim of Condillac's psychology so much as an operative assumption.

theory. For this reason, the Condillacian reinterpretation of Rameau, just like Rameau's own formulation of his theory, is vulnerable to empirical falsification on the basis of conflicting evidence drawn either from non-European sources or earlier Western ones.

Rousseau possessed little reliable evidence concerning extra-European music. He did, however, have access to historical evidence, in particular to the Greek treatises on harmonics reproduced in Marcus Meibom's *Antiquae musicae auctores septem* (1652) and to Pierre-Jean Burette's studies in the *Mémoires de littérature . . . tirés des registres de l'Académie des inscriptions*. Already in 1749, he had begun to realize that the musical structures described by Greek theorists were fundamentally different from those treated by Rameau. In the writings of Greek harmonic theorists, Rousseau found intimations of a musical culture not bound by Rameau's *basse fondamentale*.

3.7. HARMONIE, *selon le sens qui lui ont donné les anciens*

In the opening paragraphs of HARMONIE (*Musique*.), Rousseau distinguishes sharply between the ancient and modern senses of "harmony." In its modern use, the term covers both chords and chord progressions. Ancient music, though—as Rousseau elsewhere remarks—was entirely monophonic.⁸⁹ Thus, when ancient writers spoke of "harmony," they could hardly have intended the word in its modern acceptance. Instead, they meant to single out the part of music concerned with "la succession agréable des sons, en tant qu'ils sont graves ou aigus, par opposition aux autres parties de la Musique appellées *rythmica & metrica*" ("the pleasing succession of sounds, in so far as they are low or high, as opposed to the other parts of music called *rhythmica* and *metrica*," HARMONIE, VIII:50). *Harmonie* in this sense is the ancient discipline of harmonics (*harmonikē*), the science concerned with the principles of attunement (*to hērmomenon*).

Rousseau follows Pierre-Jean Burette and Alexander Malcolm in dividing harmonics into seven parts: "savoir, les sons, les intervalles, les systèmes, les genres, les tons ou modes, les nuances ou changemens, & la mélopée ou modulation" (HARMONIE,

⁸⁹ "Il paroît encore démontré qu'ils [les Grecs] ne connoissoient point la *musique* à plusieurs parties, le contre point, en un mot l'*harmonie* dans le sens que nous lui donnons. S'ils employoient ce mot, ce n'étoit que pour exprimer une agréable succession de sons. Voyez sur ce sujet les *dissertations* de M. Burette dans les *mém. De l'academie des belles-lettres*" (MUSIQUE, X:900).

XVIII:50).⁹⁰ Accordingly, his exposition of Greek harmonics is organized around these parts and presented, primarily, in the entries devoted to each. To follow Rousseau's discussion exhaustively, let alone to situate it within the general reception of Greek harmonic theory in eighteenth-century France, would obviously be well beyond the scope of this study. But in one significant respect, Rousseau's consideration of Greek harmonic theory impinges upon his engagement with Rameau. For like Greek writers, Rameau identified three distinct musical genera—the diatonic, chromatic and enharmonic—and he strongly implied that his diatonic genus, at least, was identical to the Greek one.

Throughout his writings, Rameau insists that diatonic intervals derive from harmonic ones. The former are the tones and semitones comprising the scale, the latter the fifth and third. The most exhaustive treatment of their relationship, at least in Rameau's pre-1750 writings, comes in the *Génération harmonique*. That treatise begins, as we saw in Chapter 1, with a series of postulates and *expériences* designed to establish that any *corps sonore* emits a spectrum of partial tones. The upper partials, for Rameau, are the octave, twelfth and (major) seventeenth (or assuming octave equivalence, the octave, fifth and major third). Since these *sons harmoniques* are the only pitches given immediately by the *son fondamental*, they are also the only pitches that can succeed that fundamental. When that occurs, the new pitch itself becomes a *son fondamental*, and so bear with it its own *sons harmoniques*.⁹¹ The relationships between the *sons harmoniques* of these two successive fundamentals give rise to a number of new, diatonic intervals. Suppose, for instance, that G passes to D. G has, as its *sons harmoniques*, G, B and D, and D has D, F# and A. The interval from G to A is a major tone (8:9), that from A to B a minor tone (9:10), and that from G to F# a major semitone (15:16). If these intervals are placed in ascending order, the result will be the diatonic tetrachord F#-G-A-B. Forming an analogous tetrachord from B to E and cojoining it with the first gives the diatonic scale (*mode naturel*) shown in Ex. 3.18.

The arrangement of Rameau's *mode naturel* is of course atypical: the scale runs from F# to E, then steps back to D before leaping to F# and finally reaching G. Rameau's official rationale runs as follows: omitting the repeated D so as to allow the

⁹⁰ The division is drawn, ultimately, from the second book of Aristoxenus' *Elements* (see 34.30-38.29, Barker, II, 152-55).

⁹¹ See pp. 36-37 above.

scale to move directly from E to F# would introduce three successive whole tones (i.e. C-D-E-F#). Such a progression, Rameau insists, is unnatural since it implies a stepwise motion (from C to D) in the fundamental bass. The problem with that motion is that some of the intervals formed between the respective *sons harmoniques* of the two second-related fundamentals are out of tune. In particular, the interval from A (the fifth of D) to E (the third of C) is 27:40, and that from A to C is 27:32. The former is a syntonic comma short of a perfect fifth, and the latter a syntonic comma short of a minor third (CTW, III, [66]). Yet while these facts are unimpeachable, the argument is somewhat disingenuous: the tuning problems Rameau identifies are nothing but the classic problem of the wolf fifth, a problem that besets any justly tuned major scale (including the *mode naturel* in Ex. 3.18). The real problem for Rameau is rather that implied step in the fundamental bass violates most basic postulate of his theory: that the fundamental bass moves by precisely the intervals that comprise the triad.⁹²

Ex. 3.18. Rameau's *mode naturel*, *Génération*, Ex. 6

VI.
*Ordre Diatonique des Sons Harmoniques
dans le Mode majeur.*
p. 65.

Succession fondamentale par Quintes dans un seul Mode.

⁹² In order to write the G major scale in its normal form (i.e. ascending from G to G), Rameau invokes the *double emploi*. The sixth scale degree (E) receives, in effect, two fundamentals: C, in relation to the preceding G, and A in relation to the following D. The solution has the curious consequence, however, that the last three notes of Rameau's G major scale end up in D major. See *Génération harmonique*, CTW, III, 79-81.

The peculiar ordering of Rameau's *mode naturel*, then, is in part a piece of music-theoretical subterfuge, an attempt to disguise the fact that Rameau cannot construct the diatonic scale in its normal order without violating his fundamental principle. But the arrangement also answers to a second imperative: in forming his *mode naturel* from two conjoined diatonic tetrachords, Rameau deliberately accentuates its resemblance to the Greek diatonic genus.⁹³ Slightly further on in the *Génération*, he makes the connection explicit: "c'est justement, dis-je, de cet ordre Diatonique que les Grecs ont formé leurs Systèmes Diatoniques, auxquels ils ont donné le nom de *Tetracordes*" ("It is precisely, I say, from this diatonic order that the Greeks formed their diatonic systems, which they called tetrachords," CTW, III, 44). The resemblance, at least in Rameau's eyes, is neither coincidental or superficial. Indeed, it is not properly a resemblance at all, but rather an absolute identity: the *mode naturel* is the Greek diatonic, and in explaining the generation of the former, Rameau purportedly lays bear the origin of the latter.

This is, no doubt, an astonishing claim, though one entirely in keeping with Rameau's theoretical propensities. The particular form of the Greek diatonic in question is Ptolemy's "tense" diatonic, in which, as in Rameau's *mode naturel*, each tetrachord is divided into a semitone and two whole tones tuned 16:15, 9:8, 10:9 respectively.⁹⁴ Ptolemy, though, arrives at his tense diatonic by combining his basic postulate—that melodic intervals correspond to epimoric ratios (i.e. ratios having the form $n+1:n$)—with

⁹³ The Greek greater perfect system was formed from four tetrachords (*hypaton*, *meson*, *diazeugmenon*, *hyperbolaion*) plus an added tone (*proslambenomenos*). Each of the tetrachords spans a perfect fourth and contains four notes, the outer two fixed and the middle two varying in pitch. *Hypaton* and *meson* are conjoined—that is, the highest note of the former is the lowest note of the latter—as are *diazeugmenon* and *hyperbolaion*. *Diazeugmenon* and *hyperbolaion*, on the other hand, are separated by a whole tone. Finally, an additional note (*proslambenomenos*) is added a whole tone below *hypaton*. Thus, the whole system spans two octaves. The system can appear in various genera, one of which is the diatonic. The genus of the system is determined by the internal tuning of its tetrachords. Greek writers disagreed about the number of subspecies (*chroai*) each genus admitted, about the precise tuning of each, and indeed about the proper terms in which to describe those tunings. Broadly speaking, Pythagorean theorists expressed intervals as ratios of whole numbers, usually with some ancillary hypotheses about the physical properties of sound that the numbers were assumed to measure. Plato's diatonic tetrachords, for instance, are tuned 81:64, 9:8, 9:8 (*Timaeus* 34b-36b). Archytas, according to Ptolemy's report, tuned his diatonic tetrachord 28:27, 8:7, 9:8 (Ptolemy, *Harmonics*, 30.9-31.18; Barker, II, 303-304). And so on. Aristoxenian theorists, on the other hand, assigned magnitudes not to the notes comprising intervals but rather to the intervals themselves. Thus, Aristoxenus describes the fourth as an interval spanning two and a half tones (*Elements*, 29.20ff, 46.3ff; Barker, II, 140, 160). Aristoxenos recognizes two "shades" (*chroai*) of the diatonic: the soft diatonic, in which the lowest interval is a semitone, the next 3/4 of a tone, and the last 5/4 of a tone, and the tense diatonic, which consists of a semitone followed by two wholetones (*Elements*, 51.20ff; Barker, II, 165).

⁹⁴ Ptolemy, *Harmonics*, 36.33-37.4, 72.6-74.3; Barker, II, 310, 349-50.

several ancillary *hypotheses*.⁹⁵ While Rameau probably had little direct knowledge of Greek writings on harmonics, his reading of Zarlino's *Istitutioni harmoniche* (1558) would at least have alerted him to the fact that his predecessors constructed their diatonic systems in ways quite different from his own.⁹⁶ (Zarlino, for his part, constructs the same diatonic tuning, which he calls the *diatono-sintonico*, by taking successive harmonic means, first of the octave, then the fifth, and finally the major third, and then superimposing the resultant intervals upon one another in various ways.)⁹⁷ Still, even Rameau's limited, second-hand acquaintance with the subject sufficed for him to realize that Greek theorists advanced a variety of diatonic genera and appealed, in constructing them, to criteria quite different from his own. To counter the *prima facie* implausibility of his identification of the *mode naturel* with the Greek diatonic, then, Rameau advances two slightly different explanations. Initially, he suggests that Pythagoras himself probably had some knowledge of the *corps sonore*, but that his successors misunderstood

⁹⁵ Ptolemy, *Harmonics*, 33.1-37.20; Barker, II, 306-11. Ptolemy constructs his various genera by considering all possible ways in which the ratio of the fourth (4:3) may be divided into two epimoric ratios. There are three possible divisions: 5:4 and 16:15, 6:5 and 10:9, and 7:6 and 8:7. The enharmonic and chromatic genera result when the larger interval of each pair is placed above the lower, and the lower in its turn divided into two epimores. The various shades of the diatonic genus result when the smaller interval is placed above the larger, and the larger is in turn divided into two epimores. In the "tense" diatonic, the uppermost ratio is 10:9 and the remaining, lower interval (6:5) is divided in turn into 16:15 and 9:8. Detailed commentary on Ptolemy's procedure is available in Andrew Barker, *Scientific Method in Ptolemy's Harmonics* (Cambridge: Cambridge University Press, 2001), 74-87, 132-157. On the Archytan heritage of Ptolemy's insistence that melodic intervals correspond to epimoric ratios, see Andrew Barker, "Ptolemy's Pythagoreans, Archytas and Plato's Conception of Mathematics," *Phronesis* 39 (1994): 113-135.

⁹⁶ The second book of Zarlino's *Istitutioni* provides an extended overview of Greek harmonic theory. As the preface to the *Traité* indicates, Rameau read the work in its second (1573) edition (CTW, I, 6). While Rameau does cite Ptolemy's *Harmonics*, for instance in *Suite des Erreurs* (CTW, V, 320), his remarks do not inspire much confidence that he had read it.

⁹⁷ Zarlino, *Istitutioni harmoniche*, II.39, 139-142. Zarlino begins by dividing the octave C-C' (1:2) harmonically to obtain the fifth C-G (2:3) and the fourth G-C' (3:4). He then repeats the procedure on the fifth C-G, thereby obtaining the major third C-E (4:5) and the minor third E-G (5:6). To construct the notes D and F, he superimposes the fourth on the fifth C-G, first by placing its lower note on C, then its upper note on G. To obtain A, he divides the fifth F-C harmonically. Finally, he superimposes the major third on the fourth G-C to obtain B. The resultant division, Zarlino notes, corresponds to Ptolemy's "tense" diatonic. This version of the diatonic is the natural one, because its intervals (with the exception of the major semitone) all arise from successive harmonic divisions of elements of the *senario*: the octave, divided harmonically, gives the fifth and fourth; the fifth, divided, the major and minor thirds; the major third, the major and minor tones. (The major semitone is admitted because it makes up the difference between the major third and fourth.) Thus, the *diatónico sintono* or "tense" diatonic is constructed "secondo la natura, & la passioni de i numeri harmonici, & sonori."

and distorted his teachings.⁹⁸ Later, he modifies the claim, maintaining that the Greeks derived their diatonic genus from the *corps sonore*, but unconsciously rather than explicitly. In this they were guided, as though by a sort of instinct, by a vague apprehension of the resonance of the *corps sonore*.⁹⁹ That suggestion, though ventured only in passing in the *Génération harmonique*, would later provide rich fodder for reinterpretation in the hands of Condillac and Diderot.¹⁰⁰

Like Rameau, Rousseau broadly regards the modern diatonic scale as natural, at least in the *Encyclopédie* articles of 1749. In the entry *ECHELLE, en Musique*, he writes:¹⁰¹

Il ne faut pas croire que les rapports des tons & semi tons dont l'échelle est composée, soient des choses arbitraires, & qu'on eût pû par d'autres divisions donner aux sons de cette échelle un ordre & des rapports différens, sans diminuer la perfection du système. Notre système est le meilleur, parce qu'il est engendré par les consonnances & par les différences qui sont entre'elles. (V:250)

One should not think that the ratios of the tones and semitones composing the scale are arbitrary, or that another division could have given them a different order or different ratios without prejudice to the perfection of the system. Our system is the best, because it arises from the consonances and the intervals between them.

In this particular passage, however, Rousseau does not seem to have the *Génération harmonique* in mind. The scale, he writes, is formed from the consonances and their "differences" (not, significantly, from the *sons harmoniques* of successive fundamentals).

⁹⁸ "[I]l y a même lieu de soupçonner que Pytagore pourroit bien nous avoir prévenu dans une partie de ces Progressions, puisque tout son Système, son Tétracorde, en un mot, tout ce qu'on lui attribue sur ce sujet, est directement tiré de la Progression triple; sans doute que la quintuple ne lui est point venue à l'esprit, sur ce qu'il a d'abord trouvé les Tierces fausses dans la première, d'où toute l'antiquité n'a jamais voulu recevoir ces Tierces pour Consonnances; on sçait d'ailleurs que cet Auteur abondoit en Progressions; & comme il ne nous reste rien de lui, apparemment que ses Sectateurs ont expliqué, selon leur portée, les moïens dont il s'est servi pour parvenir à son Système" (CTW, III, 38).

⁹⁹ "[C]'est justement, dis-je, de cet ordre Diatonique que les Grecs ont formé leurs Systèmes Diatoniques, auxquels ils ont donné le nom de *Tétrachordes*; vous en voyez l'origine dans la succession fondamentale par Quinte; & s'ils n'y ont pas suivi les mêmes rapports, on peut juger à présent de quel côté vient l'erreur. | Il est étonnant que les Anciens aient ainsi découvert l'une des premières conséquences du principe, sans s'être aperçus de ce principe, sans l'avoir même suivi dans les rapports qu'ils assignent aux intervalles de leurs Tétracordes: on voit par-là ce que peut l'Oreille, mais en même-tems les égaremens où elle peut nous jeter, quand on n'a point d'autre guide dans ses recherches" (CTW, III, 44). Rameau is characteristically reticent about just how this can occur. For a careful analysis of the various assumptions his claim entails, see Cohen, "The 'Gift of Nature.'"

¹⁰⁰ See pp. 67-69, above.

¹⁰¹ The passage recurs almost *verbatim* in the *Dictionnaire de musique* (OC, V, 847), and Rousseau never explicitly recanted. To say the least, however, this insistence on the scale's "naturalness" is hard to square with Rousseau's later characterization of the entire tonal system as an artifice unique to European music.

The implied procedure is that of the *Traité de l'harmonie*, in which Rameau constructs diatonic intervals by “subtracting” the consonances from one another. The difference between the fourth and fifth yields the major tone, that between the major third and fourth the major semitone, and so on.¹⁰² Of the *Génération's mode naturel*, Rousseau here makes no mention.¹⁰³

To repair that omission, d'Alembert joins a lengthy addendum to Rousseau's article. In its course he not only provides a dutiful summary of the relevant parts of the *Génération harmonique* but also reiterates Rameau's identification of the *mode naturel* with the Greek diatonic genus:

Il est singulier que le Grecs, qui paroissent n'avoir eu aucune connoissance développée de la basse fondamentale, l'ayent devinée implicitement, pour ainsi dire, en formant leur système diatonique d'une manière si simple & si conforme à la progression la plus naturelle & la moins composée de cette basse. (V:251)

It is striking that the Greeks, who seem to have had no explicit knowledge of the fundamental bass, implicitly sensed it, so to speak, in forming their diatonic system in so simple a manner and one in such conformity to the most natural and least complicated progression of that bass.

This last is a step that Rousseau never takes. Indeed, in the entry DIATONIQUE (*Musique.*), he implies instead that the Greek diatonic arose from principles quite different from Rameau's:

Le genre *diatonique* des Grecs résultoit de l'une des trois règles principales qu'ils avoient établies pour accorder les tétrachordes. Voyez GENRE, TÉTRACHORDE. Le nôtre résulte de la marche consonnante de la basse, sur les cordes d'un même mode. (IV:954)

The Greek diatonic genus resulted from one of the three principal rules that they established for the tuning of their tetrachords. See GENRE, TÉTRACHORDE. Ours results from the consonant progression of the bass, through the notes of a single key.

¹⁰² CTW, I, 52-53. In the entry ECHELLE, Rousseau refers not to Rameau, but to Sauveur: “Que l'on ait entendu plusieurs fois,” dit M. Sauveur, “l'accord de la quinte & celui de la quarte, on est porté naturellement à imaginer la différence qui est entre eux; elle s'unit & se lie avec eux dans notre esprit, & participe à leur agrément: voilà le ton majeur. Il en va de même du ton mineur, qui est la différence de la tierce mineure à la quarte, & du semi-ton majeur qui est celle de la même quarte à la tierce majeure.” Or le ton majeur, le ton mineur, & le semiton majeur, voilà les degrés diatoniques dont notre échelle est composée selon les rapports suivans” (V:250).

¹⁰³ Elsewhere, though, Rousseau does describe the generation of the major scale in the terms given in the *Génération harmonique*. For instance, in DIATONIQUE (*Musique.*): “Le genre *diatonique* des Grecs résultoit de l'une des trois règles principales qu'ils avoient établies pour accorder les tétracordes . . . Le nôtre résulte de la marche consonnante de la basse [sc. fondamentale], sur les cordes d'un même mode” (IV:954).

The entry *GENRE, en Musique* identifies the “rules” to which Rousseau alludes:

On appelloit *genres* dans la musique des Grecs, la maniere de partager le tétracorde ou l'étendue de la quarte, c'est-à-dire la maniere d'accorder les quatre cordes qui la composoient. La bonne constitution de cet accord, c'est-à-dire l'établissement d'un *genre* régulier, dépendoit des trois regles suivantes que je tire d'Aristoxene; la premiere étoit que les deux cordes extrêmes du tétracorde devoient toujours rester immobiles, afin que leur intervalle fût toujours celui d'une quarte juste ou du diatessaron. Quant aux deux cordes moyennes, elles varioient à la vérité; mais l'intervalle du *lichanos* à la *mése* (voyez *ces mots*) ne devoit jamais passer deux tons, ni diminuer au-delà d'un ton; de sorte qu'on avoit précisément l'espace d'un ton pour varier l'accord de *lichanos*, & c'est la seconde regle. La troisieme étoit que l'intervalle de la parhypate ou seconde corde à l'hypate, ne passât jamais celui de la même parhypate au *lichanos*. (VII:595)

In Greek music, the genera are different ways of dividing the tetrachord or fourth, that is to say different ways of tuning the four notes that comprise it. The proper constitution of such tunings, that is to say the establishment of a regular genus, depended on the three following rules, which I take from Aristoxenos: the first was that the two outer notes of the tetrachord stay fixed, so that they always form a fourth or diatessaron. As for the interior notes, they vary; but the interval from *lichanos* to *mese* (see these words) must never be more than two tones, nor less than a tone; so that the tuning of *lichanos* varies across exactly one tone, and that is the second rule. The third is that the interval from parhypate, the second note, to hypate never exceeds that from parhypate to *lichanos*.

As Rousseau indicates, the rules are drawn ultimately from the second book of Aristoxenos' *Elementa harmonica*.¹⁰⁴ To summarize, in any tetrachord: (1) the outer intervals form a fourth; (2) the uppermost interval is at least a tone and at most a ditone; and (3) the lowest interval is never larger than that immediately above it.

Within these general parameters, Rousseau continues, the Greeks distinguished three principal classes of tunings, namely the diatonic, chromatic and enharmonic:

Dans le diatonique la modulation précédoit par un semi-ton, un ton & un autre ton, *mi, fa, sol, la*; & comme les tons y dominoient, de-là lui venoit son nom. Le chromatique procédoit par deux semi-tons consécutifs, & une tierce mineure ou un ton & demi, *mi, fa, fa dièse, la*. Cette modulation tenoit le milieu entre celles du diatonique & de l'enharmonique, y faisant pour ainsi dire sentir diverses nuances intermédiaires; &

In the diatonic, the modulation proceeds by a semitone, a whole-tone, and then another, E-F-G-A; and as the whole-tones predominate, so the genus takes its name from them. The chromatic proceeds by two consecutive semitones and a minor third, which is a tone and a half, E-F-F#-A. This modulation is halfway between the diatonic and the enharmonic, and introduces, so to speak, diverse nuances, in

¹⁰⁴ See 46.20ff; Barker, II, 160-165.

de-là vient qu'on appelloit ce *genre chromatique* ou *coloré*. Dans l'enharmonique la modulation procédoit par quart de ton, en divisant, selon la doctrine d'Aristoxene, le semi-ton majeur en deux parties égales, & un diton ou tierce majeure, comme *mi, mi dièse* enharmonique, *fa & la*; ou bien, selon les Pythagoriciens, en divisant le semi-ton majeur en deux intervalles inégaux qui formoient, l'un le sémi-ton majeur; & ensuite le diton comme ci-devant, *mi mi dièse* ordinaire, *fa, la*. Dans le premier cas les deux intervalles égaux du *mi* au *fa*, étoient tous deux enharmoniques ou d'un quart de ton; dans le second cas il n'y avoit d'enharmonique que le passage du *mi dièse* au *fa*, c'est-à-dire, la différence du sémi-ton mineur au sémi-ton majeur, laquelle est le *dièse* pythagorique dont le rapport est de 125 à 128. Voyez Dièse. (VII:595-596)

the same way that one can introduce many intermediate nuances between two primary colours, and for this reason, the genre is called chromatic or coloured. In the enharmonic, the modulation proceeds by quartertones, dividing, according to Aristoxenos, the major semitone in two equal parts, followed by a ditone or major third, E-E raised an enharmonic diesis-F-A; or, according to the Pythagoreans, dividing the major semitone into two unequal intervals that form, on the one hand, the minor semitone, that is, our ordinary diesis, and on the other the difference between this same minor semitone and the major semitone, and then the ditone as before, E-E raised by an ordinary diesis-F-A. In the first case the two equal intervals between E and F were two enharmonic [dieses] or quarter tones; in the second only the passage from E diesis to F is enharmonic, that is the difference between the major and minor semitones, which is the Pythagorean diesis having the ratio 125:128.

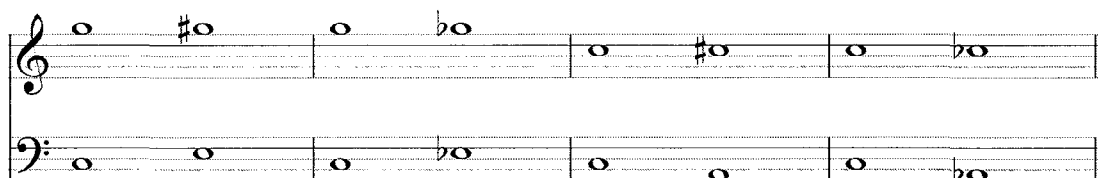
The Greek genera, then, were different ways of tuning the tetrachord. Broadly speaking, the diatonic consisted of a semitone followed by two tones ($\frac{1}{2}$; 1; 1), the chromatic of two semitones followed by a third ($\frac{1}{2}$; $\frac{1}{2}$; $1 + \frac{1}{2}$), and the enharmonic of two quartertones followed by a ditone ($\frac{1}{4}$; $\frac{1}{4}$; 2).¹⁰⁵ These three basic genera, Rousseau hastens to add, were subject to further subdivision. Aristoxenos, for instance, subdivides the chromatic into the soft chromatic, the hemiolic chromatic and tonic chromatic, the diatonic into the soft diatonic and syntonic diatonic, and so on (VII:596).¹⁰⁶ Nonetheless, these various "shades" fall into three basic classes just described.

¹⁰⁵ Rousseau's discussion, so far as it goes, is broadly accurate. The tuning he gives for the enharmonic, *selon les Pythagoriciens*, though, is idiosyncratic. Rousseau's discussion implies the following division: 625:576, 128:125, 6:5. So far as I know, no extant Greek source preserves this division.

¹⁰⁶ See Aristoxenos, *Elements*, 50.15ff; Barker, II, 164-65. Aristoxenos' list, moreover, is exemplary rather than exhaustive.

Like the Greek writers Rousseau considers, Rameau had also distinguished a *genre chromatique* and a *genre enharmonique* in addition to the diatonic genus. Rameau's diatonic genus, as we saw, results from fundamental-bass progressions by fifth; the chromatic, in contrast, arises from root motion by third.¹⁰⁷ If, for instance, the fundamental bass descends by minor third between two major triads (or seventh chords), a new, chromatic interval will occur between the root of the first and the third of the second. This new interval is the minor semitone (25:24). Ex. 3.19 shows four such progressions, with the upper part moving, in each case, by a chromatic semitone.

Ex. 3.19. *Génération harmonique*, ex. 19



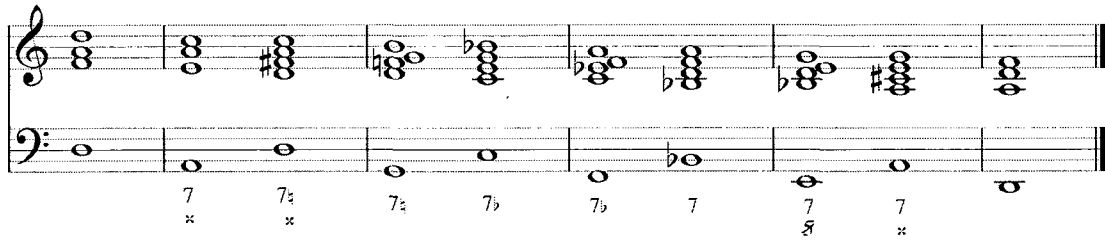
Slightly further on in the *Génération*, Rameau briefly alludes to two additional manifestations of the *genre chromatique* (neither of which involves a fundamental-bass motion by third).¹⁰⁸ The first is simply the progression from a minor triad to a major, or vice versa, over the same root (the minor semitone occurs between the thirds of the two chords).¹⁰⁹ The second, what Rameau had called the *chromatique en descendant* in the *Traité*, involves a series of interlocking evaded *cadences parfaites* in which each chord is a *dominante-tonique*—that is, what we would now describe as a sequence of applied dominants (Ex. 3.20; CTW, I, 316-18). The minor semitone occurs, in each case, between the leading tone of the preceding chord and the seventh of its successor.

¹⁰⁷ See *Génération*, CTW, III, 87; cf. *Nouveau système*, CTW, II, 61-62. The claim, though, is not strictly true since, as we will shortly see, Rameau also describes two further kinds of chromatic progressions, neither of which results from root motion by third.

¹⁰⁸ “L’origine de ce nouveau genre étant connue, on peut en profiter dans d’autres successions que celle de la Tierce, comme par exemple, en changeant la Tierce d’un Son fondamental de majeure en mineure, soit pour changer le genre du même Mode, soit pour passer dans un autre, ou bien encore dans un enchaînement de Dominantes, où la Tierce majeure de l’une peut descendre Chromatiquement sur la Septième de l’autre, & où pour lors chaque Dominante annonce un Son principal qui devient Dominante par le Chromatique annoncé” (CTW, III, 89).

¹⁰⁹ In the *Traité*, Rameau groups this progression together with that in which the fundamental bass descends by third as the *chromatique en montant*; see CTW, I, 318-20.

Ex. 3.20. *Traité de l'harmonie*, p. 287



In his early writings, Rameau treats the minor semitone as the smallest allowable melodic interval, since it is the smallest interval that can be formed between the *sons harmonique* of successive fifth or third-related fundamentals. In the *Nouveau système*, in a characteristic rhetorical burst, he expresses the point as follows:

Que faudroit-il donc faire pour trouver des degrés successifs plus petits que les *Diatoniques*, & les *Chromatiques*? Il faudroit renverser tout l'ordre naturel; il faudroit oublier qu'une seule corde &c. fait résonner trois Sons différents; que l'Harmonie & son progrès ne peuvent naître que de ces trois Sons différents; & que la Mélodie n'est qu'une suite de ce progrès de l'Harmonie. Pour lors, abandonnant tout principe, rien ne sera plus facile que d'imaginer des intervalles à son gré[.] (CTW, II, 62)

What must one do, then, to find successive [scale] degrees smaller than the diatonic and the chromatic? One must upset the whole natural order: one must forget that a single string, etc., produces three different sounds that harmony [or "triad" here?] and its progress arise from these three sounds; and that melody is only a consequence of this harmonic progression. Then, abandoning all principle, nothing will be easier than to imagine intervals at will.

In the *Nouveau système*, then, the minor semitone is the smallest melodic interval. But that insistence raises an immediate difficulty. As Rameau quickly acknowledges, Greek writers consistently describe an enharmonic genus in which the tetrachord consists of two quarter-tones followed by a third or ditone. Rameau first tries to extricate himself from the dilemma by construing the Greek enharmonic genus as a purely theoretical construct:

Les Grecs pourroient bien avoir proposé un *Système Enharmonique* pour les mêmes raisons qui nous ont engagées à proposer celui des *Comma*, (car on peut former un *Système* entier des *Comma* qui composent le *Ton*) c'est à dire qu'ils auront simplement proposé ce *Système* pour faire voir la composition de certains intervalles, &c. (CTW, II, 63)

The Greeks could well have proposed an enharmonic system for the same reasons that we [moderns] have proposed the system of commas (for one can form a whole system from the commas that compose the tone) namely that they simply proposed this system in order to show the composition of certain intervals, etc.

The reference is presumably to Joseph Sauveur's *Système générale des intervalles des sons* (1701). In that treatise, Sauveur divided the octave into 43 *merides*, each consisting in turn of 7 *eptamerides*.¹¹⁰ Sauveur's aim in so dividing the octave was not to describe a scale used in practice but rather to provide a convenient and precise system of quantifying musical intervals useful for treating traditional problems of *musica speculativa* such as temperament. Similarly, Rameau suggests, the Greek enharmonic, was devised for purely theoretical ends.

Shortly afterwards, however, Rameau recanted. As the *Remarques* prefacing the *Nouvelles suites de pièces de clavecin* (1728) indicates, that collection includes two pieces exploiting the *genre enharmonique*:

L'effet qu'on éprouve dans la douzième mesure de la reprise de l'*Enharmonique* ne sera peut-être pas d'abord du goût de tout le monde; on s'y accoutume cependant pour peu qu'on s'y prete, et l'on en sent même toute la beauté, quand on a surmonté la première repugnance que le défaut d'habitude peut occasionner en ce cas. L'harmonie qui cause cet effet n'est point jettée au hazard; elle est fondée en raisons, et autorisée par la nature même[.]

.....

Le même trait a lieu dans la cinquième mesure de la deuxième reprise de la *Triomphante*: mais l'effet est moins surprenant en consequence des Modulations successives qui y sont ménagées d'une autre manière, par rapport à la vitesse du mouvement.¹¹¹

The effect experienced in the twelfth measure of the reprise of l'*Enharmonique* will perhaps not at first be to everyone's taste. Nonetheless, one will become accustomed to it with a little exposure, and will even sense all of its beauty, once the initial repugnance caused by its unfamiliarity has been overcome. The harmony that causes this effect is no accident; it has a rational foundation, and is authorized by nature itself.

.....

The same stroke occurs in the fifth measure of the second reprise of *La Triomphante*: but the effect is less surprising because the successive modulations are managed in another manner, and because of the quick tempo.

Though they call attention to the relevant passages, the *Remarques* offer no sustained theoretical explanation of these novel "effects." That explanation first arrives, almost ten years later, in the *Génération harmonique*. There, Rameau begins by noting a characteristic property of the *accord de septième diminuée*: simply by respelling the chord in the appropriate way, any one of its constituent pitches can become a *note*

¹¹⁰ Joseph Sauveur, "Système générale des intervalles des sons, et son application à tous les systèmes et à tous les instrumens de musique," *Histoire de l'Académie Royale des Sciences, Année 1701. Mém.*, 297-364.

¹¹¹ Rameau, *Nouvelles suites des pièces de clavecin* (Paris: Boivin and Leclerc, 1728), n.p.

sensible. For instance, in m. 28 of Ex. 3.21, the leading-tone seventh chord of C# minor, B#-D#-F#-A, is transformed into that of E minor by respelling B# as C\$ (the enharmonic change is not notated in the bass, but is shown in the upper part). Similarly, in mm. 52-55 of Ex. 3.22, the leading-tone seventh chord of D minor resolves instead to F when C# is reinterpreted as Db. Rameau's *genre enharmonique*, then, turns on the enharmonic reinterpretation of diminished seventh chords. In each case, the difference between the original pitch and its enharmonic respelling is an enharmonic diesis (125:128), from which the genus takes its name.

Ex. 3.21. Rameau, "La Triomphante," mm. 24-36

The musical score for Rameau's "La Triomphante," measures 24-36, is presented in four systems of grand staff notation. The key signature is C# minor (three sharps: F#, C#, G#) and the time signature is 2/2. The score illustrates the concept of enharmonic reinterpretation of diminished seventh chords. In measure 28, the bass part contains a diminished seventh chord (B#-D#-F#-A), while the upper part shows the same chord respelled as C\$-D#-F#-A. In measure 32, the bass part contains a diminished seventh chord (B#-D#-F#-A), while the upper part shows the same chord respelled as C\$-D#-F#-A. In measure 35, the bass part contains a diminished seventh chord (B#-D#-F#-A), while the upper part shows the same chord respelled as C\$-D#-F#-A.

Ex. 3.22. Rameau, “L’Enharmonique,” mm. 51-58



Just as Rousseau resists equating Rameau’s diatonic with the Greek diatonic genus, so too he distinguishes Rameau’s chromatic and enharmonic genera from their Greek antecedents. In the entry CHROMATIQUE (*Musique.*), he comments briefly on the Greek chromatic (referring the reader to GENRE for details) before turning to the term’s modern sense. The transition is marked as follows: “Aujourd’hui,” and so by implication not for the Greeks, “le genre *chromatique* consiste à donner une telle marche à la basse fondamentale, que les diverses parties de l’harmonie puissent procéder par semi-tons” (“Today, the chromatic genus consists in giving a certain progression to the fundamental bass, such that the various upper parts of the texture can move by semitones,” III:387). From there, Rousseau proceeds to describe the *chromatique en descendant* and *chromatique en ascendant* along the lines developed in Rameau’s *Traité*. The entry ENHARMONIQUE (*Musique.*) draws the same distinction, though much more emphatically. The Greek genus was a particular tuning of the tetrachord:

Il résultoit d’une division particulière des tétracordes, selon laquelle l’intervalle qui se trouvoit entre le *lichanos* ou la troisième corde, & la *mese* ou la quatrième, étant d’un diton ou d’une tierce majeure, il ne restoit pour achever le tétracorde qu’un semiton à partager en deux intervalles; savoir, de l’hypate à la parhypate, & de la parhypate au lichanos. (V:688)

It resulted from a particular division of the tetrachord, according to which the interval between lichanos, the third note, and mese, the fourth, was a ditone or a major third and so to complete the tetrachord there remained only a semitone; which was divided in two: that is from hypate to parhypate, and from parhypate to lichanos.

Rameau’s enharmonic genus, however, is entirely different:

Nous avons aujourd'hui, une espèce de genre *enharmonique* entièrement différent de celui des Grecs. Il consiste comme les deux autres, dans une progression particulière de l'harmonie qui engendre dans les parties des intervalles *enharmoniques* en employant à la fois, entre deux notes qui sont à un ton l'une de l'autre, le dièse de l'inférieure & le bémol de la supérieure. Mais quoique selon la rigueur des rapports, ce dièse & ce bémol dussent former un intervalle entre eux, cet intervalle se trouve nul, au moyen du temperament, qui dans le système établi, fait servir le même son à ces deux usages: ce qui n'empêche pas qu'un tel passage ne produise par la force de la modulation & de l'harmonie, une partie de l'effet qu'on cherche dans les transitions *enharmoniques*. (V:688).

We have today a kind of enharmonic genus that is totally different from that of the Greeks. Like the others, it involves a particular harmonic progression that gives rise to enharmonic intervals in the upper parts by employing, given two notes lying a tone apart, the sharpened form of the lower one and the flatted form of the upper one. Though according to their ratios these two notes should form an interval, this interval ends up being none at all because of temperament, thanks to which the same pitch is employed for both notes in the established system. Even so, this does not prevent such a passage from producing a part of the effect that one strives for in enharmonic transitions because of the effect of its harmony.

As the remainder of the article makes clear, the enharmonic transitions to which Rousseau here alludes are precisely the progressions that Rameau describes in discussing the *genre enharmonique* in the *Génération harmonique*:

Il faut d'abord remarquer que l'accord de septième diminuée, est le seul sur lequel on puisse pratiquer des passages *enharmoniques*, & cela, en vertu de cette propriété singulière qu'il a de diviser juste l'octave entière en quatre intervalles égaux. Qu'on prenne dans les quatre sons qui composent cet accord celui qu'on voudra pour fondamental, on trouvera toujours également que les trois autres sons forment sur celui-ci un accord de septième diminuée. Or le son fondamental de l'accord de septième diminuée est toujours une note sensible, de sorte que sans rien changer à cet accord, on pourroit le faire servir successivement sur quatre différentes fondamentales, c'est-à-dire quatre différentes notes sensibles.

Supposons l'accord sur *ut* dièse dans le ton naturel de *ré*: car cet accord ne peut avoir lieu que dans le mode mineur . . . si je

The diminished seventh chord, first of all, is the only one that may be used in enharmonic transitions, and this in virtue of its unique property of dividing the octave exactly into four equal intervals. Whichever of the four pitches composing this chord we take as the fundamental, we will always find that the three remaining pitches form a diminished seventh chord above it. Now since the root of a diminished seventh chord is always a leading tone, without altering the chord we can make it serve successively over four different fundamentals, which are themselves four different leading tones.

Consider the diminished seventh chord on C# in D minor, for the chord can only appear in the minor mode . . . if I now take its third E as the root, E becomes a leading tone in turn, and so announces the key of F minor. Now C# still forms a part of this

prends la tierce *mi* pour fondamentale, elle deviendra note sensible à son tour, & annoncera par conséquent le mode mineur de *fa*: or cet *ut* dièse reste bien dans l'accord pris de cette manière, mais c'est en qualité de *ré* bémol, c'est-à-dire, de sixième note du ton, & le septième diminuée de la note sensible; ainsi cet *ut* dièse qui, comme note sensible, étoit obligé de monter dans le ton de *ré*, devenu *ré* bémol dans le ton de *fa* est obligé de descendre comme septième diminuée: voilà une transition *enharmonique*. (V:688)

new chord, but as Db and thus as the sixth degree of the scale and the diminished seventh above the leading tone. Thus the C# that, as a leading tone in D minor, was obliged to ascend, becomes Db in the key of F and is obliged to descend, since it is now a diminished seventh [above the bass]. This is an enharmonic transition.

The global impression Rousseau's article leaves is of the sharp distinction drawn between Rameau's enharmonic and the Greek one. In the *Suite des Erreurs*, Rameau protested in response that he had never meant to equate his *genre enharmonique* with the Greek enharmonic genus: "M. Rameau," he claims (writing of himself in the third person), "ne paroît pas avoir prétendu parler de l'Enharmonique des Grecs, quand il en a donné les loix dans sa *Génération harmonique*, p. 149. article II, il s'y est seulement servi du terme en usage" ("M. Rameau did not claim to speak of the Greek enharmonic, when he explained it in his *Génération harmonique*, p. 149, article II, he merely adopted the current term," CTW, V, 326). It is of course true that Rameau did not explicitly equate the two in his *Génération harmonique*. Still, his objection seems partly disingenuous. When he first introduced the *genre enharmonique* in 1728, Rameau did seem to imply that he was resuscitating a lost aspect of ancient practice:

[C]'est à ce même *quart de Ton* qu'est attaché le *genre Enharmonique*: mais les Modernes n'ayant pû tirer des Anciens aucun autre éclaircissement sur ce fait, ont regardé ces genres de *Chromatique* et d'*Enharmonique* comme de pure spéculation, et les ont bannis de notre Musique, sur ce que le *quarte de Ton* ne nous est pas naturel: l'Oreille en a cependant jugé autrement de nos jours[.]¹¹²

It is by this same quarter tone that the enharmonic genus is constituted. But the moderns, being unable to extract any clarification from the ancients on this matter, have regarded these chromatic and enharmonic genera as pure speculation, and we have banished them from our music with the claim that the quarter-tone is not natural. But the ear has judged otherwise in our day.

¹¹² Rameau, *Nouveau suites*, n.p.

Rameau himself, as we have seen, initially belonged to the skeptical camp. To recall, his quarrel with the enharmonic genus in the *Nouveau système* was that no interval smaller than the minor semitone could be constructed through fundamental-bass motions by fifths and thirds. By 1728, however, Rameau had realized that the enharmonic diesis (125:128) could arise from the enharmonic reinterpretation of the diminished seventh chord, a progression in which the fundamental bass moves by an ascending minor third. This progression is an instance of the *genre enharmonique*, which Rameau claims in the preface to his *Nouvelles suites des pièces de clavecin* to rescue from the incomprehension of *les modernes*.

Whether or not Rameau seriously meant to equate his *genre enharmonique* with the Greek enharmonic (we will see below that Diderot, like Rousseau, thought he did), the existence of the Greek genus as a practicable scale, rather than a speculative construct, poses a formidable challenge to his theory. The Greek enharmonic, we saw above, involves a particular division of the tetrachord such that its first and second intervals form successive quarter-tones. The problem the genus poses for Rameau is that there is now way to construct these successive quarter-tones by means of fundamental-bass progressions through fifths and thirds. Rousseau does not make this point explicitly in the *Encyclopédie*. Still, he should have been aware of it, since Condillac had already made the relevant observation in his *Essai sur l'origine des connoissances humaines*.

At one point in the *Essai*'s second part, Condillac summarizes a number of results from Rameau's *Génération harmonique*:

Il est démontré dans la *Génération harmonique*: 1^o qu'on ne peut apprécier un son, qu'autant qu'il est assez soutenu pour faire entendre ses harmoniques; 2^o que la voix ne peut entonner plusieurs sons de suite, faisant entr'eux des intervalles déterminés, si elle n'est guidée par une basse fondamentale; 3^o qu'il n'y a point de basse fondamentale qui puisse donner une succession par quart de tons. (OP, I, 67)

It is demonstrated in the *Génération harmonique*: 1. that a sound has a definite pitch only when it is sufficiently sustained that its harmonics can be heard; 2. that the voice can only sing a series of successive tones if it is guided by the fundamental bass; 3. that there is no fundamental bass that can give rise to a succession of quarter tones.

The first claim rehearses Rameau's distinction, inherited from Dortous de Mairan, between pitched and unpitched sounds: a sound has a definite pitch (is *appréciable*) only if its *sons harmoniques* are heard. The second recalls Rameau's construction of the *mode*

naturel. The relevant result, though, both for Condillac and for us, is the third, which Condillac spuriously attributes to Rameau: no fundamental-bass succession by fifths and thirds can give rise to successive melodic quarter-tones. In an addition to Rousseau's article GENRE, *en Musique*, d'Alembert reiterated Condillac's conclusion:

Il est possible de trouver la basse fondamentale dans le *genre* chromatique des Grecs; ainsi *mi, fa, fa#, la* a ou peut avoir pour basse *ut, fa, re, la*. Mais il n'en est pas de même dans le *genre* enharmonique; car ce chant, *mi, mi dièse* enharmonique, *fa*, n'a point de basse fondamentale naturelle, comme M. Rameau l'a remarqué. Voyez ENHARMONIQUE. Aussi ce grand musicien paroît rejeter le système enharmonique des Grecs, comme le croyant contraire à ses principes. (VII:596)

It is possible to find a fundamental bass for the chromatic genus of the Greeks; thus, E-F-F#-A has, or can have, for its bass C-F-D-A. But the same does not hold for the enharmonic genus; for the progression E-E raised by an enharmonic diesis-F has no natural fundamental bass, as M. Rameau has remarked. See ENHARMONIQUE. Thus this great musician seems to reject the Greek enharmonic system, believing it contrary to his principles.

Rameau, as we saw above, had indeed rejected the Greek enharmonic in his *Nouveau système*, though for slightly different reasons that d'Alembert imputes to him. He was forced, as a result, to interpret the Greek genus as a purely theoretical construct.

D'Alembert explicitly disputes that move: "il n'est guere possible," he writes, "de doubter, d'après les livres anciens qui nous restent, que les Grecs n'eussent en effet ce *genre*; peut-être n'étoit-il pratiqué que par les instrumens, sur lesquels il est évidemment praticable, quoique très difficile: aussi étoit-il abandonné dès le tems de Plutarque" ("it is impossible to doubt, on the evidence of the ancient books that have come down to us, that the Greeks did have this genus; perhaps it was only employed by instruments, on which it is clearly possible, although very difficult: also, it was obsolete by the time of Plutarch," VII:596).

The existence of the Greek enharmonic genus as a practicable musical scale has grave implications for Rameau's theoretical enterprise. In claiming to reduce harmony to physical acoustics, Rameau necessarily claims that his theory of harmony is universal in scope: the norms it articulates are universally binding laws. What the Greek enharmonic genus offered Rousseau, at least *in potentia*, was an example of a well-attested musical structure not bound by Rameau's *basse fondamentale*. His readings in and around the Greek harmonic theorists would eventually lead Rousseau to the fundamental insight that

the musical structures they described were essentially different from those presented by Rameau.¹¹³

Conclusion

Taken as a whole, Rousseau's *Encyclopédie* articles present a lucid and essentially accurate exposition of Rameau's theory of harmony. Rousseau's presentation, however, is neither orthodox nor uncritical. In a number of respects—by attending to the *accord de sixte superflue*, by admitting the third inversion *accord de sixte ajoutée*, and by allowing inverted chords by supposition—Rousseau attempts to extend Rameau's theory to cover progressions that Rameau himself regarded as licenses. Rousseau also probes the empirical adequacy of Rameau's theory by drawing attention to a number of anomalous chord progressions—the *cadence rompue*, the resolution of the leading-tone seventh chord, and the *faux-bourdon* progression, all of which are exceptions to Rameau's general account of harmonic succession. The existence of these anomalous progressions shows that Rameau cannot account for all progressions that commonly occur in musical practice. In addition to this empirical inadequacy, Rameau's theory also suffers from a number of logical failings. For one, Rameau fails to derive dissonant intervals from the *corp sonore* in any compelling fashion. Similarly, his attempt to derive harmonic progressions from the *corps sonore* cannot be sustained.

¹¹³ To some extent, that insight is already presaged in the *Encyclopédie*. In the entry *GENRE (Musique)*, Rousseau insists that Rameau's genera are entirely different from the Greek ones: "Nous avons comme les anciens le *genre* diatonique, le chromatique & l'enharmonique, mais sans aucunes subdivisions; & nous considérons ces *genres* sous des idées fort différentes de celles qu'ils en avoient" (VII:596). The distinction, for Rousseau, turns on three points. First, the modern genera, unlike the Greek, admit no subdivisions. Second, the modern chromatic and enharmonic, unlike the Greek, always appear mixed with the diatonic: "Il faut encore remarquer que dans notre musique les *genres* sont presque toujours mixtes; c. à. d. que le diatonique entre pour beaucoup dans le chromatique, & que l'un & l'autre sont nécessairement mêlés à l'enharmonique. Tout cela vient encore des règles de l'harmonie, qui ne pourroient souffrir une continuelle succession enharmonique ou chromatique, & aussi de celles de la mélodie qui n'en sauroit tirer de beaux chants; il n'en étoit pas de même des *genres* anciens. Comme les tétracordes étoient également complets, quoique divisés différemment dans chacun des trois systemes, si un *genre* eût pû emprunter de l'autre d'autres sons que ceux qui se trouvoient nécessairement communs entr'eux, le tétracorde quiroit eu plus de quatre cordes, & toutes les règles de leur musique auroient été confondues. Voyez Diatonique, Chromatique, Enharmonique" (VII:596). Finally, and most importantly, for the Greeks, the genera were essentially melodic phenomena, whereas for the moderns they are essentially harmonic: "C'étoit pour eux autant de manières particulières de conduire le chant sur certaines cordes prescrites; pour nous ce sont autant de manières de conduire le corps entier de l'harmonie, qui forcent les parties à marcher par les intervalles prescrits par ces *genres*, de sorte que le *genre* appartient encore plus à l'harmonie qu'il l'engendre, qu'à la mélodie qui le fait sentir" (VII:596).

In place of Rameau's attempt, in the *Génération harmonique*, to reduce harmony to physical acoustics, Rousseau seems tentatively to endorse a psychologizing reinterpretation of Rameau's theory that he borrows from Diderot and Condillac. While the triad is directly given by the resonance of the *corps sonore*, moving from the triad to the construction of harmonic progressions requires the intervention of Condillac's philosophical psychology. Rousseau's *Encyclopédie* articles appear, in this respect, to fit into the *philosophes'* more general appropriation of Rameau's theory. However, a number of features in Rousseau's exposition sit uneasily with the Condillacian recasting of Rameau ventured in the entry HARMONIE. Though he rejects Rameau's acoustical justification for dissonance, Rousseau nonetheless follows Rameau in requiring the addition of characteristic dissonance to the intermediate chords in any harmonic progression. Rousseau does not, however, succeed in deriving these dissonances through the analysis of the triad. Similarly, it is unclear that the Condillacian reinterpretation of *ramiste* theory will be able to accommodate the anomalous progressions that Rousseau identifies any more readily than Rameau's original formulation could. Most significantly of all, neither version of Rameau's system can accommodate the enharmonic genus described by Greek theorists, a structure to which Rousseau devotes considerable attention in the *Encyclopédie* and beyond.

Rousseau seems not to have been fully cognizant of these tensions in 1749. By the time he finished his *Dictionnaire de musique*, however, he had abandoned the Condillacian interpretation of Rameau almost entirely. In its place, as we will see in the following chapter, he offers a comprehensive critique of Rameau forged both from new insights and from criticisms recapitulated from the *Encyclopédie*.

Chapter Four:

“Du Principe de la mélodie” and the *Dictionnaire de musique*

Rousseau forwarded his completed *Encyclopédie* articles to Diderot near the end of March 1749. One year later, Diderot passed them on to d’Alembert, under whose editorial competence their subject came.¹ As we saw in the preceding chapter, d’Alembert probably intervened in the early 1750s to tone down the vehemence of Rousseau’s criticism of Rameau. But d’Alembert also intervened in another way. Between 1751, when the first volume of the *Encyclopédie* appeared, and 1759, when he resigned his editorship, d’Alembert joined various addenda to Rousseau’s articles, and these addenda testify to d’Alembert’s own developing attitude towards Rameau’s theory of harmony, from the enthusiasm of the *Discours préliminaire* and *Elémens* to the pointed criticisms elaborated in the entry FONDAMENTAL and beyond.

As an examination of those addenda reveals, the criticisms outlined in Rousseau’s articles exerted a considerable influence upon their editor.² But while d’Alembert absorbed and responded to Rousseau’s 1749 articles in the early 1750s, Rousseau’s own attitudes towards *ramiste* theory continued to evolve. In 1753, the year his *Lettre sur la musique française* appeared, Rousseau began revising his *Encyclopédie* articles with an eye to reissuing them apart.³ The sole impetus, he later implied in the preface to the *Dictionnaire de musique*, was his private dissatisfaction with the originals: “Blessé de l’imperfection de mes articles à mesure que les volumes de l’Encyclopédie paroissoient, je résolus de refondre le tout sur mon brouillon, et d’en faire à loisir un ouvrage à part traité avec plus de soin” (“Dissatisfied with the imperfection of my articles as the volumes of the *Encyclopédie* began to appear, I resolved to redo the whole on the basis of

¹ “Tous les articles de Musique que j’avois promis pour l’*Encyclopédie* furent faits dès l’année de 1749 et remis par M. Diderot l’année suivante à M. d’Alembert, comme entrant dans la partie *Mathématique* dont il étoit chargé” (*Dialogues*, OC, I, 680).

² See Michael O’Dea, “Consonances et dissonances.”

³ Jean-Jacques Eigeldinger, introduction to *Jean-Jacques Rousseau: Dictionnaire de musique*, OC, V, cclxxii. The evidence comes from two sources: the first, a letter from Rousseau to Ballière de Laisement dated January, 1765, in which Rousseau remarks: “Que ne donnerois-je pas pour avoir pu consulter votre Ouvrage ou vos lumières il y a dix ou douze ans, lorsque je travaillois à rassembler les Articles mal dirigé que j’avois faits pour l’*Encyclopédie*” (CC, XXIII, 298); the second, a passage from the *Confessions* concerning the arrival of his library at Môtiers in May 1763, which runs “je repris mon *Dictionnaire de musique* que dix ans de travail avoit déjà fort avancé” (OC, I, 607).

my drafts and to prepare from them a separate work treated with more care,” OC, V, 606). The publication of Rameau’s *Observations sur notre instinct pour la musique* (1754) and *Erreurs sur la musique dans l’Encyclopédie* (1755), however, imparted a new urgency to the endeavour. Compelled to respond to Rameau’s attacks, Rousseau drafted “Du Principe de la mélodie” (1755) and began to adapt the *Dictionnaire de musique* to the new exigency of responding to Rameau.⁴

In 1755, Rousseau still hoped to see the *Dictionnaire* in print the following year, and the work was announced in 1756, in the *avertissement* that d’Alembert added to the sixth volume of the *Encyclopédie* in response to Rameau’s *Erreurs*.⁵ Circumstances, however, soon intervened. Rousseau’s move from Paris to Montmorency in April 1756 deprived him of easy access to the materials and resources he required. At Montmorency, Rousseau quarreled, first with Grimm and Mme d’Épinay, and then with Diderot. His love affair with Mme de Houdetot and its sublimation into *La Nouvelle Héloïse* (1761) further deflected his attention from the *Dictionnaire*. *Émile* (1762) and the *Contrat social* (1762) followed. In short, progressively removed from the dispute with Rameau and the other circumstances surrounding the early stages of work on the *Dictionnaire*, Rousseau gradually lost interest in the project in the face of more pressing concerns, both personal and literary:

Éloigné des amusemens de la Ville, je perdis bien-tôt les goûts qui s’y rapportoient; privé des communications qui pouvoient m’éclairer sur mon ancien objet, j’en perdis aussi toutes les vues; et soit que depuis ce tems l’Art ou sa théorie aient fait des progrès, n’étant pas même à portée d’en rien savoir, je ne fus plus en état de les suivre. Convaincu, cependant, de l’utilité du travail que j’avois entrepris, je m’y remettois de tems à autre, mais toujours

Far from the amusements of the city, I soon lost the taste for them; deprived of the contacts that could enlighten me concerning my original object, I also lost it from view, and if the art or its theory progressed since that time, I was no longer able to follow it, since I was not in a position to know. Convinced, nonetheless, of the utility of the work I had begun, I applied myself to it from time to time, but always with less success and always

⁴ Eigeldinger, introduction, OC, V, cclxxii-cclxxiii. The evidence is from the article “Accompagnement” in the Neuchâtel manuscript of the *Dictionnaire*. See below p. 228n18.

⁵ On January 3, 1755, Rousseau reassured his (then) publisher Marc-Michel Rey: “Je prepare mon Dictionnaire de Musique pour le mettre sous presse l’Été prochain” (CC, III, 85; cf. CC, III, 287). The passage from d’Alembert’s *avertissement* is as follows: “M. Rousseau qui joint à beaucoup de connoissance & de goût en Musique le talent de penser & de s’exprimer avec netteté, que les Musiciens n’ont pas toujours, est trop en état de se defendre par lui-même pour que nous entreprenions ici de soutenir sa cause. Il pourra, dans le Dictionnaire de Musique qu’il prepare, repousser les traits qu’on lui a lancé, s’il juge, ce que nous n’osons assurer, que la brochure de l’anonyme le mérite” (VI:i).

avec moins de succès, et toujours éprouvant que les difficultés d'un Livre de cette espèce demandent, pour les vaincre, des lumières que je n'étois plus en état d'acquérir, et une chaleur d'intérêt que j'avois cessé d'y mettre. (*Dictionnaire*, OC, V, 606)

discovering that in order to be surmounted, the difficulties posed by a book of this kind demanded knowledge that I was no longer able to acquire and a warmth of interest that I no longer felt.

By the late 1750s, *Dictionnaire* served merely as "un travail de cabinet pour les jours de pluie" ("indoor work for rainy days," *Conf.*, OC, I, 410).

Still, notwithstanding his *goût attédi*, Rousseau made intermittent progress on the work, and by 1759, he had reached the end of the entry "Overture" in what was then his fair copy of the text.⁶ Forced to flee France following the condemnation of *Émile*, Rousseau took up residence at Môtiers in the Swiss Val des Travers in 1762 where he completed the text and recopied the manuscript in its entirety for the printer.

Enfin, désespérant d'être jamais à portée de mieux faire, et voulant quitter pour toujours des idées dont mon esprit s'éloigne de plus en plus, je me suis occupé, dans ces Montagnes, à rassembler ce que j'avois fait à Paris et à Montmorenci[.] (OC, V, 607)

At last, despairing of ever being able to do better, and wishing to have done with ideas that were increasingly distant from my mind, I set about assembling what I had written in Paris and Montmorency in these mountains.

The text was ready by 1764 (the preface is dated December 20, 1764 at Môtiers). Further delays with his publisher Duschene, however, meant that Rousseau did not see the *Dictionnaire* in print until 1767, by which time, forced successively from Môtiers, the Ile St. Pierre and Bern, he had found uneasy refuge in England at Wooton.

The *Encyclopédie* articles of 1749 provided Rousseau with the obvious basis for his work on the *Dictionnaire*.⁷ Nonetheless, the project soon expanded well beyond their scope. Of the *Dictionnaire*'s 904 articles, 534 are entirely new, and of the 381 entries

⁶ Eigeldinger, introduction, OC, V, cclxxxii.

⁷ In the preface to the *Dictionnaire*, Rousseau implies that he had no access to his *Encyclopédie* manuscripts after 1749: "au bout de trois mois mon manuscrit entier fut écrit, mis au net et livré; je ne l'ai pas revu depuis" (OC, V, 606). That cannot, however, have been true. Vols. 8-17 of the *Encyclopédie* did not appear in print until 1765, but Rousseau completed work on the *Dictionnaire de musique* in 1764. Since the *Dictionnaire* borrows liberally from articles not yet printed when it was completed, Rousseau must have had access to manuscript versions. The remark in the *Dictionnaire*'s preface must therefore refer to the *mise au net* prepared by Rousseau's amanuensis (see *Confessions*, OC, I, 384) and not to the autographs.

reprinted from the *Encyclopédie*, 221 contain significant additions or revisions.⁸ In the course of these additions, Rousseau developed the aesthetic stance first sketched in the *Lettre sur la musique française*, deepened his treatment of Greek musical culture and of music history more generally, exploited a variety of new music-theoretical sources,⁹ and honed and developed his critique of *ramiste* theory.

That the *Dictionnaire* represents an almost entirely new work is undeniable. But at the same time, a considerable amount of material is taken over directly from the *Encyclopédie*. This is particularly true of Rousseau's exposition of *ramiste* theory, which owes extensive debts to the articles of 1749: many of the relevant entries are recopied more or less verbatim from the *Encyclopédie*; others contain revisions or additions that correct or amplify particular details but do not substantively alter the point being made.¹⁰ The number of new or wholly rewritten articles is actually fairly small: of the 61 articles treating Rameau's theory that Rousseau contributed to the *Encyclopédie*, 42 are reprinted essentially intact in the *Dictionnaire*, 17 contain significant additions, and only 2 are all but entirely rewritten; the remaining 15 articles that round out the corpus are new.

Given the amount of material recapitulated from the *Encyclopédie*, it is unsurprising that the outlines of Rousseau's account of *ramiste* theory remain essentially stable. The same is true of the criticisms he develops: his observations regarding diminished seventh chords, augmented-sixth chords, and the *cadence rompue*, for instance, all reappear in more or less their expected places.¹¹ Rousseau does, however, open a significant new front in his critique, for over the course of the *Dictionnaire*, he systematically unearths the acoustical errors in Rameau's account of the *corps sonore* (discussed in Section 4.2). These errors undermine Rameau's explanations of the minor

⁸ Thomas Webb Hunt, "The *Dictionnaire de musique* of Jean-Jacques Rousseau" (Ph.D. diss., University of North Texas, 1967), 187-98, 522-29. Hunt counts 534 new articles and 381 articles adapted from the *Encyclopédie*, of which 221 contain significant revisions and 160 are reproduced essentially verbatim (17 of these last from articles by writers other than Rousseau).

⁹ Among them: Pierre Estève's *Nouvelle découverte du principe de l'harmonie* (1751), Jean-Adam Serre's *Essais sur le principe de l'harmonie* (1753), and Tartini's *Trattato di musica* (1754).

¹⁰ "Si les grands principes échappent à M. Rameau, j'avoue qu'il relève attentivement et habilement les petites fautes, et j'aurai soin de profiter de ses corrections" (OC, V, 370). For instance, Rousseau corrects the *accord d'onzième* in the chord table he gives under "Accord" in response to Rameau's criticism in the *Erreurs*. Catherine Kintzler compares the versions of the entry "Cadence" given in the *Encyclopédie* and *Dictionnaire* in "Les Articles 'Cadence' de Rousseau dans l'*Encyclopédie* et dans le *Dictionnaire de musique*," in *L'Encyclopédie, Diderot, l'esthétique: mélanges en hommage à Jacques Chouillet*, ed. Sylvain Auroux (Paris: Presses universitaires de France, 1991), 267-72.

¹¹ A curious exception is the *fauxbourdon* progression, which is no longer treated in the entry "Liaison."

mode and the subdominant (Sections 4.3 and 4.4) and further compromise his account of dissonance (Section 4.5). In the key entry “Harmonie,” Rousseau weaves these new threads together to form a significant new front in his criticism of Rameau (Section 4.6). Before turning to these details, though, it will be appropriate to venture some preliminary remarks on reading the *Dictionnaire de musique*.

4.1. Reading the *Dictionnaire de musique*

As in the *Encyclopédie*, Rousseau’s exposition of *ramiste* theory in the *Dictionnaire* is morselled into a collection of isolated articles that are dispersed across the text according to the vagaries of alphebetization. In approaching the *Dictionnaire*, we therefore confront the same range of problems that we encountered in the preceding chapter. As we saw above, the editors of the *Encyclopédie* developed a number of devices intended to mediate between the logical structure that they envisioned for their work and the alphabetical order in which they chose to cast it. By exploiting these devices—in particular, the network of cross-references, or *renvois*, worked into the body of the articles—it was possible to devise a kind of roadmap through Rousseau’s articles.¹² When Rousseau began revising his *Encyclopédie* articles for inclusion in the *Dictionnaire*, he consciously took over not just the texts of individual articles but also the network of *renvois* meant to bind those articles together: “Mon premier projet,” he writes in a passage with which we are already familiar, “étoit d’en traiter si relativement les articles, d’en lier si bien les suites par des renvois, que le tout, avec la commodité d’un Dictionnaire, eût l’avantage d’un Traité suivi” (“My initial idea was to make the articles so inter-related, to tie them so well together with cross-references, that the whole would have, alongside the convenience of a dictionary, the advantage of a continuous treatise,” OC, V, 608). Yet that project ultimately proved unworkable: “pour excécuter ce projet, il eût fallu me rendre sans cesse présentes toutes les parties de l’Art . . . ce que le défaut de resources et mon goût attiédi m’ont bien-tôt rendu impossible” (“to excecute this project, I would have had to keep all the parts of the art incessantly before me . . . something that the lack of resources and my waning enthusiasm soon made impossible,” OC, V, 608).

¹² See above, pp. 91-101.

Despite Rousseau's own reservations, however, the *renvois* probably provide enough structure to allow his exposition of Rameau to be read from the *Dictionnaire* in much the same way that we read it from the *Encyclopédie* in Chapter 3. Doing so, however, would have two considerable disadvantages. The first is a simple matter of economy. Since so much of Rousseau's exposition of Rameau is simply carried over from the *Encyclopédie*, following his account in all its details would accordingly involve considerable redundancy, these aspects of the corpus having been surveyed already. The second disadvantage flows more directly from the nature of the text—and here, we arrive at a distinctive feature of the *Dictionnaire*. While the *Encyclopédie* articles were compiled in a matter of months, the *Dictionnaire* was over ten years in the making. Unsurprisingly, Rousseau's views shifted markedly over the course of that long gestation. As his interest in the project waned, Rousseau also became progressively less inclined to revise its earlier parts. As a result, the text he eventually published is a patchwork of passages written at various times and reflecting a variety of opinions, not all of which are mutually consistent. As Rousseau's preface concedes, "C'est ici moins un Dictionnaire en forme qu'un recueil de matériaux pour un Dictionnaire, qui n'attendent qu'une meilleure main pour être employés" ("This is less a dictionary in form than a collection of materials for a dictionary, which await a better hand for their employment," OC, V, 605). The *recueil*, moreover, is a heterogeneous one. Paragraphs or entire entries dating from 1749 often stand directly beside much later passages, generally with no indication of the fact. That a text compiled over more than a decade should exhibit some inconsistencies is probably inevitable, even with the most conscientious editing. When the revision is half-hearted, or lacking entirely, inconsistencies abound. In order to interpret such contradictions, it is crucially important to date each passage as precisely as possible. Reading the *Dictionnaire* therefore requires careful attention to the discrete temporal layers of which it is composed. But to attend only to the logical structure implied by the *renvois* would be to level precisely those distinctions.

The *Dictionnaire* must therefore be read diachronically. At least at the level of the individual article, it is clear how this should be done. The first step is to compare the text of a given entry back to the corresponding article from the *Encyclopédie*, provided such an article exists. Doing so allows the initial 1749 layer of the text to be separated

out from all later additions. Of course, these subsequent additions may themselves have been added at various stages. Making these further distinctions is frequently possible by recourse to the manuscripts.

There are, in fact, two complete autographs of the *Dictionnaire de musique*, one at the Bibliothèque municipale de Lille (ms. 270) and the other at the Bibliothèque publique et universitaire de Neuchâtel (ms. R. 55).¹³ The Lille manuscript, from which the *Dictionnaire* was printed in 1767, is the later of the two, having been copied from the Neuchâtel manuscript between 1762 and 1764.¹⁴ The Neuchâtel autograph was itself begun as a fair copy, either in late 1754 or early 1755.¹⁵ As was his custom, Rousseau wrote on the recto of each leaf only, leaving the verso blank for additions and corrections. These proliferated—hence Rousseau’s decision to recopy the text—and it is in this fact that the manuscript’s interest primarily lies. By comparing the printed text of an article to the version preserved in the Neuchâtel manuscript it is possible to determine whether a given passage belongs to the initial stage of copying or was added at a later date, since passages that appear on the versos of the leaves, rather than in body of the text (i.e. on the rectos), are generally later additions. Finally, some passages in the printed text are not in the Neuchâtel manuscript at all but instead make their first appearance in the Lille version.

For any given article, the two steps—comparison to the *Encyclopédie* and then to the Neuchâtel manuscript—will typically yield up to four distinct strata: (1) text belonging to the initial 1749 layer; (2) text added before or while the article was copied into the Neuchâtel manuscript; (3) text added after the initial copying, but before the preparation of the Lille manuscript; (4) text added only in the Lille manuscript.

Of course, any number of intermediate stages presumably separate what I have here called the first, second and third layers. As the full range of autograph materials preserved at Neuchâtel suggests, Rousseau generally began by jotting down phrases or paragraphs on whatever scraps of paper he had available, by collecting relevant notes and

¹³ Neither manuscript contains the musical examples given in the plates of the printed work, and the Lille manuscript is missing the first 36 pages (they are copied in another hand from the printed text and inserted into the autograph). The Bibliothèque publique et universitaire de Neuchâtel also preserves a third autograph copy of the beginning of the work as part of ms. R. 56.

¹⁴ Eigeldinger, Introduction, OC, V, cclxxviii.

¹⁵ Eigeldinger, Introduction, OC, V, cclxxix–cclxxx.

extracts, and by entering corrections and revisions directly into his *Encyclopédie* manuscripts.¹⁶ These items collectively furnished the raw material from which he worked in preparing his first drafts. These drafts are generally written hurriedly, in a single column on the right hand side of the page, both recto and verso. The left hand side is left blank for additions and corrections, which are usually numerous. Once satisfied with his preliminary drafts, Rousseau recopied the text in his fair hand into the Neuchâtel manuscript, now over the entire recto side of each leaf, but leaving the verso blank. With rare exceptions, however, the earlier stages of composition cannot be reconstructed, the relevant manuscripts having been lost or destroyed.

What I have termed the third textual layer also conflates a number of steps. For instance, a given article may contain multiple additions on the verso, each potentially dating from a different time. In some cases, as when the addition contains a citation or quotation, these passages can be dated either exactly or approximately. Beyond such *ad hoc* methods, however, I can suggest no general procedure for determining when a given addition was made, whether relative to the body of the article or to other addenda. Barring further discoveries or greater ingenuity, it therefore seems unlikely that the majority of the additions can be dated very precisely.

Of course, sorting out the textual layers that comprise a given article is only a first step, for the articles must also be brought together and coordinated. No doubt the ideal means of doing so would be to reconstruct the chronological stages in the elaboration of an entire corpus of articles (e.g. those treating *ramiste* theory). This, at least, would be the mode of interpretation that would most do justice to the composite nature of the text—its status as a collage of heterogeneous temporal layers—and so hold the greatest promise of explaining, if not reconciling, its manifold inconsistencies. There are, however, some significant obstacles to such an endeavour. The first is the disarray of the sources. While the Bibliothèque publique et universitaire de Neuchâtel preserves a wealth of material pertaining to the *Dictionnaire*, these sources have yet to be adequately described, identified and dated, the pioneering work of Marie-Elisabeth Duchez, Sammuel Baud-Bovy, Jean-Jacques Eigeldinger, and Alain Cernuschi notwithstanding.¹⁷

¹⁶ For an inventory of these materials, see below, pp. 261-62.

¹⁷ See above, pp. 16-17, and below, pp. 261-62.

Attempting to take full account of these documents at this point in my argument would accordingly threaten to overwhelm the task at hand with a mass of archival considerations.¹⁸ Furthermore, even a preliminary survey of the source material suggests that, despite its wealth and intrinsic interest, it may be insufficient to support the kind of thorough-going reconstruction imagined above.

It would seem, therefore, that we are caught between two unpalatable options. Reviewing the whole of Rousseau's exposition by exploiting the *renvois* in the text would lead to an unacceptable degree of redundancy and would magnify, rather than minimize, the inconsistencies of the text by ignoring the gradations between temporal layers through which these inconsistencies most frequently arise. Since these gradations are not signaled in the printed text, they must be distinguished through the kinds of procedures detailed above. Yet to attempt a full reconstruction of the *Dictionnaire*'s composition—even for the limited corpus of articles that are relevant here—seems impractical at present and is perhaps ultimately unattainable.

Fortunately, Rousseau himself suggests a way out of the dilemma. In 1755, Rousseau drafted, but did not publish an extended response to Rameau's *Erreurs* under the title "Du Principe de la mélodie." Exactly ten years later, he considered publishing the text in conjunction with the *Dictionnaire* under the title *Examen de deux principes avancés par M. Rameau*. To that end, he made a fair copy of the manuscript in which he inserted the following note:¹⁹

Je jettai cet Ecrit sur le papier en 1755 lorsque parut la Brochure de M. Rameau, et après avoir déclaré publiquement, sur la grande querelle que j'avoie eue à soutenir, que je ne répondrois plus à mes adversaries. Content même d'avoir fait note de mes observations sur l'Ecrit de M. Rameau, je ne les publiai point; et je ne les joints maintenant ici que parce qu'elles servent à l'éclaircissement de quelques

I jotted this writing down in 1755 when M. Rameau's brochure appeared, and after having declared publicly that I would no longer respond to my adversaries in the great quarrel in which I had been engaged. Satisfied with having noted my observations on M. Rameau's text, I did not publish them, and I join them here only because they serve to clarify various articles of my dictionary, since the form of

¹⁸ I will, however, have more to say about the materials in the Neuchâtel archives in Chapter 5, when I turn to the implications that Rousseau drew from his criticisms of Rameau.

¹⁹ There are three extant copies of the text, all in the Bibliothèque publique et universitaire de Neuchâtel. The 1755 version, ms. R. 60, bears the title "Du Principe de la mélodie." The second autograph, ms. R. 58, was prepared for DuPeyrou in 1765. The final copy, ms. R. 59, is that from which the text was posthumously published in 1781. See Oliver Pot, introduction to *Jean-Jacques Rousseau: Examen de deux principes avancés par M. Rameau*, OC, V, cxlviii-cli.

Articles de mon Dictionnaire, où la forme de l'Ouvrage ne me permettoit pas d'entrer dans de plus longues discussions. (OC, V, 347) that work did not permit me to enter into more lengthy discussions.

In the end, Rousseau suppressed the *Examen*, but his remarks signal its usefulness for the present endeavour. Indeed, Rousseau expressly identifies one of the principle difficulties that must be surmounted in extracting his critique of Rameau from the *Dictionnaire*—namely the form of the work itself—and proposes the *Examen* as a skeleton key to his argument. I propose in what follows to take his advice. By using the *Examen*/"Du Principe" as an outline and amplifying its discussion with parallel passages from the *Dictionnaire*, it is possible to read his critique as a continuous treatise. Conveniently enough, it turns out that Rousseau concentrates in the "Du Principe" on those aspects of his overall critique that are new—that is, on the errors in Rameau's acoustics and their consequences.

It might be objected, to be sure, that reading the *Dictionnaire* through the lens of "Du Principe" will generate a synchronic rather than diachronic reading. The fact is undeniable. Still, its effect can be mitigated. "Du Principe" was written entirely in 1755 and contains no borrowings from the *Encyclopédie*. Parallel passages in the *Dictionnaire* accordingly reflect developments in Rousseau's critique that antedate the *Encyclopédie* articles but that were in place by 1755, even if they found their way into the Neuchâtel manuscript only later. When I turn from "Du Principe" to parallel passages from the *Dictionnaire*, moreover, I will take the chronology of the latter text into account where relevant. At least on the level of the individual article, the reading will therefore make room for the diachronic.

One final piece of justification is in order before beginning. Readers familiar with the *Examen* will notice that I reorganize Rousseau's argument. In that text, Rousseau identifies two principal points of disagreement between Rameau and himself: first, whether harmony is prior to melody or vice versa; and second, whether the accompaniment "represents" the *corps sonore* (OC, V, 350-51). In what follows, I pass over the first question entirely. I do so because the first question actually depends on the second: whether or not harmony is prior to melody depends on whether or not the *corps*

sonore generates the chords comprising the harmonic texture of the *phrase harmonique*.²⁰ Accordingly, I follow the second part of Rousseau's argument here and leave any consideration of its aesthetic consequences for another time.

4.2. Acoustical Revisions and their Implications

"Il faut d'abord remarquer," Rousseau begins in "Du Principe de la mélodie," "que M. Rameau fait dériver toute l'harmonie de la resonance du corps sonore" ("One must note first of all that M. Rameau derives all of harmony from the resonance of sounding bodies").

Et il est certain que tout son est accompagné de trois autres sons harmoniques ou concomitans, qui forment avec lui un accord parfait tierce majeure. En ce sens l'harmonie est naturelle et inseparable de la melodie puisque tout porte avec lui son accord parfait. ("Du Principe," 441)

And it is certain that every sound is accompanied by three other concomitant overtones that form a major triad with the first. In this sense, harmony is natural and inseparable from melody, since each sound carries is triad with it.

In the *Encyclopédie*, Rousseau had been content to leave matters at that. As the entry ACCORD, *en Musique* puts it, the triad is the "harmonie naturelle produite par la resonance d'un corps sonore" ("natural harmony produced by the resonance of a sounding body," I:78). By the time he drafted "Du Principe," however, Rousseau had come to realize that the overtone series contains a wealth of partials beyond those comprising the triad.

Mais outre ces trois sons concomitans chaque son principal en donne beaucoup d'autres qui ne sont point harmoniques et n'entrent point dans l'accord parfait telles sont toutes les aliquotes non reductibles par leurs octaves à quelcune de ces trois premières. Or il y a une infinité de ces aliquotes qui peuvent échapper à nos sens mais dont la resonance est démontrée par induction et n'est pas impossible à confirmer par expérience. L'art les a rejetées de l'harmonie, et voila où il a

But in addition to these three concomitant sounds, each principal sound gives many others that are not harmonic and do not enter into the triad. Such are all the aliquot parts that are not reducible, through their octaves, to one of the first three. Now, there are infinitely many of these aliquots that may escape our sensation, but whose resonance is demonstrated by induction, and which it is not impossible to confirm by experiment. Art has rejected them from harmony, and that is where it has begun to

²⁰ As Marie-Elisabeth Duchez points out in "'Principe de la mélodie' et *Origine des langues*: un brouillon inédit de Jean-Jacques Rousseau sur l'origine de la mélodie," *Revue de musicologie* 60 (1974): 37.

commencé à substituer ses règles à celles
de la nature. ("Du Principe," 441-42)

substitute its own rules for those of nature.

Today, the point is so obvious as to be banal. In the eighteenth century, it was far less so. Indeed, as late as 1761, d'Alembert still believed that the *corps sonore* generated only the twelfth and major seventeenth in addition to the fundamental and its octaves.²¹ The standard descriptions of the overtone series, moreover, were mutually inconsistent. In the preface to his *Système général des sons* (1701,) for instance, Sauveur implies that only the twelfth and seventeenth are heard above the fundamental:

En méditant sur les phénomènes des Sons, on me fit remarquer, que sur tout la nuit, on entendoit dans les longues cordes, outre le Son principal, d'autres petits Sons qui étoient à la douzième & à la dix-septième de ce Son[.]²²

While thinking about the phenomenon of sound, I noticed that, particularly at night, one hears other small sounds in long strings in addition to the principal sound and that these are at its twelfth and seventeenth.

Later in the treatise, Sauveur provides a table listing 32 *sons harmoniques* produced from a single string (Fig. 4.1). Yet Sauveur's *sons harmoniques* are not overtones.²³ Rather, they are harmonics or flageolet tones (*sons flutés*) produced by lightly touching the string at its nodes.²⁴ And while Sauveur does connect the two phenomena, he apparently thinks that only the first few of his *sons harmoniques* are actually heard together with the fundamental:

L'expérience montre que les longues cordes, lorsqu'elles sont bonnes ou harmonieuses, font entendre les premiers Sons harmoniques, principalement ceux qui ne sont pas en Octave l'un de l'autre, les cloches & les autres corps resonans & harmonieux font le même effet.²⁵

Experience shows that long strings, when they are good and harmonious, make the first harmonics heard, principally those that are not octaves of one another; bells and other resonating, harmonious bodies have the same effect.

²¹ d'Alembert, "Recherches sur les vibrations des cordes sonores," in *Opusculs mathématiques* (Paris, David, 1761), vol. 1, 40.

²² Sauveur, "Système général des intervalles des sons, & son application à tous les systèmes & à tous les instrumens de musique," in *Histoire de l'Académie Royale des Sciences, année MDCCI, avec les mémoires de mathématique & de physique pour la même année*, 2nd ed. (Paris: Imprimerie Royale, 1719), 300-301.

²³ "J'appelle *Son harmonique* d[']un Son fondamental, celui qui fait plusieurs vibrations pendant que le Son fondamental n'en fait qu'une, ainsi un Son à la douzième du Son fondamental est harmonique, parce qu'il fait 3 vibrations pendant que le Son fondamental n'en fait qu'une" (Sauveur, "Système général," 349).

²⁴ This is the sense Rousseau gives the term in the entry "Sons harmoniques ou Sons flutés" (OC, V, 1057-59).

²⁵ Sauveur, "Système général," 355.

Sauveur writes “les premiers sons harmoniques”—not, that is, all of the 32 *sons harmoniques* listed in Fig. 4.1. And which partials are heard seems clear from Sauveur’s remarks in the preface. Sauveur did not, then, suggest that partials beyond the sixth could be heard in the resonance of the *corps sonore*.

That suggestion does, however, appear in the work of an earlier writer on acoustics. In the fourth *Livre des Instrumens* in his monumental *Harmonie Universelle* (1636), Marin Mersenne briefly turns his attention to the existence of overtones. “La chorde frappée, & sonnée à vuide,” he remarks, “fait du moins cinq sons différens en mesme temps” (“A string struck and sounding unstopped makes at least five different sounds at the same time”).²⁶ These five sounds are the fundamental, its octave, twelfth, double octave and major seventeenth. The “au moins” in Mersenne’s observation, though, is significant, for one page later, Mersenne mentions an additional overtone that he sometimes hears in addition to the four just listed:

Outre ces quatre sons extraordinaires, i’en entends encore vn cinquiesme plus aigu, que i’oy particulièrement vers la fin du son naturel, & autresfois vn peu apres le commencement: il fait la Vingtiesme maieure auec le son naturel, avec lequel il est comme trois à vingt. Mais i’experimente quasi toujours que la Douziesme, & la Dix-septiesme s’entendent plus distinctement que les autres: de là vient qu’il semble souuent que l’on n’oyt que l’vne de deux, que l’on prend aysément pour la Quinte & pour la Dixiesme, si l’on n’y prend garde fort exactement[.]²⁷

Beyond these four extraordinary sounds, I also hear a fifth one that is higher; I hear it particularly towards the end of the natural sound, and sometimes a bit after the beginning: it makes a major twentieth with the natural sound, with which it is in the ratio 3:20. But I almost always find that the twelfth and seventeenth are heard more distinctly than the others. From this, it often seems that one hears only one of the two and that one easily takes them for the fifth and the tenth if he is not extremely careful.

The additional sound is the seventh partial, which Mersenne misidentifies as a major sixth two octaves above the fundamental.

²⁶ Marin Mersenne, *Harmonie Universelle*, Livre Quatriesme des Instrumens, 208.

²⁷ *ibid.*, 209.

Fig. 4.1. Sauveur, *Système général*, p. 350

1.	2.	3.	4.	5.	6.	7.
Rapports des vibra- tions au son fonda- mental.	Rapports des vibra- tions au premier son de chaque Oc- tave.	Intervall- es en Octaves, Merides & Spermeri- nes.	Intervall- es Diatoniques au premier son de cha- que Octave.	Intervall- es Diatoniques au son fon- damental.	Noms nouveaux.	Noms an- ciens.
I 1	10000	0	I	I	PA	VT
I 2	10000	1+0	I	VIII	fem-PA	VT
I 3	15000	1+25'	V	XII	fem-BO	SOL
I 4	10000	2+0	I	XV	bis-PA	VT
I 5	12500	2+14'	III	XVII	bis-GAn	MI
I 6	15000	2+25'	V	XIX	bis-BOr	SOL
I 7	17500	2+35''	7 7	21	bis-lal	la. d
I 8	10000	3+0	I	XXII	ter-PA	VT
I 9	11250	3+7''	II	XXIII	ter-RAs	RE
I 10	12500	3+14'	III	XXIV	ter-GAn	MI
I 11	13750	3+20''	10 IV	10 XXV	ter-fol	fa $\frac{1}{2}$ d
I 12	15000	3+25'	V	XXVI	ter-Bor	SOL
I 13	16250	3+30'	6 7	27 7	ter-lor	la $\frac{2}{3}$ b
I 14	17500	3+35''	7 7	28	ter-lal	la. d
I 15	18750	3+39'	VII	XXVIII	ter-DO	SI
I 16	10000	4+0	I	XXIX	quat-PA	VT
I 17	10625	4+4''	2 2	30	quat-rol	re. b
I 18	11275	4+7''	II	XXX	quat-RAs	RE
I 19	11875	4+11''	4 3	31	quat-gol	mi b
I 20	12500	4+14'	III	XXXI	quat-GAn	MI
I 21	13125	4+17'	7 4	32	quat-Sin ou gin	fa $\frac{1}{3}$ b
I 22	13750	4+20''	10 IV	10 XXXII	quat-fol	fa $\frac{1}{2}$ d
I 23	14375	4+23''	5 5	33	quat-bes	fol. b
I 24	15000	4+25'	V	XXXIII	quat-BOr	SOL
I 25	15625	4+28''	10 6	34	quat-bal	fol. d
I 26	16250	4+30'	6 7	34 7	quat-lor	la $\frac{2}{3}$ b
I 27	16875	4+32''	VI 5	XXXIV	quat-LOr	LA
I 28	17500	4+35''	7 7	35	quat-lal	la. d
I 29	18125	4+37'	7 7	35 7	quat-den	fi $\frac{2}{3}$ b
I 30	18750	4+39'	VII	XXXV	quat-DO	SI
I 31	19375	4+41'	VII 14	XXXV 14	quat-ph ou du	fi $\frac{2}{3}$ d
I 32	10000	5+0	VIII	XXXVI	quin-PA	VT

Mersenne's *Harmonie universelle* and Sauveur's *Système général* were the two sources from which Rameau drew his account of overtones in the *Nouveau système*. Sauveur's discussion clearly offered Rameau an illustrious precedent for restricting the *sons harmoniques* (in Rameau's sense) to the first six partials. Mersenne's, though,

would have alerted him to the existence of a seventh partial, and in fact, Rameau considers it briefly at one point in the *Génération harmonique*.

<p>Raclez une des plus grosses cordes d'une Viole, ou Violoncello, vous entendrez, avec le Son de la totalité, ceux de son Octave, double, peut être même triple, de sa Douzième & de sa Dix-septième majeure, qui sont en rapport de $1 \frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{8} \dots$. Vous pourrez encore y distinguer le Son de son $\frac{1}{7}$, pour ne pas dire plus[.] (CTW, III, 19)</p>	<p>Bow one of the lowest strings of a viol or a cello, and you will hear together with the sound of the whole [string], those of its octave, double and perhaps triple octaves, of its twelfth and major seventeenth, which are in the progression $1 \frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{8} \dots$. You will also distinguish the sound of its $\frac{1}{7}$, not to say more.</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Yet despite acknowledging the natural seventh's existence, Rameau excludes it from his theory on the grounds that it is allegedly too weak to be readily heard. The seventh, he writes, "sera si foible, qu'il vous échappera sans doute" ("will be so weak that it will undoubtedly escape your notice").

<p>[L]e Son de ce $\frac{1}{7}$ n'y paroît que comme un Son perdu, qui est d'ailleurs si foible, qu'on ne s'imagineroit jamais qu'on dût l'entendre en pareil cas, si l'on n'en étoit averti; encore vous y échappera-t'il peut-être toujours. (CTW, III, 20)</p>	<p>The sound of this $\frac{1}{7}$ is like a lost sound, which moreover is so weak, that one would never imagine it should be heard in such a case, if one were not forewarned; even then it will perhaps always escape you.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Jean-Adam Serre, who cites this passage in his *Essais sur les principes de l'harmonie* (1753), was unimpressed. "On allégueroit en vain," he remarks dryly, "le peu de force sonore de ce Son supposé *anti-musical*; il ne peut guères être plus foible que celui de la Dix-septième majeure" ("One alleges the weakness of this supposedly anti-musical sound in vain; it is no weaker than the major seventeenth").²⁸ Furthermore, Serre continues, the *corps sonore* produces a whole range of upper partials beyond the natural seventh: "On sçait que la Resonnance d'un Corps sonore ne fait pas seulement entendre l'Octave, la Douzième, & la Dix-septième majeure du Son fondamental; mais encore un nombre indéfini d'autres Sons plus aigus" ("We know that the resonance of the sounding

²⁸ Serre, *Essais*, 118.

body does not only make the octave, twelfth and major seventeenth audible; but also an indefinite number of higher pitches").²⁹

Rousseau, who draws on Serre extensively in "Du Principe," makes the same observation both there and in the *Dictionnaire*. The overtones accompanying the fundamental, he remarks in the entry "Dissonance," "ne se bournent pas à ceux qui composent l'Accord parfait . . . Il y en a une infinie d'autres moins sensibles à mesure qu'ils deviennent plus aigus et leurs rapports plus composés, et ces rapports sont exprimés par la série naturelle des aliquotes $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6} \frac{1}{7}$, etc." ("[the overtones] are not limited to those that comprise the triad . . . there are infinitely many others that are less perceptible to the extent that they are higher and their ratios less simple, and these ratios are expressed by the natural series of aliquots $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6} \frac{1}{7}$, etc.," OC, V, 774). Rousseau also draws out the obvious implication. Why, he asks in the entry "Harmonie," are the first six partials to be taken as consonances but the remainder not, when all are equally given by nature?—"Pourquoi les premiers sont-ils consonans, et pourquoi les autres ne le sont-ils pas, puisqu'ils sont tous également donnés par la Nature?" (OC, V, 849).

In light of the existence of higher partials, Rameau cannot reasonably maintain that the intervals comprising the major triad are consonances because they, and only they, are given by the *corps sonore*. The same privilege would presumably have to be extended to the intervals introduced by the upper partials as well. Thus, either Rameau must recognize these intervals as consonances, or he must find some other criterion by which to single out the intervals comprising the triad. One of Rameau's most basic claims thus founders on acoustical fact.

In the *Génération*, Rameau had introduced a second *expérience* in order to explain the subdominant and the minor triad. Strings tuned to frequencies matching the *sons harmoniques* of a given fundamental, he correctly observed, will vibrate sympathetically when that fundamental is sounded. But Rameau also claimed that certain strings tuned below the fundamental would vibrate sympathetically when it was sounded: Prenez une Viole, ou un Violoncello, dont Take a Viol or a Cello and tune two of its vous accorderez deux cordes à la Douzième strings a twelfth apart. Bow the lower, you

²⁹ *ibid.*, 116.

l'une de l'autre; raclez la grave, vous verrez frémir l'aiguë, vous l'entendrez peut-être même résonner, & vous l'entendrez indubitablement, si vous l'effleurez avec l'ongle pendant qu'elle frémit: raclez ensuite l'aiguë, vous verrez non-seulement la grave frémir dans sa totalité, vous la verrez encore se diviser en trois parties égales, formant trois ventres de vibrations entre deux noeuds, ou points fixes. (CTW, III, 18-19)

will see the higher tremble, you will perhaps even hear it resonate, and you will certainly hear it, if you brush it with your fingernail while it trembles. Next bow the upper string. Not only will you see the lower tremble along its whole length, you will also see it divide into three equal parts and form three vibrating loops between two nodes, or fixed points.

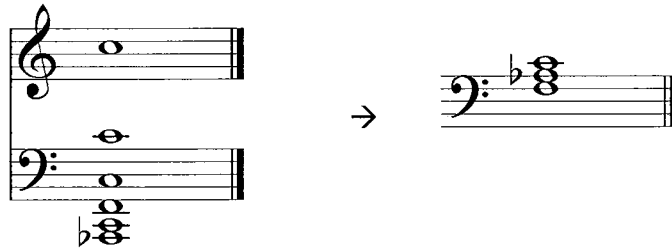
In addition to the twelfth below the fundamental, Rameau also singled out the major seventeenth. Strings tuned at these intervals, Rameau spuriously maintained, vibrate along their entire length when the fundamental was sounded. Unlike strings tuned to the *sons harmoniques*, however, these lower strings (he claimed) vibrate without emitting a sound.³⁰

Taken together, the fundamental and its lower twelfth and seventeenth form a minor triad below the fundamental—the exact mirror image of the major triad formed by the fundamental and its *sons harmoniques* above. Rameau also took the sympathetic vibration of the lower twelfth as the source of the subdominant. Both derivations are straightforward. If the fundamental frequency is C, the lower pitches will be F and Ab respectively (Ex. 4.1). Thanks to octave equivalence, the collection reduces to the closed position minor triad F-Ab-C above the subdominant note F.

In addition to producing the minor triad and the subdominant, the vibration of the lower twelfth and seventeenth also has a role to play in Rameau's derivation of dissonance. When Rameau comes to join characteristic dissonances to the triads on the dominant and subdominant in the *Génération harmonique*, he argues that the subdominant triad's characteristic dissonance should be added below its root, since the subdominant is generated downward. Thus, from the triad F-Ab-C, he forms the seventh chord D-F-Ab-C, which, rewritten F-Ab-C-D yields the subdominant added-sixth chord.

³⁰ “Les plus grans corps ont plus de puissance sur les plus petits, que ceux-ci sur les premiers; d'où il suit que les vibrations les plus lentes ont plus de puissance sur les plus promptes, que celles-ci sur celles-là; & que par conséquent les plus promptes n'agitant que foiblement les plus lentes, ne peuvent donner aux corps qui les reçoivent tout l'ébranlement nécessaire, pour que le Son puisse en être transmis à l'Oreille” (CTW, III, 17).

Ex. 4.1. Rameau's derivation of the minor triad and subdominant



Thus Rameau's derivations of the subdominant, the minor triad and, to a certain extent, his account of dissonance all depend on his claims concerning the sympathetic vibration of strings tuned below the fundamental. Unfortunately, as d'Alembert had discreetly pointed out in 1749, these claims are false. Strings tuned below the fundamental do not vibrate along their entire length, but only in aliquot parts. The correction appears prominently, though with little other fanfare, at the beginning of d'Alembert's 1749 report on Rameau's theory:

Si on accorde avec le corps *ut* quatre autres corps, dont le premier soit à sa douzième au-dessus, le second à sa dix-septième majeure au-dessus, le troisième à sa douzième au-dessous, le quatrième à sa dix-septième majeure au-dessous; alors, en faisant résonner le corps *ut*, on verra frémir dans leur totalité, le premier & le second des deux corps. A l'égard du troisième & du quatrième, ils frémiront aussi; mais en frémissant, ils se diviseront par une espèce d'ondulation, l'un en trois, l'autre en cinq parties égales, (circonstance essentielle pour ce que nous avons à dire dans la suite, & de laquelle nous avons été témoins.) (CTW, III, 223-24)

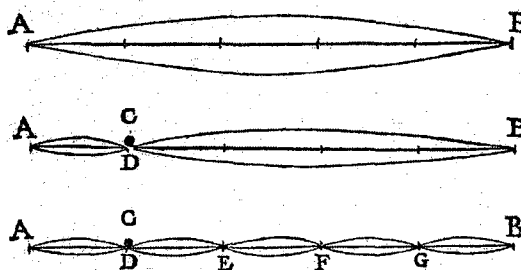
If one tunes four other strings to a string [sounding] C, so that the first is a twelfth above and the second a major seventeenth above, the third a twelfth below and the fourth a major seventeenth below, then when the string C is sounded, one will see the first and second string tremble along their totality. As for the third and fourth, they will also tremble, but in so doing they will be divided by a kind of wave, the one in three, the other in five equal parts (a circumstance that is essential for what we will say below, and which we have witnessed ourselves).

D'Alembert punctuates the correction by citing John Wallis' accurate 1677 description of the phenomenon.³¹ The correct account should, moreover, have been familiar to Rameau, since Joseph Sauveur had also given it in his "Système generale des sons."³²

³¹ John Wallis, "A Letter to the Publisher Concerning a New Musical Discovery," *Philosophical Transactions* 12 (April, 1677): 839-42.

In Sauveur's version, the result is established by the following experiment. Let a string AB be divided with a moveable bridge at C in such a way that the distance from A to C is one fifth of the total length of AB (Fig. 4.1). When the length AC is plucked, CB will be seen to tremble. The latter does not, however, vibrate along its whole length, but only in parts corresponding to the length of AC . This claim can be confirmed as follows. Continue dividing the string into fifths at points E , F and G such that each segment (CE , EF , FG , GB) is equal to one fifth of AB . Place black paper riders at points E , F , G , and white riders in the middle of each segment CE , EF , FG , GB . When AC is plucked, the white paper riders will fall, while the black ones will remain in place. This result proves that CB does not vibrate along its total length but only in aliquot parts corresponding to the length of AC .³³

Fig. 4.1. Sauveur, *Système général*, p. 351



Not only, therefore, was Rameau's claim false; it was manifestly and demonstratively false in the eyes of any scientifically-informed contemporary reader. The error stands nonetheless in the *mémoire* that Diderot prepared for Rameau to read before the Académie in 1749 (this after all was the text to which d'Alembert was responding).³⁴ Rameau first corrected the mistake in the extensively reworked version of

³² Fontenelle's description of the experiment in the *Histoire* for the same year implies that Sauveur devised his experiment independently of Wallis', and that the experiment was replicated by the Académie that same year, *Histoire de l'Académie Royale des Sciences, année MDCCI, avec les mémoires de mathématique & de physique pour la même année*, 2nd ed. (Paris 1719), 129-30.

³³ Joseph Sauveur, "Système général," 351-53.

³⁴ "J'appercus des cordes tendues frémir, et même en faire résonner d'autres. J'examinai de près le phénomène, et je vis à ma grande satisfaction les quintes en dessus et en dessous d'un son fondamental frémir" ("Mémoire," 159).

the *Mémoire* that he published in 1750 as his *Démonstration du principe de l'harmonie*.

There, Rameau admits:

Si l'on accorde d'autres corps sonores, qui soient avec ce principe en même rapport que les sons qu'il fait entendre, non-seulement comme son tiers & son cinquième, mais encore comme son triple & son quintuple, il les fera tous frémir, avec cette différence, que les premiers frémissent dans leur totalité, au lieu qu'il force les derniers à se diviser dans toutes les parties qui en font l'*Unisson*[.] (CTW, III, 177)

If one tunes other sounding bodies, which form the same ratio with the principle one as the sounds they produce, not only as its third and fifth but also as its triple and quintuple, [the principle] will make them all tremble, with this difference: the former tremble along their entire length, whereas the latter are forced to divide into the parts that make a unison [with the principle]; so that in this case, the principle has the same power over its multiples as over its submultiples.

That admission, however, leaves a significant hole in Rameau's theory, for as we have just seen, the alleged sympathetic vibration of the lower twelfth and seventeenth serves as the acoustical foundation for the minor triad and the subdominant in the *Génération harmonique*. Rameau never really comes to terms with the problem. Instead, he tends to proceed with his derivations of the minor triad and subdominant as though the acoustical revision made no difference to his theory.³⁵

Rousseau first takes aim at this acoustical error in "Du Principe de la mélodie":

M. Rameau dit que la resonance d'une corde sonore met en mouvement une autre corde sonore triple ou quintuple de la première et la fait frémir sensiblement dans sa totalité quoiqu'elle ne resonance point. voila le fait sur lequel il établit les calculs qui lui servent à la production de la dissonance et du mode mineur. et ce fait me paroît à rejeter comme faux et contradictoire. ("Du Principe," 478)

M. Rameau says that the resonance of a sounding string sets in movement another string triple or quintuple [in length] to the first and makes it tremble perceptibly along its totality even though it does not resonate. That is the fact on which he bases the calculations that allow him to produce dissonance and the minor mode. And it seems to me that this fact should be rejected as false and contradictory.

In the 1765 version of the text, Rousseau refines the point by invoking the experiment with the string and paper riders detailed in Sauveur's *Système general*. "Si l'expérience de M. Rameau est vraie," he bluntly concludes, "il faut necessairement que celle de M. Sauveur soit fausse" ("If Rameau's observation is true, then Sauveur's experiment must be false").

³⁵ See below, pp. 198-99.

Car si une corde résonante fait vibrer son triple et son quintuple, il s'ensuit que les noeud de M. Sauveur ne pouvoient exister, que sur la résonnance d'une partie la corde entière ne pouvoit frémir, que les papiers blancs et rouges devoient également tomber, et qu'il faut rejeter sur ce fait le témoignage de toute l'academie. (OC, V, 365)

For if a resonating string makes its triple and quintuple vibrate, it follows that the nodes M. Sauveur describes cannot exist, that the entire string must tremble upon the resonance of a part, that the white and red papers must equally fall, and that the testimony of the entire Academy must be rejected on this point.

The *Dictionnaire* elaborates further. In an early draft of the entry "Noeuds" preserved in the Neuchâtel manuscript of the work, Rousseau recapitulates Sauveur's experiment and drives home its consequences for Rameau.

M. Sauveur rendre cette expérience sensible aux yeux en plaçant sur les noeuds des papiers d'un couleur et sur les ventres des papiers d'un autre couleur, tandis que la corde étoit immobile. Car aussi-tot que l'unisson ce son des aliquotes en question rendu par quelque autre corde forçoit celle ou l'on avoit mis les papiers à se diviser pour ~~en résonner~~ et vibrer et résonner à l'unison, l'on voyait tomber tous les papiers qui étoient sur les ventres et rester en place tous ceux qui étoient sur les noeuds

Si M. Rameau avoit apporté la même précaution pour ~~vérifier sa prétendue~~ ~~expérience~~ <l'expérience qu'il dit avoit faite> qu'une corde vibre dans toute sa totalité mais pourtant sans résonner, au don de son tiers ou de son cinquieme, il auroit vu <vraisemblément trouvé> que cette vibration totale n'est point réelle et que la corde se divise en tierce? trois ou en cinque parties <vibrantes> a l'un dont ou? l'oreille ne saisit la resonance échape à l'oreille parceque l'unisson n'est pas facile à distinguer.³⁶ (ms. R. 55, f. 254r)

M. Sauveur makes this observation perceptible to the eyes by placing papers of one colour on the nodes and of another colour on the loops while the string is immobile. For as soon as the sound of the aliquots in question is given by another string that forces the one on which the papers have been put to divide so as to vibrate and resonate in unison [with the other string]; all the papers on the loops will be seen to fall, while all those on the nodes stay in place

If M. Rameau had brought the same care to the observation that he claims to have made, according to which a string vibrates along its totality when its third or fifth is sounded but nonetheless does not resonate, he presumably would have found that this total vibration is not real and that the string divides in three or in five vibrating parts, the sound of which escapes the ear since it is not easy to notice the unison.

The *expérience* that Rameau relates in the *Génération*, according to which the lower strings vibrate along their totality, is therefore false, and Rousseau is quick to draw out

³⁶ There is a second version of the entry sketched on f. 254v of the Neuchâtel manuscript. Neither version matches the published article, which first appears in the Lille manuscript.

the implications for Rameau's account of the subdominant and his derivation of the minor mode.

4.3. The Minor Triad

In the *Encyclopédie*, Rousseau passes over about Rameau's notorious difficulties with the minor triad. The fact is odd, since he had earlier drawn attention to precisely that point in his early *Dissertation sur la musique moderne*.³⁷

In the *Traité*, Rameau began by dividing the monochord string into two, three, four, five, six and eight parts. That division does produce a minor third (that between the fifth and sixth divisions), but not the one that Rameau requires. What Rameau needs is the minor third directly above the fundamental. Unfortunately, that minor third cannot be produced by dividing the string into aliquot parts.³⁸ Rameau's solution, such as it is, is to claim that the order of the thirds in the major triad can simply be reversed so as to produce the minor.³⁹

The *Nouveau système* offers essentially the same account of the minor triad,⁴⁰ and it was thus only in the *Génération harmonique* that Rameau managed to derive the minor triad in a manner that was at least consistent with the acoustical observations that he presented. As we have already seen, however, those acoustical observations are fundamentally flawed, and while Rameau corrected his error in the *Démonstration*, he nonetheless continued to imply that the sympathetic vibration of the lower twelfth and seventeenth—even if only in parts—could account for the minor triad:

<p>[P]our former un accord parfait où le <i>genre mineur</i> ait lieu, il faut supposer que les multiples résonnent, & qu'ils résonnent dans leur totalité, au lieu, qu'en suivant l'expérience que j'ai rapportée, ils ne font</p>	<p>In order to form a triad in which the minor genre appears, one must suppose that the multiples resonate, and that they resonate along their totality, whereas according to the observation that I have reported, they</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

³⁷ See above, p. 86.

³⁸ If it were possible to do so, then five could be written as a power of two. But five is prime.

³⁹ "[L]a *Quinte* se trouvant pour lors composée d'une *Tierce majeure* & d'une *Tierce mineure*, il est impossible que chacune de ces *Tierces* puisse se rapporter en même tems à son principe; mais il suffit aussi que l'une d'elles proissent en être engendrée immédiatement, pour que l'on ne puisse se dispenser d'attribuer à l'autre le même privilege" (CTW, I, 42-43). For incisive commentary on this passage, see Lewin, "Two Interesting Passages," 3-8.

⁴⁰ "Puisque la *Quinte* est la plus parfaite de toutes les Consonances, (sans parler de l'*Octave*), & puisqu'elle peut être composée de la *Tierce majeure* & de la *mineure*; l'ordre de ces *Tierces* doit y être indifférent: du moins c'est ainsi que l'oreille décide, & il n'est pas besoin d'en apporter d'autres preuves" (CTW, II, 31).

que frémir, & se divisent, en frémissant, dans les parties qui constituent l'*Unisson* du corps sonore qui les met en mouvement, de sorte que si, dans cet état de division, on supposoit qu'ils vinssent à résonner, on n'entendrait que cet *Unisson*.

On ne peut donc supposer la résonnance des multiples dans leur totalité, pour en former un tout harmonieux, qu'en s'écartant des premières loix de la nature . . . mais ne suffit-il pas de trouver dans cette proportion l'indication de l'*accord parfait* qu'on en peut former? La nature n'offre rien d'inutile, & nous voyons le plus souvent qu'elle se contente de donner à l'Art de simples indications, qui le mettent sur les voyes.⁴¹ (CTW, III, 198-99)

merely tremble and divide themselves, in trembling, into the parts that sound the unison of the sounding body that puts them in motion, so that if, in that state of division, we suppose that they succeed in resonating, we would only hear the unison.

We cannot therefore suppose that the multiples resonate in their totality, so as to form a harmonious whole, except in departing from the first laws of nature . . . but does it not suffice to find in this proportion the indication of the triad we could form from it? Nature offers nothing in vain, and we see most often that she is content to give simple indications to art, which set it on its way.

The fact that the lower strings vibrate in three and five parts respectively, Rameau seems to think, suffices to "indicate" the minor triad.⁴²

As Rousseau emphasizes in the entry "Harmonie," however, Rameau is hardly entitled to this conclusion:

[L]a propriété qu'ont les Cordes de se diviser, n'est point particulière à celles qui sont accordées à la Douzième et à la Dix-septième en-dessous du Son principal . . . elle est commune à tous ses multiples. D'où il suit que, les Intervalles de Douzième et de Dix-septième en-dessous n'étant pas unique en leur manière, on n'en peut rien conclure en faveur de l'Accord parfait mineur qu'ils représentent. (OC, V, 848)

The property that strings have of dividing themselves is not at all particular to those tuned to the twelfth and seventeenth below the principal sound . . . it is common to all the multiples. From this, it follows that since the intervals of the twelfth and seventeenth are not unique in this respect, we can conclude nothing in favour of the minor triad that they represent.

⁴¹ Christensen claims, on the basis of manuscript evidence, that this passage is a late addition to the *Démonstration*. See *Rameau and Musical Thought*, 166n122.

⁴² Rameau reiterated that claim two years later in his *Nouvelles réflexions* of 1752, in a gloss on the passage just quoted from the *Démonstration*: "La proportion Arithmétique a sur l'oreille à peu près les mêmes droits que l'harmonique; il s'agissoit de la fonder, & c'est le sujet de l'article intitulé, du *Mode mineur*, dans ma démonstration, p. 62, jusqu'à 80, où l'on peut voir que je n'ai prétendu tirer aucun avantage de la résonnance des multiples dans leur totalité, de sorte qu'il y auroit de la mauvaise foi à le supposer, & que je n'ai regardé la proportion qui s'en forme, que comme une indication, &c. p. 66." (CTW, V, 113). In 1754, the *Observations sur notre instinct pour la musique* once again finds Rameau invoking the sympathetic resonance of lower strings to explain the minor triad: "Le Corps sonore ne se borne pas à la génération de ses *soummultiples*, il engendre encore un pareil nombre de ses *multiples* en même rapport avec lui à l'inverse, en les faisant frémir, d'où naît la proportion arithmétique 1. 3. 5." (CTW, III, 32).

Since any string whose frequency integrally divides that of the fundamental will vibrate sympathetically in parts when the fundamental is sounded, Rameau can hardly use that property to single out the twelfth and seventeenth below.

Rameau has therefore failed to produce an acoustical foundation for the minor triad. Rousseau emphasizes that point in the entry "Mode," where he claims that the minor triad is in no way given by nature, but rather arises from the major by analogy and a kind of "inversion":

Le *Mode* majeur est engendré immédiatement par la résonnance du corps sonore qui rend la Tierce majeure du Son fondamental: mais le *Mode* mineur n'est point donné par la Nature; il ne se trouve que par analogie et renversement. Cela est vrai dans le système de M. Tartini, ainsi que dans celui de M. Rameau.

Ce dernier Auteur dans ses divers ouvrages successifs a expliqué cette origine du *Mode* mineur de différentes manières dont aucune n'a contenté son Interprète M. d'Alembert. C'est pourquoi M. d'Alembert fonde cette même origine sur un autre principe que je ne puis mieux exposer qu'en transcrivant les propres termes de ce grand Géometre. (OC, V, 895)

The major mode is engendered immediately by the resonance of the sounding body, which gives the major third of the fundamental sound. But the minor mode is not at all given by nature; it is only found by analogy and inversion. This is true in M. Tartini's system, as well as in M. Rameau's.

This last author, in various successive works, has explained the origin of the minor mode in different manners, none of which has satisfied his interpreter M. d'Alembert. That is why M. d'Alembert founds this same origin on another principle, which I cannot expound better than by transcribing this great geometer's own words.

There follows a long quotation from d'Alembert's *Elémens*:

Dans le Chant *ut mi sol* qui constitue le *Mode* majeur, les Sons *mi* et *sol* sont tels que le son principal *ut* les fait résonner tous deux; mais le second Son *mi* ne fait point résonner *sol* qui n'est que sa Tierce mineure.

Or, imaginons qu'au lieu de ce Son *mi* on place entre les Sons *ut* et *sol* un autre Son qui ait, ainsi que le Son *ut*, la propriété de faire résonner *sol*, et qui soit pourtant différent d'*ut*; ce Son qu'on cherche doit être tel qu'il ait pour Dix-septième majeure le Son *sol* ou l'une des octaves de *sol*: par conséquent le Son cherché doit être à la

In the succession C, E, G, which constitutes the major mode, the sounds E and G are such that the principal sound C makes them both resonate. But the second sound E does not make its own minor third G resonate.

Now, imagine that in place of this sound E a different sound were placed between C and G that, like the sound C, had the property of making G resonate, but which was nonetheless different from C. This sound that we are looking for must be such that it would have the sound G, or one of its octaves, for its major seventeenth.

Dix-septieme majeure au-dessous de *sol*, ou, ce qui revient au même, à la Tierce majeure au-dessous de ce même Son *sol*. Or, le Son *mi* étant à la Tierce mineure au-dessous de *sol*, et la Tierce majeure étant d'un semi-Ton plus grande que la Tierce mineure, il s'ensuit que le Son qu'on cherche sera d'un semi-Ton plus bas que le *mi*, et sera par conséquent *mi* Bémol.

Ce nouvel arrangement, *ut*, *mi* Bémol, *sol*, dans lequel les Sons *ut* et *mi* Bémol font l'un et l'autre résonner *sol*, sans que *ut* fasse résonner *mi* Bémol, n'est pas, à la vérité, aussi parfait que le premier arrangement *ut*, *mi*, *sol*; parce que dans celui-ci les deux Sons *mi* et *sol* sont l'un et l'autre engendrés par le Son principal *ut*, au lieu que dans l'autre le Son *mi* Bémol n'est pas engendré par le Son *ut*: mais cet arrangement *ut*, *mi* Bémol, *sol*, est aussi dicté par la Nature, quoique moins immédiatement que le premier; et en effet l'expérience prouve que l'oreille s'en accommode à-peu-près aussi bien.

Dans ce Chant *ut*, *mi* Bémol, *sol*, *ut*, il est évident que la Tierce d'*ut* à *mi* Bémol est mineure; et telle est l'origine du genre ou *Mode* appelé *Mineur*. (OC, V, 895-96)

Consequently, the required sound must lie a major seventeenth below this G, or (what amounts to the same thing) a major third below this same sound G. Now, the sound E being a minor third below G, and the major third a semitone larger than the minor third, it follows that the sound we are looking for will be a semitone lower than E, and thus it will be Eb.

This new arrangement, C, Eb, G, in which the sounds C and Eb both make G resonate, without C making Eb resonate, is not, it is true, as perfect as the first arrangement C, E, G. Because in the former the two sounds E and G are both engendered by the principal sound C, whereas in the latter the sound Eb is not engendered by the sound C. But this arrangement C, Eb, G, is also dictated by nature, although less immediately than the first, and experience proves that the ear accepts it almost as well.

In this melody C, Eb, G, C, it is evident that the third C-Eb is minor, and this is the origin of what is termed the minor mode

The explanation of the minor triad that d'Alembert advances thus posits a kind of dual generation according to which the C minor triad, to take his example, is generated both from its root C and from its third Eb. Though Rousseau makes no mention of the fact, the explanation d'Alembert's gives is actually due to Rameau: in the paragraphs Rousseau quoted, d'Alembert is paraphrasing from Rameau's *Démonstration*.⁴³

⁴³ In that treatise, after having first suggested that nature "indicates" the minor triad to the extent that strings tuned to the twelfth and seventeenth below the fundamental vibrate in three and five parts respectively when the fundamental is sounded, Rameau then goes on to offer precisely the explanation that Rousseau here attributes to d'Alembert "Aussi l'oreille indique-t-elle clairement les opérations du principe générateur *ut* dans cette circonstance; il s'y choisit, lui-même, un *son* fondamental, qui lui devient subordonné, & comme propre, & auquel il distribue tout ce dont il a besoin pour paroître comme générateur. | En formant la Tierce mineure, de ce nouveau *son* fondamental, qu'on juge bien devoir être le *son* *la*, le principe *ut* lui donne encore sa Tierce majeure *mi* pour *Quinte*" (CTW, III, 202).

The misattribution is perhaps surprising. There are two possible explanations. The first possibility is that Rousseau simply had not read the *Démonstration*.⁴⁴ The second emerges when the article's chronological layers are properly sorted out. The extract from d'Alembert, it turns out, is from the second (1762) edition of the *Elémens* (a copy of which d'Alembert sent to Rousseau at Montmorency in February 1762).⁴⁵ The passage cannot therefore have been added before 1762. But already in 1759, Rousseau had copied to the end of the letter 'O' in the Neuchâtel manuscript.⁴⁶ Physical evidence from the manuscript confirms that the quotation is a late addition, for the paragraph introducing it ("Ce dernier Auteur . . .," etc.) is added on f. 228v. The quotation itself does not appear in its entirety but is merely indicated by an incipit and citation, again on f. 228v. The entire passage, that is to say, was something of an afterthought. Moreover, by the time Rousseau came to add it, he seems no longer to have had access to Rameau's writings. A comment inserted in a later article, "Sous-Médiate," testifies to that circumstance. There, excusing himself for a possible lapse, Rousseau writes: "Je puis me tromper dans l'acceptation des deux mots précédens, n'ayant pas sous les yeux, en écrivant cet Article, les écrits de M. Rameau" ("I could be wrong about the meaning of the two preceding words ["sous-dominante" and "sous-médiate"], since I no longer have M. Rameau's writings before me as I write this article," OC, V, 1062). The reason Rousseau could no longer consult Rameau's writings, one assumes, is that the passage was written at Môtiers, after his flight from France in 1762. If the addition to "Mode" was also made at Môtiers, Rousseau's failure to attribute the double generation of the minor triad to Rameau becomes far more understandable.

It is clear, in any case, that Rousseau originally contented himself with remarking that Rameau had in no way succeeded in deriving the minor triad from the *corps sonore* but had merely constructed it by a kind of analogy and "inversion." In the body of the Neuchâtel manuscript, the passage simply runs thus:

⁴⁴ In the entry "Enharmonique," however, Rousseau describes Rameau's *genre diatonique-enharmonique* and *genre chromatique-enharmonique* (OC, V, 806-807). Rameau introduced both for the first time in the *Démonstration*. Accordingly, they do not appear in Rousseau's *Encyclopédie* article ENHARMONIQUE, *en Musique*. They do, however, figure in d'Alembert's addendum to that article, and in the *Dictionnaire*, Rousseau cites d'Alembert's *Elémens*, not Rameau's *Dissertation*. It is possible, then, that d'Alembert was his only source on this point.

⁴⁵ See CC, X, 117.

⁴⁶ Eigeldinger, introduction, OC, V, cclxxxii.

Le *Mode* majeur est engendré immédiatement par la résonnance du corps sonore qui rend la Tierce majeure du Son fondamental: mais le *Mode* mineur n'est point donné par la Nature; il ne se trouve que par analogie et renversement. (ms. R. 55, 220r)

The major mode is immediately engendered by the resonance of the sounding body, which gives the major third above the fundamental sound: but the minor mode is not at all given by nature; it is only found by analogy and inversion.

Mode here does not mean “key” (*ton*) but rather refers to the species—whether major or minor—of the triad. (It is the major triad, after all, that is “engendré immédiatement par la résonnance du corps sonore” in Rameau’s theory, not the major key.) What Rousseau’s claim that the minor triad is found by analogy and inversion might mean can be reconstructed by turning to parallel discussions in the entries “Sous-Dominante” and “Sous-Médiane.”

In the former, Rousseau notes that the term *sous-dominante* “vient de l’affinité que cet Auteur [Rameau] trouve par renversement entre le Mode mineur de la *Sous-Dominante*, et le Mode majeur de la Tonique” (“comes from the affinity that this author finds by inversion between the minor mode of the subdominant and the major mode of the tonic,” OC, V, 1061). *Renversement* is, of course, Rameau’s usual term for intervallic or chordal inversion. Here, however, it refers instead to the symmetrical inversion of the major triad on the tonic about its root, a procedure that yields the minor subdominant.⁴⁷ The minor subdominant, that is to say, is the mirror inversion of the tonic triad: it consists of the root together with the pitches lying a major third and perfect fifth below.

In the entry “Sous-Médiane,” which follows immediately in the text, Rousseau characterizes this same relationship one of *analogie*:

SOUS-MÉDIANTE ou SOUMÉDIANTE: C’est aussi, dans le Vocabulaire de M. Rameau, le nom de la sixième Note du Ton. Mais cette *Sous-Médiane* devant être [*sic*] au même Intervalle de la Tonique en dessous, qu’en est la Médiane en dessus, doit faire Tierce majeure sous cette Tonique, et par conséquent Tierce mineure sur la sous-Dominante; et c’est sur cette analogie que le même M. Rameau établit le

SUBMEDIANT is also, in the vocabulary of M. Rameau, the name of the sixth note of the scale. But this submediant, being as it necessarily is at the same interval below the tonic as the mediant is above, must form a minor third below this tonic, and consequently a minor third above the subdominant; it is on the basis of this analogy that M. Rameau establishes the minor mode.

⁴⁷ Rameau uses the word *renversement* in this sense at *Traité*, CTW, I, 42, and *Génération*, CTW, III, 32, 83.

principe du Mode mineur[.] (OC, V, 1061)

As we saw, Rameau claimed to derive the minor triad from the sympathetic vibration of strings tuned to the twelfth and seventeenth below the fundamental, first claiming that these lower strings vibrate along their entire lengths, then acknowledging that they do so only in parts. Both attempts, as Rousseau realized, are in vain, and Rameau is left merely with the analogy between the major and minor triads, not an acoustical foundation for the latter.

4.4. The Subdominant

Rameau first employed the term *sous-dominante* in the *Nouveau système* (in the *Traité*, the fourth scale degree, or fifth below the tonic, was distinguished by no particular denomination). The newly-christened scale degree plays a pivotal role the revised account of *mode* that Rameau gives in this second treatise: flanking the tonic below, the *sous-dominante* offers a kind of counterweight to the *dominante* above, and the three pitches together (along with their respective chords) constitute a key. Despite its new-found practical importance, however, the subdominant presents Rameau with a significant theoretical problem: unlike the dominant, the subdominant does not appear among the *sons fondamentale* generated above the tonic. In the *Nouveau système*, Rameau tries to gloss over the difficulty by treating the subdominant rather than the tonic as the generator of the mode. That is, he takes C, G and D as the subdominant, tonic and dominant of his prototypical mode, rather than F, C, and G, despite having generated all the other elements of his system from C, not G. The move is obviously unsatisfactory, though, because it severs the link that Rameau clearly intends between the generator of the system and the tonic of the key. In the *Génération*, Rameau found a solution that he thought more satisfactory. By appealing to the alleged sympathetic vibration of the lower twelfth and seventeenth, he was able to construct the subdominant from the tonic rather than vice versa.

Diderot captures the evolution nicely in his 1749 *mémoire*. Having already produced the tonic and dominant and their respective triads, he goes on to have Rameau address the problem of the subdominant:

Il ne manquoit à ce dernier système que Only two pitches were missing from this

deux sons, le *fa naturel* et le *la* pour former notre échelle diatonique complete, et la former d'une manière, sinon forcée, du moins fondée en nature et nullement arbitraire. Mais où prendre ces deux sons?

.....

Il me vient un soupçon, c'est que le premier qui avoit été tenté de faire du chant et par conséquent de former une échelle ou une succession de sons, avoit pris par hazard pour l'unité des sons ou pour premier fondamental, le son qui me manquoit et qu'il avoit eu pour premier système *fa la ut mi sol si re*, sons que l'organe préoccupée réduisit à leur moindres intervalles et qui donnèrent notre système diatonique *ut re mi fa sol la si ut* dans toute son étendue, mais ce n'étoit là qu'une supposition gratuite et peu conforme à la méthode philosophique que j'avois suivie jusqu'ici dans mes recherches. J'avois tout tiré de la resonance des corps sonores et j'imaginai qu'en considérant le même phénomène sous une autre face, il me donneroit peut-être ce qui me restoit à trouver.

Je regardai donc encore autour de moi. Je parcourus les phénomènes des corps sonores, cherchant s'il ne s'en rencontreroit pas un qui m'offrit le son qui me manquoit, et cette seconde tentative me réussit. J'aperçus des cordes tendues frémir, et même en faire résonner d'autres. J'examiner de près le phénomène, et je vis à ma grande satisfaction les quintes en dessus et en dessous d'un son fondamental frémir. Voilà, me dis-je alors, les sons qui me manquoient tous trouvés[.]

("Mémoire," 159)

last system: the F \sharp and the A, which complete our diatonic scale, and form it in away that is, if not compulsory, at least grounded in nature and in no way arbitrary. But where are these two sounds to be found?

.....

There came to me a suspicion, namely that the first person who tried to sing and thus to form a scale or series of sounds, had taken by hazard the sound I lacked for the unity of the sounds or first fundamental and that he had taken for his first system F-A-C-E-G-B-D, which the distracted organ reduced to the least degrees and which give our diatonic system C-D-E-F-G-A-B-C in its entire span. But this was merely a supposition and one little in conformity with the philosophical method that I had followed up to then in my investigations. I had drawn everything from the resonance of sounding bodies, and I imagined that by considering the same phenomenon from another side, it would give me perhaps what remained to be found.

Thus, I looked around myself once again. I ran through the phenomena concerning sounding bodies, looking to see if there was not one that would offer me the sound that I lacked, and this second attempt succeeded. I saw stretched strings tremble and even make others resonate. I examined the phenomenon closely, and I saw to my great satisfaction that the fifths above and below the sound fundamental trembled. That, I said to myself, is where the sounds I lack can be found.

Rousseau's criticism picks up at this point. "[Q]u'y a-t-il de commun," he asks in the entry "Dissonance," "entre la résonnance, le frémissement des unisons d'*ut*, et le Son de sa Quinte en dessous?" ("What does the resonance, the trembling, of [chords tuned to] the unison with C have to do with its fifth below?").

Ce n'est point parce que la corde entière est un *fa* que ses aliquotes résonnent au Son d'*ut*, mais parce qu'elle est un multiple de la corde *ut*, et il n'y a aucun des multiples de ce même *ut* qui ne donne un semblable phénomène. Prenez le septuple, il frémira et résonnera dans ses Parties ainsi que le triple; est-ce à dire que le Son de ce septuple ou ses octaves soient des cordes essentielles du Ton? Tant s'en faut; puisqu'il ne forme pas même avec la Tonique un rapport commensurable en Notes. (OC, V, 768-69)

It is not because the entire string sounds an F that its aliquots resonate at the sound of a C, but because it is a multiple of the string [sounding] C, and there is no multiple of this same C that would not give rise to a similar phenomenon. Take the septuple, it will tremble and resonate in its parts just like the triple. Is this to say that the sound of this septuple or its octaves are degrees essential to the key? Hardly, since they do not even form a relationship measurable in notes with the tonic.

Even if Rameau's "observation" were accurate, Rousseau continues, it would indicate the minor, not the major, subdominant, for the lower twelfth and major seventeenth form a minor triad below the fundamental:⁴⁸

Remarquez encore que si la contre-génération qu'il suppose pouvoit avoir lieu, l'Accord de la sous-Dominante *fa* ne devroit point porter une Tierce majeure, mais mineure; parce que le *la* Bémol est l'Harmonique véritable qui lui est assigné par ce renversement $1 \frac{1}{3} \frac{1}{5}$ *ut fa la* [*bémol*].

De sorte qu'à ce compte la Gamme du Mode majeur devroit avoir naturellement la Sixte mineure; mais elle l'a majeure, comme quatrième Quinte, ou comme Quinte de la seconde Note: ainsi voilà encore une contradiction. (OC, V, 769)

Note also that if the counter-generation that he supposes were to take place, the triad on the subdominant F would necessarily bear a minor third, not a major third, because the Ab is the true harmonic that this inversion assigns $1 \frac{1}{3} \frac{1}{5}$ C-F- Ab. So that on this account the scale of the major mode would naturally have to have a minor sixth. But its sixth is major, as the fourth fifth, or the fifth above the second degree, and here again there is a contradiction.

The only note approximating the subdominant that the *corps sonore* offers, Rousseau adds, is the eleventh partial of the overtones series, but this pitch is not the subdominant used in practice but another pitch forming the slightly larger ratio of 8:11 with the tonic.⁴⁹

⁴⁸ I pass over paragraphs 16-17 of Rousseau's article here. The former is a late addition that does not figure in ms. R. 55 and first appears in the Lille manuscript. The addition, moreover, is not a salutary one, for it turns without indication from the derivation of the subdominant in the *Démonstration* to that in the *Génération* and so muddies the argument (recall that Rousseau no longer had access to Rameau's writings after 1762). Paragraph 17 returns to the claim, first ventured in paragraph 14, that Rameau's derivation of the subdominant turns on a *fausse analogie*. I develop this aspect of Rousseau's criticism at pp. 221-27 below.

⁴⁹ "Enfin remarquez que la quatrième Note donnée par la série des aliquotes, d'où naît le vrai Diatonique naturel n'est point l'Octave de la prétendue sous-Dominante dans le rapport de 4 à 3, mais une autre

The obvious conclusion of these arguments is that the subdominant does not derive from the resonance of the *corps sonore*.

4.5. "Dissonance"

Among the principal criticisms that Rousseau leveled at Rameau in the *Encyclopédie* was the charge that Rameau had failed to derive the dissonances his theory mandates from the *corps sonore*. Rousseau reiterates that charge in the *Dictionnaire* and elaborates upon it, principally in his extensive reworking of his 1749 entry *DISSONANCE, en Musique*. The revised article reprises the original indictment before turning to d'Alembert's handling of dissonance in the *Elémens*.⁵⁰

L'illustre Géomètre qui a daigné interpréter au Public le Système de M. Rameau, ayant supprimé tous ces vains calculs, je suivrai son exemple, ou plutôt je transcrirai ce qu'il dit de la *Dissonance*, et M. Rameau me devra des remerciemens d'avoir tiré cette explication, des *Elémens de Musique* plutôt que de ses propres écrits. (OC, V, 767)

The illustrious geometer who has deigned to interpret M. Rameau's system for the public has suppressed all these useless calculations, and I will follow his example, or rather I will transcribe what he says concerning dissonance, and M. Rameau should thank me for having taken this explanation from the *Elémens de musique* rather than from his own writings.

With that remark, Rousseau launches into an extended quotation from d'Alembert's *Elémens*. The explanation of dissonance that he quotes, however, is essentially Rameau's, for while d'Alembert divests Rameau's exposition of its *vain calculs*, he retains most of its original contours:

Supposant qu'on connoisse les cordes essentielles du Ton selon le Système de M. Rameau; sçavoir, dans le Ton d'*ut* la Tonique *ut*, la Dominante *sol* et la sous-Dominante *fa*, on doit savoir aussi que ce même Ton d'*ut* a les deux cordes *ut* et *sol* communes avec le Ton de *sol*, et les deux cordes *ut* et *fa* communes avec le Ton de *fa*. Par conséquent cette marche de Basse *ut sol* peut appartenir au Ton d'*ut* ou au Ton de *sol*, comme la marche de Basse *fa*

Supposing that the essential degrees of the key according to M. Rameau's system are familiar (namely, in the key of C, the tonic C, the dominant G and the subdominant F), one must also know that this same key of C has two degrees C and G in common with the key of G, and two degrees C and F in common with the key of F. Consequently, the bass progression C-G might belong to the key of C or to that of G, and the bass progression F-C or C-F might belong to the

quatrième Note toute différente dans le rapport de 11 à 8, ainsi que tout Théoricien doit l'apercevoir au premier coup-d'oeil" (OC, V, 770).

⁵⁰ See pp. 142-43 above.

ut ou *ut fa*, peut appartenir au Ton d'*ut* ou au Ton de *fa*. Donc, quant on passe d'*ut* à *fa* ou à *sol* dans une Basse-fondamentale, on ignore encore jusques-là dans quel Ton l'on est. Il seroit pourtant avantageux de le savoir et de pouvoir, par quelque moyen, distinguer le générateur de ses Quintes.

On obtiendra cet avantage en joignant ensemble les Sons *sol* et *fa* dans une même Harmonie; c'est-à-dire, en joignant à l'Harmonie *sol si re* de la Quinte *sol* l'autre Quinte *fa*, en cette manière *sol si re fa*: ce *fa* ajouté étant la Septième de *sol* fait *Dissonance*: c'est pour cette raison que l'Accord *sol si re fa* est appelé Accord dissonant ou Accord de Septième. Il sert à distinguer la Quinte *sol* du générateur *ut*, qui porte toujours, sans mélange et sans alteration, l'Accord parfait *ut mi sol ut*, donné par la Nature même . . . Par-là on voit que, quand on passe d'*ut* à *sol*, on passe en même tems d'*ut* à *fa*, parce que le *fa* se trouve compris dans l'Accord de *sol*, et le Ton d'*ut* se trouve, par ce moyen, entièrement déterminé, parce qu'il n'y a que ce Ton seul auquel les Sons *fa* et *sol* appartiennent à la fois. (OC, V, 767)

Adding a dissonant seventh to the triad on the dominant thus serves to clarify its position in the key—such an addition being necessary since, for Rameau, any unadorned triad risks being taken as the tonic of its corresponding key.

An analogous procedure, motivated by identical considerations, yields the added-sixth chord on the subdominant:

Voyons maintenant . . . ce que nous ajouterons à l'Harmonie *fa la ut* de la Quinte *fa* au-dessous du générateur, pour distinguer cette Harmonie de celle de ce même générateur. Il semble d'abord que l'on doive y ajouter l'autre Quinte *sol*, afin que le générateur *ut* passant à *fa*, passe en même tems à *sol*, et que le Ton soit déterminé par-là, mais cette introduction de *sol* dans l'Accord *fa la ut*, donneroit deux Secondes de suite, *fa sol*, *sol la*, c'est-à-

key of C or to that of F. Thus, when one passes from C to F or G in the fundamental bass, the key is not yet clear. But it would be advantageous to make it known and to be able, by some means, to distinguish the generator from its fifths.

We obtain this advantage by joining together the sounds G and F in a single harmony (that is to say, by joining to the harmony G-B-D on the fifth G the other fifth F, in this manner G-B-D-F). This added F, being the seventh of G, forms a dissonance. It is for this reason that the chord G-B-D-F is called a dissonant chord or seventh chord. The dissonance serves to distinguish the fifth G from the generator C which always bears the triad C-E-G-C given by nature itself without mixture or alteration . . . In this way, we see that when we pass from C to G, we pass at the same time from C to F, because the F is found included in the chord on G, and the key of C, by this means, is entirely determined, because there is no other key to which the sounds F and G belong at the same time.

Let us now see . . . what we will add to the harmony F-A-C on the fifth F below the generator, in order to distinguish this harmony from that of the generator. It seems at first that one should add the other fifth G, so that the generator C should pass to both F and G and the key be determined in that way, but this introduction of G into the chord F-A-C would give two successive seconds F-G, G-A, that is to say, two dissonances whose unison would

dire, deux *Dissonances* dont l'union seroit trop désagréable à l'oreille; inconvénient qu'il faut éviter: car si, pour distinguer le Ton, nous altérons l'Harmonie de cette Quinte *fa*; il ne faut l'altérer que le moins qu'il soit possible.

C'est pourquoi, au lieu de *sol*, nous prendrons sa Quinte *re*, qui est le Son qui en approche le plus; et nous aurons pour la sous-Dominante *fa* l'Accord *fa la ut re*, qu'on appelle Accord de Grande-Sixte ou Sixte-ajoutée. (OC, V, 768)

be too disagreeable to the ear, an inconvenience that must be avoided. For if, in order to clarify the key, we alter the harmony of the fifth F, it must be altered as little as possible.

That is why, instead of G, we take its fifth D, which is the sound that most closely approximates it, and we will have for the subdominant F the chord F-A-C-D, which is called the Grande-sixte or added-sixth chord.

Just as the subdominant note is added to the triad on the dominant, so too the fifth of the dominant is added above the subdominant, and for the same reason: namely, to prevent the chord from being heard as a tonic.

These operations, along with the considerations that motivate them, are familiar from Rameau's writings. Rousseau is not, however, willing to grant that they are legitimate: "Le défaut que j'y trouve," he remarks with reference to the quotation from d'Alembert, "c'est l'emploi d'une corde étrangere au Ton, comme corde essentielle du Ton; et cela par une fausse analogie qui, servant de base au Système de M. Rameau, le détruit en s'évanouissant" ("The default that I find here is the use of a note foreign to the key as an essential note of the key, and that by a false analogy that, serving as the basis of M. Rameau's system, destroys it when it is dissolved," OC, V, 768). The *corde étrangere* is of course the subdominant, which does not in any way derive from the *corps sonore*. Yet the account of dissonance that d'Alembert presents (following Rameau) obviously requires the subdominant, for it is both the dissonant note that is joined to the triad on the dominant and the root of the subdominant added sixth chord. Without it, everything collapses. But as we have seen Rousseau argue, the subdominant cannot be derived from the *corps sonore*. It follows that Rameau's account of dissonance is untenable:

Si le témoignage de l'oreille et celui de la raison se réunissent, au moins dans le Système donné, pour rejeter la prétendue sous-Dominante, non-seulement du nombre des cordes essentielles du Ton, mais du nombre des Sons qui peuvent entrer dans

If the testimony of the ear and that of reason unite, at least in the present system, in rejecting the subdominant, not only from among the essential degrees of the key, but even from among the pitches entering into its scale, what becomes of this whole

l'Échelle du Mode, que devient toute cette théorie des *Dissonances*? que devient l'explication du Mode mineur? que devient tout le Système de M. Rameau? (OC, V, 770)

theory of dissonances? What becomes of the explanation of the minor mode? What becomes of M. Rameau's whole system?

Rousseau's answer comes in the key entry "Harmonie."

4.5. "Harmonie"

Under the head-word "Harmonie," Rousseau brings together various strands of his critique and draws them together into a forceful repudiation of *ramiste* theory. The revised entry bears only a passing resemblance to its encyclopedic forbearer. The opposition between the ancient and modern sense of *harmonie* remains, but is expounded in novel terms; Rousseau's account of modern harmony, moreover, is entirely rewritten. In fact, the only passage directly recapitulated from the *Encyclopédie* is the enigmatic derivation of harmonic succession from the analysis of the *accord parfait*, and in its new context, that passage takes on an entirely different resonance.

As before, Rousseau begins by briefly considering the sense of the Greek word *harmonikē*. Once again, the Greek term serves as a foil for a uniquely modern sense of "harmony," according to which the term signifies "une succession d'Accords selon les loix de la Modulations" ("a succession of chords according to the laws of modulation," OC, V, 846). These laws, Rousseau continues, were long regarded as a matter of custom and tradition—until, that is, Rameau advanced his system of harmony:

Longtems cette *Harmonie* n'eut d'autres principes que des règles presque arbitraires ou fondées uniquement sur l'approbation d'une oreille exercée qui jugeoit de la bonne ou mauvaise succession des Consonnances et dont on mettoit ensuite les décisions en calcul. Mais le P. Mersenne et M. Sauveur ayant trouvé que tout Son, bien que simple en apparence, étoit toujours accompagnée d'autres Sons moins sensibles qui formoient avec lui l'Accord parfait majeur, M. Rameau est parti de cette expérience, et en a fait la base de son système Harmonique dont il a rempli beaucoup de livres, et qu'enfin M.

For a long time, harmony had no other principles than more or less arbitrary rules founded only on the approval of the trained ear, which judged the worth of successions of consonances and whose decisions were afterwards translated into calculations. But Father Mersenne and M. Sauveur having discovered that every pitched sound, though simple in appearance, is always accompanied by other less perceptible sounds that form its major triad, M. Rameau set out from this observation and made it the basis of his system of harmony, with which he filled many books and which M. d'Alembert has now taken the trouble

d'Alembert a pris la peine d'expliquer au Public. (OC, V, 846)

of explaining to the public.

Having set the stage, Rousseau then launches into a wholesale attack on Rameau's system:

Je dois pourtant déclarer que ce Système, quelque ingénieux qu'il soit, n'est rien moins que fondé sur la Nature, comme il le répète sans cesse; qu'il n'est établi que sur des analogies et des convenances qu'un homme inventif peut renverser demain par d'autres plus naturelles; qu'enfin, des expériences dont il le déduit, l'une est reconnue fausse, et l'autre ne fournit point les conséquences qu'il en tire.⁵¹ (OC, V, 846)

I must nonetheless declare that this system, however ingenious it may be, is in no way founded upon nature, as he repeats incessantly; that it is established merely on analogies and predilections that an inventive man could overturn tomorrow by others that are more natural; that finally, of the observations from which it is derived, the one is manifestly false and the other does not furnish the consequences that he draws from it.

The two *expériences* in question are of course production of overtones and the alleged sympathetic vibration of the twelfth and seventeenth below the fundamental. Upon this shifting foundation, Rameau has erected a system of harmony only by relying on analogies and other *convenances*. Rousseau elaborates the point in the discussion that follows, beginning with the paragraphs borrowed from the *Encyclopédie*:

Le principe physique de la résonnance nous offre les Accords isolés et solitaires; il n'en établit pas la succession. Une succession régulière est pourtant nécessaire. Un Dictionnaire de mots choisis n'est pas une harangue, ni un recueil de bons Accords une Pièce de Musique: il faut un sens, il faut de la liaison dans la Musique ainsi que dans le langage; il faut que quelque chose de ce qui précède se transmette à ce qui suit, pour que le tout fasse un ensemble et puisse être appelé véritablement un.

Or la sensation composée qui résulte d'un Accord parfait, se résout dans la sensation absolue de chacun des Sons qui le composent, et dans la sensation comparée de chacun des Intervalles que ces mêmes Sons forment entr'eux: il n'y a rien au de-

The physical principle of resonance offers us isolated and solitary chords; it does not establish their succession. A regular succession is, however, necessary. A dictionary of well-chosen words is not a speech, nor a collection of good chords a piece of music: a sense is required, a connection in music just as in language; something in what precedes must be transmitted to what follows, so that the whole forms an ensemble and can truly be called one.

Now the compound sensation that results from the triad is resolved into the absolute sensation of each of the sounds that composes it and the comparative sensation of each of the intervals that these same sounds form amongst themselves. There is

⁵¹ The entire paragraph, including the portion just quoted, is a late addition, appearing as it does on f. 194v of the Neuchâtel manuscript.

là de sensible dans cet Accord; d'où il suit que ce n'est que par le rapport des Sons et par l'analogie des Intervalles qu'on peut établir la liaison dont il s'agit, et c'est-là le vrai et l'unique principe d'où découlent toutes les loix de l'*Harmonie* et de la Modulation. (OC, V, 847)

nothing else that can be perceived in the triad. From this, it follows that it is only by means of the rapports between sounds and the analogy of intervals that one can establish the requisite connection, and that is the true and unique principle from which the laws of harmony and modulation result.

This deduction, Rousseau continues, might be persuasive if harmony consisted only of major triads:

Si donc toute l'*Harmonie* n'étoit formée que par une succession d'Accords parfaits majeurs, il suffiroit d'y procéder par Intervalles semblables à ceux qui composent un tel Accord; car alors quelque Son de l'Accord précédent se prolongeant nécessairement dans le suivant, tous les Accords se trouveroient suffisamment liés et l'*Harmonie* seroit une, au moins en ce sens. (OC, V, 847)

If therefore all of harmony consisted only of a succession of major triads, it would suffice to move by intervals similar to those comprising such chords, for then some pitch of the preceding chord would be prolonged in the next, and all the chords would be sufficiently connected and the harmony would be unified, at least in this sense.

A glance at musical practice, though, shows that harmonic progressions involve a variety of other chords: "Les marches Diatoniques exigeoient que les Accords majeurs et mineurs fussent entremêlés, et l'on a senti la nécessité des Dissonances pour marquer les phrases et les repos"; "la succession liée des Accords parfaits majeurs," however—the model *phrase harmonique* that Rousseau has just constructed—"ne donne ni l'Accord parfait mineur ni la Dissonance, ni aucune espèce de phrase" ("Diatonic progressions require that minor and major chords be intermingled, and dissonances are also necessary to mark the phrases and their ends . . . the succession of connected major triads . . . gives neither the minor triad nor dissonances, nor any kind of phrase," OC, V, 847).

To make up for this failing, Rousseau continues, Rameau has recourse to an "expérience de son invention": the imagined vibration of the twelfth and seventeenth below the fundamental.

M. Rameau voulant absolument, dans son Système tirer de la Nature toute notre *Harmonie*, a eu recours pour cet effet, à une autre expérience de son invention . . . Il a prétendu qu'un Son quelconque fournissoit dans ses multiples un Accord

M. Rameau, wanting absolutely to derive all of our harmony from nature had recourse in his system to another observation of his invention in order to do so. . . He has claimed that any sound whatsoever will give a minor triad through

parfait mineur au grave, dont il étoit la Dominante ou Quinte, comme il en fournit un majeur dans ses aliquotes, dont il est la Tonique ou Fondamentale. Il a avancé comme un fait assuré, qu'une Corde sonore faisoit vibrer dans leur totalité, sans pourtant les faire résonner, deux autres Cordes plus graves, l'une à sa Douzième majeure [*sic*] et l'autre à sa Dix-septième[.] (OC, V, 848)

its lower multiples, of which it is the dominant or fifth, just as it furnishes a major [triad] in its aliquots, of which it is tonic or fundamental. He has advanced it as an undisputed fact that a sounding string makes two lower strings, the one at the twelfth and the other at the major seventeenth, vibrate along their totality without however making them resonate.

Only by appealing to this second *experience* did Rameau manage “fort ingénieusement” to derive “non-seulement l’introduction du Mode mineur et de la dissonance dans l’*Harmonie*, mais les règles de la phrase harmonique et toute la Modulation” (“not only the introduction of the minor mode and of dissonance into harmony, but also the rules governing the *phrase harmonique* and the whole of modulation,” (OC, V, 848).⁵²

However, as we have seen Rousseau show at length above, “l’expérience est fausse.” Strings tuned to the twelfth and seventeenth below the fundamental vibrate not along their entirety, but in three and five parts respectively.⁵³ This phenomenon, moreover, cannot be invoked in order to single out the lower twelfth and seventeenth, for it is common to all strings whose lengths are multiples of the first.⁵⁴ Rameau’s claims concerning the sympathetic vibration of strings tuned below the fundamental, along with the conclusions he draws therefrom, are therefore untenable, and as a result his explanations of the minor third, the subdominant and dissonance collapse. Rameau’s problems, though, do not end there, for the other acoustical pillar of his system, namely the existence of overtones, also does not furnish the results he claims to derive, since the *sons harmoniques* contained in a given sound are not restricted to the first six harmonic partials. Rameau cannot, therefore, claim that the triad derives from the resonance of the

⁵² And, we should add, the subdominant.

⁵³ “Il est reconnu que les Cordes accordées au dessous du Son fondamental, ne frémissent point en entier à ce Son fondamental, mais qu’elles se divisent pour en rendre seulement l’unisson, lequel, conséquemment, n’a point d’Harmoniques en-dessous” (OC, V, 848).

⁵⁴ Il est reconnu de plus que la propriété qu’ont les Cordes de se diviser, n’est point particulière à celles qui sont accordées à la Douzième et à la Dix-septième en-dessous du Son principal; mais qu’elle est commune à tous ses multiples. D’où il suit que, les Intervalles de Douzième et de Dix-septième en-dessous n’étant pas uniques en leur manière, on n’en peut rien conclure en faveur de l’Accord parfait mineur qu’ils représentent” (OC, 484; this paragraph is added on f. 195v).

corps sonore, or that it is consonant in virtue of that origin.⁵⁵ The *corps sonore* does not generate even the major triad, let alone the minor triad, the subdominant, dissonances or harmonic progressions.⁵⁶

Conclusion

Already in his *Encyclopédie* articles (1749) and *Lettre à Grimm* (1752), Rousseau had explicitly rejected the program of Rameau's *Génération harmonique*. By 1755, when he drafted "Du Principe de la mélodie," he had elaborated a further set of criticisms directed at Rameau's acoustics, and these arguments were incorporated in turn into his *Dictionnaire de musique*. When the new arguments presented in these texts are joined with those recapitulated from the *Encyclopédie*, the result is a comprehensive and incisive critique of Rameau's theory of harmony.

In claiming to derive all of harmony from the resonance of the *corps sonore*, Rameau believed that he had established a veritable science of harmony. Impressed by both the synthetic power of Rameau's theory and by its scientific pretensions, Diderot, d'Alembert and Condillac initially concurred. In the late 1740s and early 1750s, they assumed that Rameau had discovered the *vrai système de l'harmonie*—a true science in Condillac's sense. Rousseau's critique takes aim at that conclusion. First, Rameau does not account for all of the chords and progressions employed in musical practice. Certain progressions commonly appearing in practice violate some or all of Rameau's criteria for harmonic succession. These are, notably: the resolution of the leading-tone seventh chord to the tonic, the *cadence rompue*, the *faux-bourdon* progression and, arguably, the resolution of the augmented-sixth chord. Second, Rameau's reasoning is flawed: the acoustical foundations he posits do not support the conclusions he draws. Rameau fails to generate dissonant chords in any compelling way, and neither do the criteria for

⁵⁵ "[L]e corps sonore ne donne pas seulement, outre le Son principal, les Sons qui composent avec lui l'Accord parfait, mais une infinie d'autres Sons, formés par toutes les aliquots du corps sonore, lesquels n'entrent point dans cet Accord parfait. Pourquoi les premiers sont-ils consonans, et pourquoi les autres ne le sont-ils pas, puisqu'ils sont tous également donnés par la Nature?" (OC, V, 848-49).

⁵⁶ Each of the arguments drawn together here, as we have already seen, is amplified elsewhere in the *Dictionnaire*. The global argument, moreover, is largely anticipated in "Du Principe de la mélodie," which closely parallels the entry "Harmonie." With the exception of the criticisms regarding the subdominant outlined in the entry "Dissonances," each element in Rousseau's general argument appears already in the 1755 draft.

harmonic succession that he advances derive from the *corps sonore*. Finally, the acoustical foundation that Rameau claims for his theory is itself problematic, resting as it does on a series of erroneous or misleading observations. Strings tuned below the fundamental vibrate only in aliquot parts, and this vibration is not unique to the twelfth and seventeenth below. In addition, the *corps sonore* produces a whole series of additional upper partials beyond those corresponding to the pitches of the major triad. Thus Rameau's system, as Rousseau writes at the end of "Du Principe," is "insuffisant, mal prouvé, et fondé sur une fausse expérience" ("insufficient, badly proved and founded on false observations," "Du Principe," 481). *Insuffisant* because it cannot account for all the chords and progressions that appear in practice; *mal prouvé*, because the arguments by which it is ostensibly established are incomplete or invalid; and *fondé sur une fausse expérience* because the acoustical observations on which it is purportedly founded are illusory. The general implication of these arguments is clear enough: whatever its practical merits as an account of eighteenth-century French harmonic practice, Rameau's theory is not the *vrai système de l'harmonie* that the *philosophes* originally took it for. The more general inferences that Rousseau drew from that conclusion are the subject of the following chapter.

Chapter Five:
Consequences and Conclusions

In the wake of Rousseau's *Encyclopédie* articles, Rameau's scientific failings came to be widely acknowledged amongst the *philosophes*. By the time the *Encyclopédie* appeared in its entirety, neither Diderot nor d'Alembert still believed that Rameau had discovered the true system of harmony.¹ But their reactions to Rameau's scientific failings varied. At times, they caricatured Rameau as an addled *homme à système* whose deluded reveries offered, as Diderot put it in *Le Neveu de Rameau*, "tant . . . de visions inintelligibles et de vérités apocalyptiques sur la théorie de la musique, où ni lui ni personne n'entendit jamais rien" ("so many unintelligible visions and apocalyptic truths concerning music theory the neither he nor anyone else understood," OD, XII, 73). In the *Leçons de clavecin* (1771), a lengthy dialogue on music theory ghostwritten for Anton Bemetzrieder, Diderot has the *maître de musique* ask rhetorically:

Que fait un bon physicien, lorsqu'il rencontre un phénomène qui contredit son hypothèse? Il y renonce. Que fait un systématique? Il force, il tord si bien les faits, que, bon gré, mal gré, il les ajuste avec ses idées; et c'est ce qu'a fait Rameau. (OD, XIX, 378)

What does a good physicist do, when he encounters a phenomenon that contradicts his hypothesis? He renounces it. What does a systematizer do? He forces things, twists around the facts so that one way or another they are made to fit with his ideas. That is what Rameau did.

The charge appears in later d'Alembert's writings as well. The "Réflexions sur la théorie de la musique" (1777), for instance, offer the following verdict:

[Rameau] expliqua assez bien quelques-uns des faits connus; il réussit moins à quelques autres; il voulut même en expliquer que se refusoient entièrement à son principe; il finit par vouloir trouver dans les proportions musicales toute la géométrie, dans les modes majeur et mineur les deux sexes des animaux, enfin la *Trinité* dans la

[Rameau] explained some of the known facts well enough; he succeeded less well with some others; he wanted to explain even those that refused entirely to be subjected to his principle; he finished by finding all of geometry in musical proportions, the two sexes of animals in the major and minor modes, and finally the

¹ All mention of Rameau disappears from Condillac's *oeuvre* after the *Traité des sensations* (1754). In the revised version of the *Traité des systèmes* that Condillac prepared later in life (eventually included in the 1798 edition of his works) the passages recommending Rameau's theory are deleted.

triple résonance du corps sonore.²

trinity in the triple resonance of the
sounding body.

Goaded on by an ever-expanding tissue of analogies, both Diderot and d'Alembert imply, Rameau mistook his own imaginings for reality and so built a chimerical *système abstrait*.

Yet the *philosophes* were far from dismissing Rameau outright. In their more conciliatory moods, they tended to concede that Rameau's system offered an incomparable improvement over its predecessors. In Diderot's *Leçons*, the *philosophe* counters the *maître de musique*'s condemnation by emphasizing both the practical utility of *ramiste* theory and the desirability of its program.³ D'Alembert also remained sympathetic to Rameau's theoretical enterprise and increasingly came to view its instantiation in Rameau's own writings as a flawed, but nonetheless invaluable, first step towards an eventual science of harmony. In other words, d'Alembert came to regard Rameau's system as what Condillac called a *système hypothétique*—a valuable first approximation to be supplemented and perhaps ultimately supplanted by further investigation and research.

This new attitude makes its first appearance in a passing reference to Rameau in d'Alembert's *Essai sur les élémens de philosophie* (1759). "Un célèbre Musicien de nos jours," d'Alembert writes there, has managed to derive the principal rules of harmony from the phenomenon of acoustic resonance:

Mais ayant a débrouiller le premier cette
matiere difficile, qui sur un grand nombre
de points importans ne paroît pas
susceptible de démonstration, il a été
souvent obligé, comme il le reconnoit lui-
même, de multiplier les *analogies*, les
transformations, les *convenances*, pour

But as he was the first to attempt to unravel
this difficult material, which on a great
number of points does not seem susceptible
to demonstration, he was often obliged, as
he recognized himself, to multiply
analogies, transformations, and
predilections in order to satisfy reason

² Jean le Rond d'Alembert, "Réflexions sur la théorie de la musique," in *Oeuvres et correspondences inédits*, ed. Charles Henry (Paris: Perrin, 1887), 138.

³ "Que voulez-vous que je vous dise? Il y a longtemps que ce vice du système de Rameau m'avait frappé, moi et beaucoup d'autres. Mais le moyen de s'élever contre une grande autorité fondée sur de grands ouvrages? Et puis j'étais enchanté d'une doctrine appuyée sur un phénomène naturel qui présentait une base solide à un art où l'on n'avait eu jusqu'alors d'autres guides que la routine et le génie. Je me serais reproché la moindre objection contre une méthode qui abrégait le temps et l'étude; et lorsque je rencontrais quelques détracteurs de la basse fondamentale, surtout étrangers, Allemands ou Italiens, j'attribuais leur dédain à jalousie de métier; ou je me disais, notre musique nationale est plate, insipide, et le mépris de nos productions a passé à nos connaissances théoriques" (OD, XIX, 378).

satisfaire la raison *autant qu'il est possible* dans l'explication des phénomènes. L'Illustre Artiste dont il s'agit, a été pour nous le Descartes de la Musique. On ne peut se flatter, ce me semble, de faire quelque progrès dans la théorie de cette science, qu'en suivant la méthode qu'il a tracée.⁴

insofar as possible in explaining these phenomena. The illustrious artist in question is for us the Descartes of music. It seems to me that we cannot flatter ourselves that we make any progress in the theory of this science unless we follow the method that he has traced.

D'Alembert elaborates this new attitude towards Rameau more fully in the second (1762) edition of his *Elémens*. Though the resonance of the *corps sonore* remains the "origine la plus vraisemblable de l'harmonie," he suggests in the *discours préliminaire* to that work, Rameau has not succeeded in reducing all of harmony to that principle (CTW, VI, 463). The minor mode remains problematic, as do the subdominant and "certains accords de septieme" (CTW, VI, 465); the *accord de sixte superflue* has also not been adequately explained (CTW, VI, 467). More generally, Rameau was forced to rely on "des raisonnemens d'analogie & de convenance," and his system cannot therefore be said to have been "demonstrated" (CTW, VI, 466-467).⁵ At the same time, it would be precipitous in the extreme to dismiss Rameau's system on the basis of these shortcomings.

[Q]uoi que la plupart des phénomènes de l'Art musical paroissent se déduire d'une manière simple & facile de la résonnance du corps sonore, on ne doit peut-être pas se hâter encore d'affirmer que cette résonnance est *démonstrativement* le principe unique de l'harmonie. Mais en même tems on ne

Even if the majority of musical phenomena can apparently be deduced in a simple and easy manner from the resonance of the sounding body, we should perhaps not be too hasty in affirming that this resonance is *demonstratively* the sole principle of harmony. But at the same time it would be

⁴ d'Alembert, *Essai sur les élémens de philosophie* (Paris, 1759; reprinted Paris: Fayard, 1986), 163. The reference to Descartes is particularly significant in this context, for it was Descartes, d'Alembert writes in the *Discours préliminaire* to the *Encyclopédie*, who opened the way to modern science: "Reconnoissons . . . que Descartes, forcé de créer une Physique toute nouvelle, n'a pû la créer meilleure; qu'il fallu, pour ainsi dire, passer par les tourbillons pour arriver au vrai système du monde; & que s'il s'est trompé sur les lois du mouvement, il a du moins deviné le premier qu'il devoit y en avoir" (I:xxvi). D'Alembert is here following Condillac, *Traité des systèmes*, OP, I, 203. On Condillac's reception of Descartes see pp. 240-41 below.

⁵ This censure is aimed at Rameau, who re-titled the revised and expanded version of the 1749 *mémoire* that he read before the Académie des Sciences, *Démonstration du principe de l'harmonie* when he published it in 1750. Since he appended d'Alembert's laudatory review of the 1749 *mémoire* to the published text of the *Démonstration*, Rameau gave the impression that the Académie had endorsed the revised text, including the new title. Rousseau evokes the incident in the *Dictionnaire de musique* (under the head-word "Harmonie") when he writes: "En effet, quand cet Auteur a voulu décorer du titre de *Démonstration* les raisonnemens sur lesquels il établit sa théorie, tout le monde s'est moqué de lui; l'Académie a hautement désapprouvé cette qualification obreptice" (OC, V, 856).

seroit pas moins injuste de rejeter ce principe, parce que certains phénomènes ne paroissent pas s'en déduire aussi heureusement que les autres. (CTW, VI, 467)

no less unjust to reject this principle on the grounds that some phenomena seem to be deduced from it less readily than the others.

The wise course is to withhold judgment while awaiting further evidence:

Il faut seulement conclure, ou qu'on parviendra peut-être par de nouvelles recherches à réduire ces phénomènes au principe; ou que l'harmonie a peut-être quelqu'autre principe inconnu, plus général que celui de la résonnance du corps sonore, & dont celui-ci n'est qu'une branche; ou enfin, qu'il ne faut peut-être pas chercher à réduire toute la Science musicale à un seul & même principe[.] (CVTW, VI, 467-468)

One must simply conclude either that thanks to new investigations we will perhaps succeed in reducing these phenomena to the principle, or that harmony perhaps has some other unknown principle that is more general than the resonance of the sounding body and of which this latter is merely a branch, or finally that perhaps it is impossible to reduce the entire science of music to one and the same principle.

What is required, therefore, is more research: "en applaudissant aux travaux & aux découvertes de M. Rameau, on ne doit point négliger d'exhorter les Savans à les perfectionner encore" ("In applauding the work and discoveries of M. Rameau, we must not neglect to exhort the learned to perfect them further," CTW, VI, 468).

It is this conviction that best explains d'Alembert's interest in Tartini's *Trattato di musica* (1754). D'Alembert first drew attention to Tartini's book in his 1757 *Encyclopédie* article FONDAMENTAL, *Musique moderne* (VII:62-63). In the second edition of the *Elémens*, he numbers Tartini among those "[qui] ont déjà fait des tentatives louables . . . pour jeter de nouvelles lumières sur la théorie de l'Art musical" ("who have made praiseworthy attempts . . . to shed new light on the theory of music," CTW, VI, 468-469). Finally, in the "Réflexions sur la théorie de la musique," d'Alembert draws a suggestive parallel between the Rameau and Tartini, on the one hand, and the botanical systems of Buffon and Linnaeus, on the other: if neither Rameau's nor Tartini's writings advance "le vrai système de la musique," they nonetheless serve "à classer les faits, à les mettre en ordre et à les rendre par là plus faciles à retenir . . . à peu près comme les méthodes de botanique, bonnes ou mauvaises, servent à ranger les plantes dans la mémoire" ("to arrange the facts, to put them in order, and to make them easier to remember . . . much like the methods of botany, whether good or bad, serve to order

plants in our memories.”⁶ All of these systems, d’Alembert insists, are *systèmes hypothétiques*:

Jusqu’à ce qu’on ait trouvé le vrai système musical et le vrai système des plantes (si pourtant ce système existe) chacun pourra choisir en liberté le système hypothétique qu’il croira plus propre à lui servir de mémoire artificielle, à condition pourtant qu’il n’y attachera pas d’autre prix et n’en fera pas d’autre usage.⁷

Until the true system of music and the true system of plants are found (if the latter does indeed exist) each is free to choose the hypothetical system that he believes best suited to serve him as an aid to memory, on the condition, though, that he not attach any other worth to it or try to use it for some other end.

Thus, in d’Alembert’s final analysis Rameau’s theory is a hypothetical system. Accordingly, it presents precisely those pitfalls and advantages that Condillac attributed to all such systems: as a provisional, reasoned catalogue of observations, Rameau’s system helps to retain and organize what is known and so serves as a stimulus and foundation for future research; if its provisional status is not kept firmly in mind, however, it will merely serve as a catalyst for error.

Both of the editors’ attitudes, both the dismissal of Rameau’s system as a *système abstrait* and its qualified endorsement as a *système hypothétique*, can be found in Rousseau’s later writings (discussed in Sections 5.1 and 5.2 respectively). But there is also a third, more radical, direction in which Rousseau’s thinking sometimes tends. This third implication can be seen most clearly when d’Alembert’s considered position is set against Rousseau’s. As we have just seen, d’Alembert came to regard Rameau’s system as a *système hypothétique*: he continued to hold out the possibility of a true system of harmony, that is to say, but he no longer believed that Rameau had managed to provide it. Fundamentally, then, d’Alembert’s assumptions concerning the proper aims and methods of music theory remained unchanged. His characterization of its method in the second edition of the *Elémens* might just as easily have appeared in the *Discours préliminaire* to the *Encyclopédie*:

En exhortant les Philosophes & les Artistes à faire de nouveaux efforts pour perfectionner la théorie de la Musique, nous devons les avertir en même tems de ne se point méprendre sur ce qui doit être le

In exhorting philosophers and artists to a renewed effort to perfect the theory of music, we must advise them at the same time not to mistake the true goal of their research. Experience alone must be its

⁶ d’Alembert, *Oeuvres inédites*, 140.

⁷ *ibid.*, 140.

vrai but de leurs recherches. L'expérience seule en doit être la base; c'est uniquement en observant des faits, en les rapprochant les uns des autres, en les faisant dépendre ou d'un seul s'il est possible, ou au moins d'un très-petit nombre de faits principaux, qu'ils pourront parvenir au but si désiré, d'établir sur la Musique une théorie exacte, complete & lumineuse. (CTW, VI, 470)

basis; it is only by observing the facts, comparing them to one another, and making them depend on a single fact, if possible, or at least on a very small number of principle facts, that they will arrive at the much-desired goal of establishing an exact, complete and illuminating theory of music.

This, it should be evident, is precisely the method that Condillac sanctioned in his *Traité des systèmes*. If Rameau's system turns out to have fallen short of Condillac's methodological ideal, the ideal itself is in no way impugned: for d'Alembert, the discovery and articulation of the true system of harmony remains the goal towards which music theory should strive.

Rousseau, in contrast, begins to suggest that no such system is possible at all. This conclusion follows from the conviction that harmony is an idiosyncrasy of recent European musical practice: "de tous les peuples de la terre," Rousseau writes at one point in the *Dictionnaire de musique*, "les Européens sont les seuls qui aient une *Harmonie*, des Accords, et qui trouvent ce mélange agréable" ("of all the people on earth, Europeans are the only ones who have harmony and chords and who find this mélange agreeable," OC, V, 850-851). Harmony, that is to say, is contingent not necessary, local not universal, artificial not natural. So ephemeral a thing, it would seem to follow, cannot possibly be the object of the Condillacian science that d'Alembert envisions. But this does not mean that harmony cannot be explained—only that such explanation must instead be historical rather than scientific in character. Given that harmony is a quirk of European musical culture, the problem becomes one of discovering by what processes, by what series of historical contingencies and accidents, European music developed (tonal) harmony while all other musical traditions did not. Explaining harmony therefore means mapping out the vicissitudes of European music's particular historical development. In his later musical writings, Rousseau attempts to do just that (Section 5.3).

The second and third trajectories—the reclassification of Rameau's theory as a *système hypothétique*, and the eclipse of its scientific pretensions by a kind of nascent historicism—are obviously incompatible. They are also strictly contemporaneous in

Rousseau's *oeuvre*: both attitudes first appear in the manuscript essay "Du Principe de la mélodie," and they are developed in tandem in the *Dictionnaire de musique*. Rousseau never resolved the contradiction. Rather, from about 1756 on, he progressively lost interest in questions of music theory and music history. It is worth recalling in this context that all of the texts with which we are here concerned are works that Rousseau either did not publish or published in forms with which he was avowedly unhappy. Rousseau's response to Rameau thus remains a thought in progress, arrested in mid-stride, and there is no way to know how Rousseau himself would have resolved its contradictions. Of the two trajectories, however, it is the last that is of most abiding interest for us. For in it, Rousseau begins to identify what is undeniably the towering failure of Rameau's theoretical enterprise: its incomprehension before nature of its own object. For harmony, Rousseau's later musical writings begin to suggest, is not constituted naturally but historically, and as such it must be explained historically. While Rousseau cannot be said to have defended this view explicitly, it is clearly implied in what he does say. And even in this nascent, partly occluded form, the insight is both novel and profound.

5.1. Rameau's *système abstrait de l'harmonie*

Rousseau is not above parodying Rameau as an *homme à système*. He does so, for instance, in "Du Principe de la mélodie," when he writes (à propos of Rameau's acoustical errors): "Je n'accuse point en cela M. Rameau de mauvaise foi; . . . dans une expérience fine et délicate un homme à systèmes voit souvent ce qu'il a envie de voir" ("I do not accuse M. Rameau of bad faith . . . In fine and delicate observations, a systematizer often sees what he wants to see," "Du Principe," 479).

The insinuation that Rameau's thought evinces more *esprit de système* than *esprit systématique* resurfaces at various points in the *Dictionnaire de musique*. Rameau's system, Rousseau declares in the entry "Harmonie," rests on analogies and *convenances*, a charge that we have seen d'Alembert level as well (OC, V, 847). In the entries "Dissonance" and "Mode," Rousseau identifies two of the analogies on which Rameau's system rests: namely that between the major triad and the minor, and that between

dominant and subdominant.⁸ The major triad, Rousseau is sometimes willing to grant, is given by the resonance of the *corps sonore*.⁹ The minor triad is not. Instead, it is formed from the major by “analogy” and “inversion”—that is, by taking the intervals that form the major triad above the tonic and reading them downward from the tonic instead. By the same construction, Rameau also claims to have obtained the subdominant, since the lowest note of the minor triad that he has obtained coincides with the fourth degree of the scale. Though the third above the subdominant is minor according to Rameau’s construction, he replaces it with a major third by analogy with the triad on the dominant.

Another, more fundamental, analogy that Rameau employs is that between the structure of the triad and the progression of the fundamental bass.¹⁰ In Chapter 3, we saw Rousseau distinguish between natural and metaphysical analogies, the former being a legitimate means of establishing relationships between objects or ideas, and the latter not.¹¹ Rousseau seems at first to have taken the analogies employed in Rameau’s theory as *analogies naturelles* (at least *in potentia*). By the time he completed the *Dictionnaire*, however, he had changed his mind. Rameau’s theory, he insists in a late addition to the entry “Harmonie,” “n’est établi que sur des analogies et des convenances qu’un homme inventif peut renverser demain par d’autres plus naturelles” (“is established merely by analogies and *convenances* that an inventive man could reverse tomorrow by others that are more natural,” OC, V, 846). Evidently, the analogies envisioned here are no longer to be construed as *analogies naturelles*.

The conceptual framework underlying Rousseau’s distinction is borrowed from Condillac’s thought. For Condillac, it will be recalled, abstract systems take general statements (*maxims générales ou abstraites*) as their principles (OP, I, 121-22). General ideas are formed by abstracting from particulars: “Les notions abstraites ne sont que des idées formées de ce qu’il y a de commun entre plusieurs idées particuliers” (“Abstract notions are merely ideas formed from what many particular ideas have in common,” OP, I, 122). The general idea of “man,” to take his example, contains only those features that

⁸ See above, pp. 203-204.

⁹ As we saw, Rousseau had realized by the time he wrote “Du Principe” (i.e. 1755) that the *corps sonore* gives partials beyond the sixth and that, for this reason, it is not true that it generates (exclusively) the triad. Rousseau is not, however, consistent on this point throughout the *Dictionnaire de musique*.

¹⁰ See pp. 148-50 above.

¹¹ See above, pp. 152-53.

are common to all men and is formed by generalizing from our knowledge of individual men. From this basic nominalism, Condillac infers that general ideas are sterile, that they cannot be used to occasion new knowledge but merely serve as a convenient shorthand for what we know from our experience of particulars (OP, I, 125).¹² Taking general ideas as the principles of a system, and so appearing to derive new knowledge from them, must therefore involve some kind of error. In fact, Condillac thinks that there are two basic errors on which abstract systems depend: the first consists in taking claims that are true of particular cases and falsely generalizing them; the second involves conceiving of one thing along the model of another that it resembles (OP, I, 125). Abstract systems therefore depend either on false generalizations or on false analogies.

Condillac enlivens his discussion with a number of examples. Perhaps the most famous is the extended speculative history of superstition that he gives in the fifth chapter of the *Traité des systèmes*. Beset by constantly shifting fortunes, human beings began to search for the causes of their alternating pleasures and pains. Those blessings or misfortunes that they could not otherwise explain, they ascribed to the influence of various gods and spirits, and soon the earth was peopled with nymphs and genies of all manner and type (OP, I, 134). Not content to confine their imaginations to sublunary beings, these early thinkers attributed influences to the sun, the moon and the stars (OP, I, 134). Since these heavenly bodies took their names from gods, "Il ne falloit donc plus que consulter le caractère de chaque dieu pour deviner l'influence de chaque planète" ("thus it was only necessary to consider the character of each god in order to divine the influence of each planet"):

Ainsi Jupiter signifia les dignités, les grands soins, la justice, etc.; Mars, la force, le courage, la vengeance, la témérité, etc.;	Thus Jupiter signified dignity, great cares, justice, etc.; Mars, strength, courage, vengeance, temerity, etc.; Venus, beauty,
---------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------

¹² "Si les principes abstraits sont des propositions générales, varies dans tous les cas possibles, ils sont moins des connoissances qu'une manière abrégée de rendre plusieurs connoissances particulières, acquises avant même qu'on eût pensé aux principes" (OP, I, 125). "Les principes abstraits, même lorsqu'ils sont vrais et bien determines, ne sont pas proprement des principes premières: la seule denomination d'*abstrais* fait juger que ce sont des connoissances qui en suppose d'autres. Ces principes ne sont pas même un moyen propre à nous conduire à nous conduire à des découvertes; car, n'étant qu'une expression abrégée des connoissances que nous avons acquises, ils ne peuvent jamais nous ramener qu'à ces connoissances mêmes. En un mot, ce sont des maxims qui ne renferment que ce que nous savons; et, comme le peuple à ses proverbs, ces prétendus principes sont les proverbs des philosophes; ils ne sont que cela" (OP, I, 195). Condillac's contention is debatable, to say the least, with mathematics providing the most obvious counter-example.

Vénus, la beauté, les graces, la volupté, l'amour du plaisir, etc.: en un mot, on jugea de chaque planète par l'idée qu'on s'étoit formée du dieu dont elle portoit le nom. Quant aux signes, ils dûrent leur vertu aux animaux, d'après lesquels ils avoient été nommés.

On ne s'arrêta pas là. Une vertu étant une fois attribuée aux astres, il n'y avoit plus de raison pour borner leur influence. Si cette planète produit tel effet, pourquoi ne produira-t-elle pas cet autre, qui a quelque rapport avec le premier? L'imagination des astrologues passant, de la sorte, d'une analogie à l'autre, il n'est plus possible de découvrir les différentes liaisons d'idées dont se sont formés leurs systèmes. (OP, I, 135)

grace, voluptuousness, love of pleasure, etc.; in a word, each planet was judged by the idea that had been formed of the god whose name it bore. As for the signs [of the zodiac] they received their virtues from the animals for which they were named.

They did not stop at that. A virtue having been once attributed to the stars, there was no more reason to limit their influence. If this planet produced such and such an effect, why not this other, which has some relationship to the first? The imagination of the astrologers having passed, in this way, from one analogy to the other, it is no longer possible to determine the different connections of ideas from which they formed their systems.

The astrologer, in other words, is the dupe of analogy. The unrestrained association of ideas has carried him away.

Another example is the long-standing trope of the music of the spheres:

On a toujours été porté à supposer une véritable musique, par-tout où l'on a pu faire usage du mot *harmonie*. N'est-ce pas sur ce fondement qu'on a cru que les astres formoient par leur mouvement un concert parfait? On ne manqueroit pas même de raisons propres à confirmer cette vision, pour peu qu'on voulût appliquer son imagination à découvrir quelques rapports entre les élémens de la musique et les parties de ce monde. Je le vais faire, et je tirerai de-là mon second exemple.

C'est une chose évidente, remarquerai-je d'abord, que, s'il y a sept tons dans la musique, il y aussi sept planets. En second lieu, je puis supposer que, qui apercevrait la grandeur de ces planètes, et d'autres qualités qui leur appartiennent, trouveroit entre elles une proportion semblable à celle qui doit être entre sept corps sonores qui sont dans l'ordre diatonique. Cela posé (car on peut supposer tout ce qui n'est pas impossible: et qui d'ailleurs pourroit

We have always been inclined to suppose that there is really music wherever we are able to use the word "harmony." Is it not on this basis that people have believed that the stars form a perfect concert by their movement? There will be no lack of arguments that can be invoked to confirm this vision, if we only have a bit of imagination in discovering relationships between the elements of music and the parts of the world. I will set out to do so, and I will draw my second example from this.

It is obvious, I would remark first of all, that there are seven notes in music just as there are seven planets. Second, I can suppose that whoever is able to perceive the size of the planets and the other properties that pertain to them would find among them a proportion similar to that which obtains between seven sounding bodies arranged in a diatonic scale. That assumed (for one can suppose anything that

prouver le contraire?), rien n'empêcheroit de reconnoître que les corps célestes forment un concert parfait. (OP, I, 132)

is not impossible, and who would be able to prove the contrary?), nothing would prevent us from supposing that the celestial bodies form a perfect concert.

The whole system, in Condillac's view, turns upon a false analogy between the planets of the solar system and degrees of the scale that is motivated by the application of the word "harmony" (in different senses) to both and enabled by the various resemblances that can be found between the two.

The faculty responsible for that false analogy is the imagination, which infers identity where there is only resemblance:

Le plus grand avantage de l'imagination, c'est de nous retracer toutes les idées qui ont quelque liaison avec le sujet dont nous nous occupons . . . Mais si, malgré nous, les idées se réveilloient en trop grand nombre; si celles qui devroient être le moins liées, l'étoient si fort que les plus éloignées de notre sujet s'offrissent aussi facilement, ou plus facilement que les autres; ou même si, au lieu d'y être liées par leur nature, elles l'étoient par ces sortes de circonstances qui associent quelquefois les idées les plus disparates, on feroit des digressions dont on ne s'apercevrait pas; on supposeroit des rapports où il n'y en a point; on prendroit pour une idée précise, une image vague; pour une même idée, des idées tout opposées. (OP, I, 204-205)

The greatest advantage of the imagination is to trace for us all the ideas that have some connection with the subject that occupies us . . . But if, despite ourselves, the ideas are reawakened in too great a number; if those that should be the least connected, are connected so strongly that the ideas that are most distant from our subject offer themselves just as readily as the others, or even more readily; or if, rather than being connected by their nature, they are connected by the kinds of circumstances that sometimes associate the most disparate ideas, we will fall into digressions that we fail to notice; we will assume relationships where there are none; we will take vague images for precise ideas, and ideas that are entirely opposite for the same idea.

For Condillac, the association of ideas thus is the principle both of knowledge and of error. Connecting ideas together is the work of the imagination, and ideas come to be connected largely in virtue of their resemblance, their analogy. The decisive question—the one that marks the boundary between knowledge and delusion—is whether that analogy is real or apparent, whether the ideas are linked only in the imagination, or in reality as well.

For the Rousseau of the *Dictionnaire*, the *analogies métaphysiques* on which Rameau's theory of harmony depends are undoubtedly of the former kind. The

suggestion, therefore, is that Rameau is one of those “esprits qui croient interroger la nature, lorsqu’ils ne consultant que leur imagination” (“minds that believe they are interrogating nature when they are only consulting their imagination,” OP, I, 134).

There is, I think, a significant insight to be had once that verdict it is shorn of the polemical weight that it obviously carried for Rousseau. In the most general terms, Condillac’s *Traité des systèmes* defends a broadly Lockean empiricism against the competing claims of Cartesian, Leibnizian and Spinozist metaphysics. Condillac’s strategy is to draw a basic distinction between modern (scientific, rational) and pre-modern (mystical, irrational) thought, and then to force the great systems of seventeenth-century metaphysics over to the pre-modern side of the divide. Condillac’s claim, in effect, is that the great seventeenth-century metaphysicians are engaged in an essentially pre-rational mode of thought and that their systems are therefore the product of a pre-scientific, magical way of thinking. This manhandling of Descartes, Malebranche, Spinoza, and Leibniz is obviously provocative, and it is unlikely to find many defenders among modern philosophers or historians of ideas. But the distinction that enables it is familiar in another guise, namely as almost reflexive distinction between the outlooks and intellectual habits (*mentalités*, *Weltanschauungen*, *epistémès*) of the Renaissance and the Scientific Revolution or Enlightenment.¹³

Shorn of its polemical colouring, the broader implication of this facet in Rousseau’s criticism is that Rameau’s style of thought is far closer to the symbolic turn of mind typical of the Renaissance than it is to the routines of eighteenth-century science. The role of analogy in Rameau’s system recalls, for instance, Zarlino’s claim in the *Istitutioni* that the consonances are contained in the first six numbers because there are six signs in each hemisphere of the zodiac, six planets, six circles in the heavens, six substantial qualities of elements, etc.¹⁴ Far from being the Cartesian science of harmony for which it has frequently been mistaken, Rameau’s theory might be seen to owe much

¹³ There is a strong family resemblance, for instance, between the emphasis Condillac places on relations for resemblance and analogy in his sketch of the *esprit de système* and the roles that Foucault assigns to *convenientia* (*convenance*) and *analogie* in his account of the Renaissance *epistémè*. See Michel Foucault *Les Mots et les choses* (Paris: Gallimard, 1966), 32-59, esp. 33-34, 36-38.

¹⁴ Zarlino, *Istitutioni*, 29-31.

more to habits of thought inherited from the long tradition of speculative music theory and imbibed through such theorists as Zarlino.¹⁵

5.2. Tartini's *Trattato di musica* and Rameau's *système hypothétique de l'harmonie*

One of the more puzzling features of Rousseau's *Dictionnaire de musique* is its apparent enthusiasm for Giuseppe Tartini's *Trattato di musica* (1754). That enthusiasm can perhaps best be explained when Rousseau's reception of Tartini is read in conjunction with d'Alembert's.

Rousseau's first mention of Tartini in the *Dictionnaire* comes in the final paragraph of the entry "Basse fondamentale".¹⁶ The reference is a passing one, a brief nod to the *Trattato di musica* alongside an equally fleeting mention of Jean-Adam Serre's *Essais sur les principes de l'harmonie* (1753):

Je ne parle point ici du Systême ingénieux de M. Serre de Genève, ni de sa double *Basse-fondamentale*; parce que les principes qu'il avoit entrevus avec une sagacité digne d'éloges, ont été depuis développés par M. Tartini dans un Ouvrage dont je rendrai compte avant la fin de celui-ci. (Voyez SYSTEME.) (OC, V, 658-59)

I will not speak here of the ingenious system advanced by M. Serre of Geneva or of its double fundamental bass, because the principles that he has wisely discerned have since been developed by M. Tartini in a work that I will give an account of before the end of this one (see SYSTEME).

His next reference to Tartini, again in conjunction with Serre, comes under the headword "Battemens":

M. Serre prétend, dans ses *Essais sur les Principes de l'Harmonie*, que ces *Battemens* produits par la concurrence de deux Sons, ne sont qu'une apparence acoustique, occasionnée par les vibrations coincidentes de ces deux Sons. Ces *Battemens*, selon lui, n'ont pas moins lieu lorsque l'Intervalle est consonnant; mais la rapidité avec laquelle ils se confondent

M. Serre claims, in his *Essais sur les principes de l'harmonie*, that these beats produced by the concurrence of two sounds are merely an acoustical appearance occasioned by the coinciding vibrations of two sounds. According to him, these beats also occur when the interval is consonant, but the rapidity with which they follow one another in that case does not permit the ear

¹⁵ Something along these lines is perhaps suggested by Carl Dahlhaus when he writes: "Dem Gedanken, Fundamentprogressionen aus denselben Intervallen zusammenzusetzen wie Akkordstrukturen und darin den systematischen, wissenschaftlichen Charakter der Harmonielehre begründet zu sehen, liegt unverkennbar das traditionelle Analogie- und nicht das moderne Kausalprinzip zugrunde, während andererseits die Ableitung des Durakkordes vom Naturvorbild der Partialtonreihe offenbar als kausale Erklärung gemeint ist" ("Ist Rameaus *Traité* eine Harmonielehre," 125-26).

¹⁶ There is a paragraph on Tartini in the entry "Accompagnement" (OC, V, 624), but this passage is a late addition that does not appear in the Neuchâtel manuscript.

alors, ne permettant point à l'oreille de les distinguer, il en doit résulter, non la cessation absolue de ces *Battemens*, mais une apparence de Son grave et continu, une espèce de foible Bourdon, tel précisément que celui qui résulte, dans les expériences citées par M. Serre, et depuis détaillées par M. Tartini, du concours de deux Sons aigus et consonnans. (On peut voir au mot *Système*, que des Dissonnances les donnent aussi.) (OC, V, 661)

to distinguish them, and what results is the appearance of a low and continuous sound (though not the absolute cessation of these beats), a kind of weak hum precisely like that which results from the concurrence of two high, consonant sounds according to the observations cited by M. Serre and since detailed by M. Tartini. (That dissonances produce them too is shown under the word *Système*.)

Both passages are difficult to date precisely.¹⁷ They are framed, however, by two articles for which dates can be assigned. The article "Accompagnement," as Jean-Jacques Eigeldinger has established, was copied into the Neuchâtel manuscript between 1754 and 1755.¹⁸ On the other side of the two entries in question, the articles "Chronometre" and "Consonance" were both entered into the Neuchâtel manuscript by 1757.¹⁹ That Rousseau's acquaintance with Tartini's treatise dates from the earlier part

¹⁷ Clearly, both belong to the early stages of work on the Neuchâtel manuscript. Whatever order the articles were composed in, they were copied into the manuscript alphabetically. Both paragraphs, moreover, belong to the first layer of that copying: they appear in the body of the manuscript (on f. 43r and f. 45r respectively) and are without significant addition or correction.

¹⁸ In the manuscript, the article's concluding paragraph runs as follows: "J'ai conservé cet article tel à peu près qu'il est dans l'Encyclopédie, quoi qu'on ai pu voir dans ma Lettre sur la Musique Française que de nouvelles réflexions sur l'accompagnement m'en feroient aujourd'hui bien changer la methode. L'Article comme il est aura peut être moins de Censeurs que s'il étoit plus instructif, et je le laisse en faveur des ceux qui aiment mieux qu'on loüe ce qu'ils font que de leur dire ce qu'ils devoit faire: ce sera la tâche de mon successeur" (ms. R. 55, f. 12r). The addition, evidently, was made shortly after the appearance of Rameau's *Erreurs sur la musique dans l'Encyclopédie* (privilege August 4, 1755), that is to say in the fall of 1755. Thus, the entry "Accompagnement" was copied into the Neuchâtel manuscript between 1754 and 1755. The *Lettre sur la musique française*, to recall, was published in 1753. Eigeldinger infers that the particular *censeur* Rousseau had in mind was the Rameau of the *Observations sur notre instinct pour la musique*, which appeared in 1754 (the work's *privilege* is dated April 12). Thus, the entry was copied into the Neuchâtel manuscript after April, 1754. Subsequently, Rousseau scribbled an additional paragraph on the facing page, which he keyed to the end of the text just cited: "~~M. Rameau au moment que j'achevois ceci <au moment que j'achevois ceci j'apprend que> M. Rameau vient <d'achever> dans ses Erreurs sur <la> Musique de publier ce nouveau qu'il que le <établir un nouveau principe dont il me reproche <censure> de n'avoir pas parlé dans l'Enciclopédie> que l'accompagnement doit représenter le corps sonore. Comme cet article n'est déjà que trop loin [lege: long] je renvoie à l'article <au mot> corps sonore l'examen de ce nouveau principe de M. Rameau. J'ai mont[r]é dans un autre Ecrit que par ce principe même son titre est très bien rempli, ainsi ne je n'en parlerai plus dans cet article qui n'est déjà que trop long savoir que l'accompagnement doit représenter le corps sonore; J'examine ce principe dans un autre écrit ainsi je me dispenserai d'en parler dans cet article"~~ (ms. R. 55, 11v). On all these points, see Eigeldinger, Introduction, OC, V, cclxxix-cclxxx.

¹⁹ "Chronometre" is a near verbatim reprisal of Rousseau's *Encyclopédie* article CHRONOMETRE (*Musique*). Recopying the article into the Neuchâtel manuscript, Eigeldinger notes, Rousseau initially wrote "Il y a une douzaine d'années qu'on vit reparoître le projet d'un instrument semblable" before

of this period is clear from two references to it in “Du Principe de la mélodie” (1755).

The first of these two references runs as follows:

Or comme ces sons harmoniques sont produits par la B[asse] f[ondamentale] la B[asse] fondamentale à son tour est produite par le concours des sons harmoniques, on engendre mutuellement l'un par l'autre et par tout ou se trouve un de ces deux Phénomènes l'ensemble peut en effet être pris pour la resonance du corps sonore: C'est ce que prouvent Clairement les expériences dont M. Tartini nous a donné le détail et qui sont depuis longtems connues de toutes [*sic*] l'Italie. (“Du Principe,” 472)

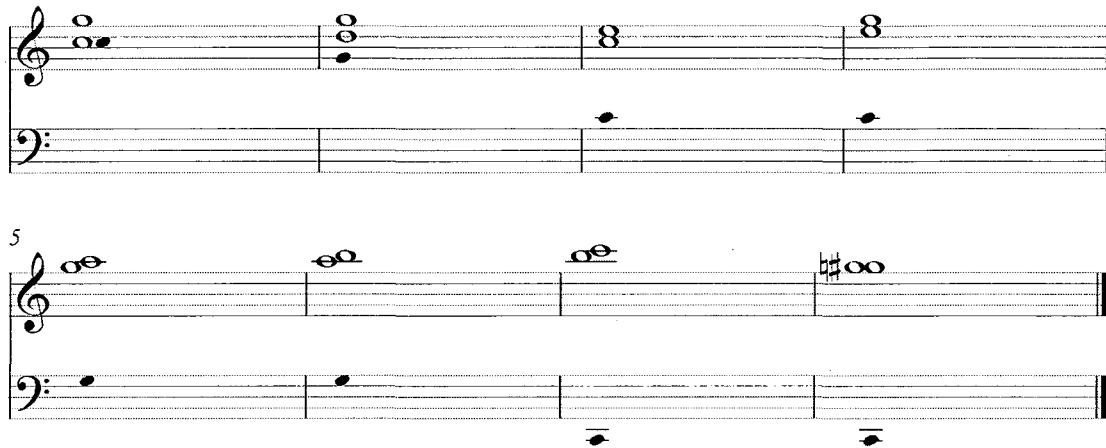
Just as these *sons harmoniques* are produced by the fundamental bass, the fundamental bass is in turn produced by the concurrence of the *sons harmoniques*. The one can be generated from the other or vice versa, and everywhere where one of these two phenomena is found the whole can be taken as the resonance of the *corps sonore*. This is clearly proved by the observations detailed by M. Tartini and which have long been known through all of Italy.

The claim that the *sons harmoniques* are produced by the *basse fondamentale* is obviously Rameau's. The inverse—that the upper pitches produce a lower third sound (*terzo suono*)—is a reference to Tartini's discussion of difference tones in the *Trattato di musica*. As Tartini observes in that treatise's first chapter, two pitches sounded together will in many cases produce a third pitch (*terzo suono*) heard at a determinate interval below. The *terzo suono* produced by a fifth, for instance, is identical in pitch to the lower note of the fifth; that produced by a fourth is an octave below the upper note, and so on (Ex. 5.1).²⁰

striking out “douzaine” and replacing it by “vingtaine.” The *Encyclopédie* article having been written in 1749, the correction in the Neuchâtel manuscript was made in 1757. (In the published version, the word is changed again to “trentaine,” OC, V, 709). The version of “Consonance” given in the Neuchâtel manuscript also preserves a telling variant. At one point in the manuscript version, Rousseau apostrophizes Diderot in the following terms. “~~Non, mon cher Diderot, vous n'exigez point de l'amitié cette lâche complaisance. Digne~~ <l>ami de la vérité dont ~~vous~~ <il> étende<z> l'empire, nous ne ~~voulez~~ <ne veut> point qu'on ~~vous~~ dise de ~~vous~~ <lui> comme autrefois de vos ses ~~devanciers~~ <[illegible]> <devanciers> j'aime mieux me tromper avec Platon que d'avoir raison avec Aristote” (ms. R. 55, f. 98r). As Eigeldinger observes, it is hard to imagine these lines having been written after Rousseau's break with Diderot in April 1757. See Eigeldinger, OC, V, cclxxxi.

²⁰ As Daniel Walker points out, Tartini's account of difference tones is riddled with errors. See “The Musical Theory of Giuseppe Tartini,” in *Studies in Musical Science in the Late Renaissance* (London: Warburg Institute, 1978), 137-38. For the correct account, see Hermann Helmholtz, *On the Sensation of Tone*, trans. Alexander J. Ellis (New York: Dover, 1954), 152-59.

Ex. 5.1. After Tartini, *Trattato*, pp. 14-15



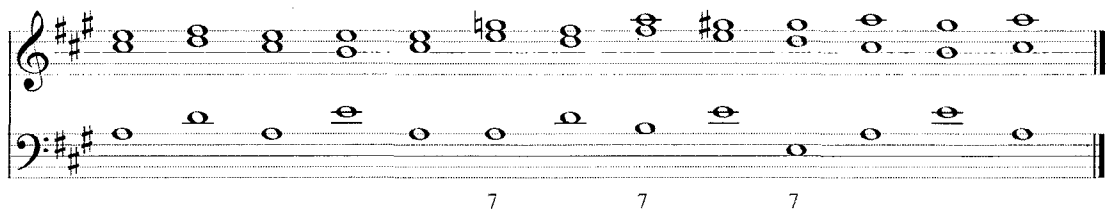
Tartini, moreover, is quick to equate the *terzo suono* with what he calls the *basso armonico* (roughly, Rameau's *Basse fondamentale*):

Mi domanderà pio ella in secondo luogo in qual relazione si trovi questo terzo suono agl' intervalli rispettivi, da' quali risulta. Le rispondo, che dati i seguenti intervalli, de' quali è rispettivo terzo suono il sottoposto, questo sarà dimostrativamente il Basso armonico de' dati intervalli, e sarà paralogismo qualunque altro Basso vi si sottoponga. (*Trattato*, 17)

I will be asked, secondly, how this third sound relates to the intervals from which it results. I answer that given the following intervals, whose third sounds are placed beneath them, this [i.e. the bottom staff of Ex. 5.2] will demonstratively be the harmonic bass of the given intervals, and it would be a paralogism to place any other bass here.

Thus in Ex. 5.2, which reproduces Tartini's musical example, the minor third C#-E generates A as its bass, the major third D-F# which follows produces D, and so on.

Ex. 5.2. Tartini, *Tratatto*, p. 17



lumiere et> de sagacité: mais ce qu'il a plus reellement trouvé c'est l'~~origine de la~~ la ~~generation~~ <production> de la dissonances ~~non-moi[n]~~ aussi naturelle et aussi précisément déterminé que la consonance la plus parfaite[.] (ms. R. 60, 22r)

intelligence. But what he has really found is a way of producing the dissonances that is just as natural and just as precisely determined as the production of the most perfect consonance.

The idea that Tartini had discovered the true origin of dissonance resurfaces in the *Dictionnaire de musique* under the head-word "Dissonance":

M. Tartini est le premier, et jusqu'à present le seul, qui ait déduit une Théorie des *Dissonances* des vrais principes de l'Harmonie. Pour éviter d'inutiles répétitions je renvoi là-dessus au mot *Système* où j'ai fait l'exposition du sien. (OC, V, 775)

M. Tartini is the first, and up to now the only one, to have deduced a theory of dissonance from the true principles of harmony. In order to avoid useless repetitions, I refer the reader to the word *Système*, where I give an exposition of his.

Exactly what derivation Rousseau has in mind, however, is ambiguous. For Tartini in fact gives two distinct and essentially incompatible accounts of dissonance. The first involves equating the minor seventh with the so-called natural seventh—that is, with the seventh partial in the overtone series. As we saw in the preceding chapter, Rameau was well aware of the natural seventh, but excluded it from harmony as a *son perdu* too weak to be heard distinctly in the resonance of the *corps sonore*.²¹ Tartini, in contrast, sometimes takes the natural seventh as the basis for the dominant seventh chord. In the *Trattato*'s first chapter, for instance, he underlines its appearance in the sixth, eighth and tenth chords in the passage given above as Ex. 5.2:

Solamente si averta, che i tre intervalli segnati, sesto, ottavo, e decimo, sono in ragione diversa da quello appare. Il sesto, e l'ottavo non sono terze minori, ma sesquisepte; coìè il Gsolreut *b* molle è la nota, che divide armonicamente la quarta, e però l'intervallo Elami, Gsolreut è minore della terza minore di . . . 36:35.

Così è l'intervallo ottavo, e così il decimo, riportando Gsolreut in acuto. (*Trattato*, 17-

It should only be noted that the three intervals marked with figured basses, namely the sixth, eighth, and tenth [intervals], are in a different ratio than might appear. The sixth and the tenth are not minor thirds but are rather in the ratio 6:7; that is, G♯ is the note that divides the fourth harmonically and so the interval E-G♯ is smaller than the minor third by . . . 36:35.

²¹ See p. 191 above. For further discussion of the natural seventh, see Martin Vogel, *Der Natureseptime: ihre Geschichte und ihre Anwendung* (Bonn: Verlag für systematischen Musikwissenschaft, 1991), 109-142.

Later on, however, the *Trattato* gives a second, competing account of the minor seventh. In general, Tartini forms dissonant intervals by compounding consonances. The ninth, for instance is formed by joining together two fifths (e.g. C-G, G-D). The seventh, in turn, is formed indirectly by comparing the upper term of the diminished fifth formed by joining two minor thirds—E-G and G-Bb in Tartini's example—back to the bass of the entire system, i.e. C.²² The procedure, however, yields the ratio 9:5, which differs from the natural seventh 7:4 by a factor of 36:35.

Of these two procedures, it is not immediately obvious which Rousseau meant to single out. Nonetheless, the balance of the evidence suggests that he had the natural seventh in mind, for that is the derivation that he develops at length in the entry "Dissonance":

Les Harmoniques qui accompagnent un Son quelconque ne se bornent pas à ceux qui composent l'Accord parfait. Il y en a une infinité d'autres moins sensibles à mesure qu'ils deviennent plus aigus et leurs rapports plus composés, et ces rapports sont exprimés par la série naturelle des aliquotes $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6} \frac{1}{7}$, etc. Les six premiers termes de cette série donnent les Sons qui composent l'Accord parfait et ses Répliques, le septième est exclus; cependant ce septième terme entre comme eux dans la résonance totale du Son générateur, quoique moins sensiblement: mais il n'y entre point comme Consonnances; il y entre donc comme *Dissonance*, et cette *Dissonance* est donnée par la Nature. Reste à voir son rapport avec celles dont je viens de parler.

The harmonics that accompany a given sound are not limited to those that comprise its triad. There are an infinity of others that are less perceptible to the extent that they are higher and their ratios become more complex, and these ratios are expressed by the natural series of aliquots $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6} \frac{1}{7}$, etc. The first six terms of this series give the sounds that compose the triad and their octaves, the seventh is excluded; nonetheless this seventh term appears in the total resonance of the generating sound just as they do, although less noticeably. But it does not enter as a consonance; it enters as a dissonance, and this dissonance is given by nature. Its relationship to the dissonances of which I have just spoken [the major sixth and minor seventh] remains to be seen.

²² Tartini, *Trattato*, 73-78.

²³ The passage is added on f. 129v of ms. R. 55. The account of dissonance that it presents is not, however, Rousseau's last word on the subject. In the Neuchâtel ms. the final paragraph of the entry is introduced as follows: "En finissant cet article un des plus importants mais non ~~des meilleurs de l'ouvrage~~ <mieux faits de ce Dictionnaire>, j'en recommande la refonte à mon successeur quand de meilleurs principes d'harmonie auront fait appercevoir la véritable origine des dissonances. Après y avoir ~~mieux~~ réfléchi voici, quant à

Or ce rapport est intermédiaire entre l'un et l'autre et fort rapproché de tous deux; car le rapport de la Sixte majeure est $\frac{3}{5}$, et celui de la Septième mineure $\frac{9}{16}$. Ces deux rapports réduits aux mêmes termes sont $\frac{48}{80}$ et $\frac{45}{80}$.

Le rapport de l'aliquote $\frac{1}{7}$ rapproché au simple par ses Octaves est $\frac{4}{7}$, et ce rapport réduit au même terme avec les précédents se trouve intermédiaire entre les deux, de cette manière $\frac{336}{560} \frac{320}{560} \frac{315}{560}$; où l'on voit que ce rapport moyen ne diffère de la Sixte majeure que d'un $\frac{1}{35}$, ou à-peu-près deux Comma, et de la Septième mineure que d'un $\frac{1}{112}$ qui est beaucoup moins qu'un Comma. Pour employer les mêmes Sons dans le genre Diatonique et dans divers Modes, il a fallu les altérer; mais cette altération n'est pas assez grande pour nous faire perdre la trace de leur origine.²³ (OC, V, 773-75)

Now this ratio is between the one and the other and is very near to both; for the ratio of the major sixth is $\frac{3}{5}$, and that of the minor seventh $\frac{9}{16}$. These two ratios reduced to the same terms are $\frac{48}{80}$ and $\frac{45}{80}$.

The ratio of the aliquot $\frac{1}{7}$ reduced to the nearest octave is $\frac{4}{7}$, and this ratio, once expressed in the same terms as the preceding ones, is found to lie in between them in this manner $\frac{336}{560} \frac{320}{560} \frac{315}{560}$. From this one sees that the middle ratio only differs from the major sixth by $\frac{1}{35}$ [*recte*: $\frac{20}{21}$], or about two commas, and the minor seventh by $\frac{1}{112}$ [*recte*: $\frac{63}{64}$], which is considerably less than a comma.²⁴ In order to employ these same sounds in the diatonic genus and in various modes, they must be altered; but this alteration is not so large as to obliterate all trace of their origin.

This brief survey of Rousseau's earliest comments on Tartini suffices to suggest some preliminary conclusions. In particular, it is worth noting that all of the ideas that Rousseau invokes are from the first chapter of the *Trattato di musica*, and Rousseau seems particularly drawn to Tartini's account of difference tones and the natural seventh. What these phenomena presumably seemed to offer was a way of moving beyond some of the more obvious failings of Rameau's system. The dissonant seventh, which Rameau never managed to explain satisfactorily, might be given an acoustical grounding by

moi, la route <voye> que je suivrois si j'avois à traiter de nouveau la même matière" (ms. R. 55, 131r). The text then proceeds to the new account of dissonance that Rousseau gives at OC, V, 775-76.

²⁴ Rousseau subtracts the ratios rather than dividing them.

appeal to the natural seventh, for instance. Perhaps the phenomenon of difference tones might serve to explain other tenuous aspects of Rameau's system.

If these conjectures about Rousseau's early attitude are correct, then his initial reception of Tartini's *Trattato* is closely parallel to d'Alembert's. In the remarks on Tartini's *Trattato* that he inserted in his 1757 *Encyclopédie* article FONDAMENTAL (*Musique moderne*), d'Alembert concentrates exclusively on Tartini's description of difference tones. Indeed, as d'Alembert goes on to acknowledge, that was the only part of the *Trattato* that he had yet read: "Nous avons crû devoir nous presser de faire part à nos lecteurs d'une si belle expérience, qui jusqu'à présent est à-peu-près tout ce que nous connoissons de l'ouvrage de M. Tartini" ("I have thought it necessary to give my readers an account of so fine an observation, even though that is almost all that I presently know of M. Tartini's work," VII:63).

One wonders, as a result, how well acquainted Rousseau was with Tartini's *Trattato* when he penned the passages considered above, and there is at least some evidence to support the suspicion that his reading had not been especially thorough. For the entry "Harmonie" contains a serious misrepresentation of Tartini's position:

M. Rameau fait engendrer les Dessus par la Basse; M. Tartini fait engendre la Basse par les Dessus: celui-ci tire l'*Harmonie* de la Mélodie, et le premier fait tout le contraire. Pour décider de laquelle des deux Écoles doivent sortir les meilleurs ouvrages, il ne faut que savoir lequel doit être fait pour l'autre, du Chant ou de l'Accompagnement. (OC, V, 846)

M. Rameau generates the upper parts from the bass; M. Tartini has the bass generated by the upper parts. The latter derives harmony from melody; the former does just the opposite. In order to decide which of the two schools produces better works, one must simply know which must be made for the other, the melody [for the accompaniment] or the accompaniment [for the melody].

Tartini, Rousseau here maintains, derives harmony from melody. But in fact, Tartini does nothing of the sort. Here as elsewhere, his approach is much closer to Rameau's:

All' armonia è congiunta la melodie, o sia cantilena. Se dall' armonia la cantilena, o dalla cantilena si abbia l'armonia, si è veduto nel capitolo antecedente nel sistema armonico, in cui il tutto, ch' è l'armonia, e la unità integrale, deve supporsi innanzi le parti, dalle quali si ha la cantilena. Lo stesso si vedrà nel capitolo presente.

Melody, or *cantilena*, is conjoined to harmony. Whether melody is from harmony, or harmony from melody was seen in the preceding chapter on the harmonic system, in which [it was shown that] the whole (i.e., harmony, the integral unity) must support the parts in itself, among which is melody. The same will be

Rousseau subsequently corrected the mistake, but only in the entry “Système.”²⁵

By the time he wrote “Système,” Rousseau had clearly acquired a comprehensive grasp of Tartini’s system. It is imperative, therefore, to date that entry as accurately as possible. As its placement in the text alone makes clear, “Système” was copied into the Neuchâtel manuscript quite late in the autograph’s preparation.²⁶ As entered in the autograph, however, the text is clean and almost without correction or addition, all of which suggest Rousseau was copying from an earlier and relatively polished draft. In fact, two such drafts survive amongst Rousseau’s papers in Neuchâtel (as ms. R. 66 and ms. R. 68). By a lucky chance, one of these can be dated, for f. 6r of ms. R. 68 contains a marginal note reading: “Barcarole. mot à ajoûter.” That manuscript was therefore written, or at least begun, before Rousseau copied the entry “Barcarolle” into the Neuchâtel manuscript. Since that entry appears in the body of the text (on f. 36r) and before the entries “Chronomètre” and “Chromatique,” which can be dated to 1757, it follows that Rousseau was at work on the entry “Système,” with all the sustained attention to Tartini’s *Trattato* that its writing would have entailed, prior to that date.²⁷

Rousseau begins his exposition of Tartini’s system by reviewing the acoustical phenomena catalogued in the *Trattato*’s first chapter, with particular attention to the phenomenon of difference tones (Ex. 5.3):

Toutes les fois que deux Sons fortes, justes et soutenus, se font entendre au même instant, il résulte de leur choc un troisieme Son, plus ou moins sensible, à proportion de la simplicité du rapport des deux premiers et de la finesse d’oreille des écoutans. (OC, V, 1084)

Any time two sounds that are loud, sustained and in tune are heard at the same time, a third sound results from their shock and is more or less perceptible in accordance with the simplicity of the ratio between the first two sounds and the finesse of the listener’s ear.

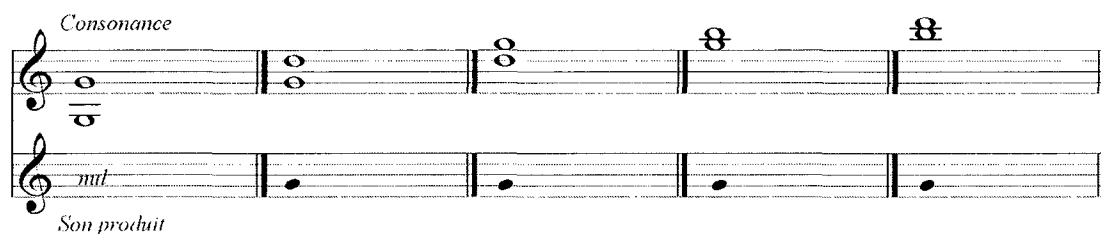
²⁵ In that entry, Rousseau acknowledges that for Tartini, “par-tout où le Système harmonique a lieu, l’Harmonie ne dérive point de la Mélodie, mais la Mélodie de l’Harmonie” (OC, V, 1096). The error and its correction are pointed out in Brenno Boccadoro, “Tartini, Rousseau, et les Lumières,” in OC, V, 1706.

²⁶ Certainly after 1759, at which point Rousseau reached the end of the letter “O” in the manuscript. See Eigeldinger, introduction, OC, V, cclxxxii.

²⁷ See n. 19 (p. 228) above. Eigeldinger dates Rousseau’s intensive study of the *Trattato* to Rousseau’s early residence at the Hermitage (i.e. after April, 1757), but without giving any evidence (OC, V, cclxxvi). For the reasons just given, that date is probably too late. For the relevance of the date, see below, p. 238.

This phenomenon, Rousseau adds, “sert de principe à tout l’Harmonie artificielle” (“serves as the principle for all artificial harmony,” OC, V, 1084).

Example 5.3. *Dictionnaire de musique*, Pl. I, fig. 8



Having introduced Tartini’s *terzo suono*, Rousseau moves on to a general reflection on method, which he borrows directly from Tartini.²⁸

Dans les sciences Physico-Mathématique, telles que la Musique, les démonstrations doivent bien être géométriques; mais déduites physiquement de la chose démontrée. C’est alors seulement que l’union du calcul à la Physique fournit, dans les vérités établies sur l’expérience et démontrées géométriquement, les vrais principes de l’Art. Autrement la Géométrie seule donnera des Théorems certains, mais sans usage dans la pratique; la Physique donnera des faits particuliers, mais isolés, sans liaison entr’eux et sans aucune loi générale. (OC, V, 1086)

In physico-mathematical sciences such as music, demonstrations must be geometrical but deduced physically from the thing being demonstrated. Only then does the union of calculation and physics furnish the true principles of the art in truths established on experience and demonstrated geometrically. Geometry alone will give theorems that are certain but without practical application; physics will give particular, isolated facts but without connecting them and without any general law.

As a physico-mathematical science (*sistema fisicomatematico*), harmony must have both a physical and a rational, or “demonstrative” (*dimostrativo*), foundation. Demonstration, Tartini thinks, requires geometrical figures, and he is convinced that the particular figure required here is the circle. This is so because the circle is both “one” (*uno in se stesso*) and “harmonic,” and in these respects is exactly like the physical phenomena on which his system also depends (*Trattato*, 21). As Rousseau puts it:

²⁸ The passage from Tartini that Rousseau here paraphrases is as follows: “Dove si tratta di stabilire un sistema, è di necessità congiungere i due generi, fisico, e dimostrativo in tal modo, che siano inseparabili tra loro, e formino un solo principio. Così dovrà reggere qualunque sistema; e noi ne saremo convinti quando intendiamo abbastanza cosa voglia dire un solo principio. Vuol dire, che il calcolo, con cui si dimostra, dev’esser intrinsecamente dedotto dalla natura fisica della cosa dimostrata [*sic*]. Così, e non altrimenti, i due generi, fisico, e dimostrativo formano tra loro un solo principio. La legge è severa, ma giusta; e in forza di tal legge, ch’è la pietra di paragone di qualunque sistema fisicomatematico, si trovano ben pochi sistemi, che non patiscano eccezione” (*Trattato*, 20).

[L]es aliquotes étant toutes comprises dans la Série des fractions $\frac{1}{1} \frac{1}{2} \frac{1}{3} \frac{1}{4}$, etc. ci-devant donnée, chacune de ces aliquotes est ce que M. Tartini appelle Unité ou Monade harmonique, du concours desquelles résulte un son. Ainsi, toute l'Harmonie étant nécessairement comprise entre la Monade ou l'Unité composante et le Son plein ou l'Unité composée, il s'ensuit que l'Harmonie a, des deux côtés, l'Unité pour terme, et consiste essentiellement dans l'Unité. (OC, V, 1084)

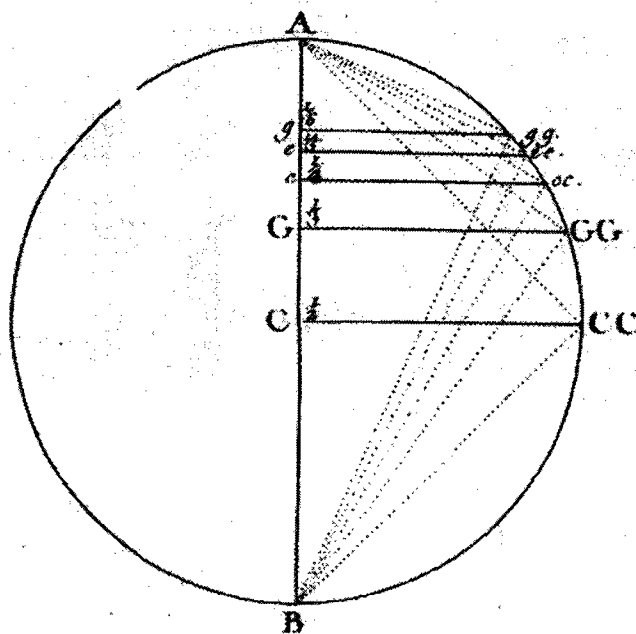
Since the aliquots are all contained in the series of fractions given above $\frac{1}{1} \frac{1}{2} \frac{1}{3} \frac{1}{4}$, etc., each of them is what M. Tartini calls a "unity" or "harmonic monad," and from their concurrence a pitched sound results. Thus, because all of harmony is necessarily comprised between the monad or composing unity and the full sound or composed unity, it follows that harmony has unity for its term on both sides and consists essentially in unity.

Since the physical foundation for Tartini's system is both "one" and "harmonic," its "demonstrative foundation"—the circle—must likewise be shown to be so, since "per lo stabilimento di qualunque sistema fisicomatematico si necessaria la congiunzione de' due generi, fisico, e dimostrativo in tal modo, che siano inseparabili tra loro, e formino un solo principio" ("in order to establish any physico-mathematical system it is necessary to conjoin the two genera, the physical and the demonstrative, in such a way that they are inseparable and form a single principle," *Trattato*, 21).

Tartini sets out, therefore, to show that the circle is "one" and "harmonic." The first is swiftly handled: the circle is one because it is formed from infinitely many radii of equal length.²⁹ That the circle is also harmonic, however, requires more elaborate proof, and Tartini accordingly devotes the bulk of his second chapter to establishing that result (his argument is considered in Appendix I). Once he has shown to his own satisfaction that the circle is harmonic, he then goes on to "derive" the properties of tonal harmony from it by dividing its diameter according to the first six terms of the harmonic series and considering the ratios formed between the segments of the diameter that he has obtained and their associated sines and chords (Fig. 5.1; see Appendix II for details). The eventual result is the series of pitches shown in Ex. 5.4.

²⁹ "è una, perchè gl' infiniti raggi condotti dal centro alla circonferenza sono eguali; e questi null' altro sono senon la unità medesima, che forma meccanicamente il circolo nell' apertura di compasso; il che non è, nè può essere in qualunque altra figura" (*Trattato*, 21).

Fig. 5.1. *Dictionnaire*, Pl. I, fig. 10



Ex. 5.4. *Dictionnaire*, Pl. I, fig. 11



The notes in the first two lines of Tartini's example form consonant intervals with the fundamental pitch C. Those of the last line (the first note excepted) form dissonances.³⁰ Tartini goes on to claim that preparation and resolution of these dissonances can be derived from the three series shown in Ex. 5.4 and with them, the remainder of his system of harmony. Rousseau dutifully follows Tartini's exposition through all its intricacies, but we need not concern ourselves with all these details here: the forgoing survey will have given enough of the flavour of Tartini's theorizing. It will also have made clear just how puzzling Rousseau's enthusiasm for Tartini is: for if anything in eighteenth-century music theory is a *système abstrait* it is surely Tartini's *Trattato di musica*. How could Rousseau, so acute a critic of Rameau's confusions, have abided the monumental contortions that issued from Tartini's pen? And if, as I have claimed, Rousseau came to believe that Rameau's attempt to ground harmony in universal principles must founder on the contingency, particularity, and artificiality of tonal harmony as practiced in eighteenth-century Europe, how could Tartini's all but identical enterprise escape the same indictment?

Though I have suggested that Rousseau's initial enthusiasm may have been founded in part on misconceptions, one cannot get out of the general dilemma by portraying Rousseau's endorsement of the *Trattato* as a kind of youthful indiscretion. By the time he wrote "Système," Rousseau had clearly absorbed the contents of Tartini's book. But he nonetheless concludes the entry by calling Tartini's theory "le vrai *Système de la Nature*" (a verdict that could easily have been excised when the article was copied into the Neuchâtel or the Lille manuscript had he no longer believed it). The preface to the *Dictionnaire*, dated December 20, 1764, likewise endorses Tartini, albeit in somewhat more muted terms.³¹

Rousseau's comments on Rameau in the preface to the *Dictionnaire* do, however, suggest a way of making sense of his interest in Tartini. Despite its imperfections,

³⁰ The appearance of the augmented fifth in Tartini's series leads Rousseau to a brief digression on the difference between "la pratique de cet Accord à la Française, et . . . à l'Italienne": "La troisième [dissonance] est la Douzième ou Quinte superflue que M. Tartini appelle *Accord de nouvelle invention*, ou parce qu'il en a le premier trouvé le principe, ou parce que l'Accord que nous appellons Quinte Superflue, n'a jamais été admis en Italie à cause de son horrible dureté" (OC, V, 1093). Rousseau gives examples of the two uses as Pl. K, figs. 3,5.

³¹ The passage is quoted on p. 240 below.

Rousseau writes there, Rameau's theory at least deserves respect as the first comprehensive attempt at a theory of harmony:

J'ai traité la partie Harmonique dans le système de la basse-fondamentale, quoique ce système, imparfait et défectueux à tant d'égards, ne soit pas, selon moi, celui de la Nature et de la vérité . . . Mais c'est un système, enfin; c'est le premier, et c'étoit le seul jusqu'à celui de M. Tartini, où l'on ait lié, par des principes, ces multitudes de règles isolées qui sembloient toutes arbitraires, et qui faisoient, de l'Art Harmonique, une étude de mémoire plutôt que de raisonnement. (OC, V, 609)

I have discussed harmony in accordance with the system of the fundamental bass, even though this system is imperfect and defective in many ways and is not, in my opinion, the system of nature and of truth . . . But it is a system, nonetheless; it is the first one, and it was the only one before M. Tartini's, in which the multitude of isolated and seemingly arbitrary rules that made the art of harmony more a exercise of memory than of reason were connected together by principles.

Rameau's system, Rousseau's wording suggests, was a valuable first approximation, but one that Tartini's theory had already begun to eclipse. Read in conjunction with d'Alembert's reception of Tartini, the remark suggests that Rousseau took both Rameau's and Tartini's theories as *systèmes hypothétiques*.

In Condillac's epistemological triptych, hypothetical systems occupy a middle ground between true and abstract systems. They are not yet true sciences, for their principles are merely conjectures or hypotheses. But unlike abstract systems, they can play a positive role to play in the acquisition and extension of knowledge. For the suppositions on which they rest "peuvent être encore des principes, c'est-à-dire, des vérités premières qui en expliquent d'autres" ("can become principles, that is, first truths that explain others") provided that they are confirmed "par de nouvelles observations que ne permettent plus de douter" ("by new observations that no longer leave any room for doubt," OP, I, 195). Hypothetical systems, then, are sometimes true systems in embryo. But even where their principles turn out to be false, hypothetical systems may be of value as catalysts to further observation and experiment:

On ne doit donc pas interdire l'usage des hypothèses aux esprits assez vifs pour devancer quelquefois l'expérience. Leurs soupçons, pourvu qu'ils les donnent pour ce qu'ils sont, peuvent indiquer les recherches à faire et conduire à découvertes. (OP, I, 203)

We should not, therefore, forbid the use of hypotheses to minds quick enough to anticipate experience in some cases. Their guesses, provided they are presented as such, can indicate inquiries that should be made and can lead to discoveries.

The key, however, is that hypotheses be ventured for what they are. When presented as truths, they mire science in confusion and retard its advance. This, Condillac thinks, was Descartes' error in the *Principia philosophia* (1644):

Si Descartes n'avoit donné ses idées que pour des conjectures, il n'en auroit pas moins fourni l'occasion de faire des observations: mais, en les donnant pour le vrai système du monde, il a engagé dans l'erreur tous ceux qui ont adopté ses principes, et il a mis des obstacles aux progrès de la vérité. (OP, I, 203)

If Descartes had presented his ideas as conjectures, he would nonetheless have furnished an occasion for making observations, but in presenting them as the true system of the world, he led all those who adopted his principles into error and placed obstacles in the path of truth.

When advanced as definitive, rather than provisional orderings of knowledge, hypothetical systems are no less pernicious than *systèmes abstraits*. When, however, their provisional status is kept firmly in mind, such systems can serve as catalysts for further investigation.

If Rameau's system, as d'Alembert came frequently to imply, is a *système hypothétique*, then what is necessary is to continue the program that it began—to discover more facts and make further observations in the hope that eventually the whole of harmony can be reduced to a proper science. Like d'Alembert, I would suggest, Rousseau saw Tartini's *Trattato di musica* as a continuation of, and improvement upon, Rameau's theoretical enterprise. And there are some obvious ways in which Tartini's system at least promised to augment Rameau's.

In particular, Tartini's system accounted for two of the anomalies that Rousseau had identified in Rameau's. The first is the augmented sixth chord. When rearranged, the pitches in Tartini's series of dissonances—D, F, G#, Bb—form precisely this sonority (Ex. 5.5).³² The interval between Bb and G#, Rousseau notes, is approximately equal to the natural seventh, which Tartini also equates with the minor seventh of the dominant seventh chord. This equivalence permits the introduction of a new kind of enharmonicism, one depending on the enharmonic reinterpretation of the seventh chord as an augmented sixth chord, and vice versa:

Cette même Sixte superflue a encore des usages plus importants et plus fins dans les

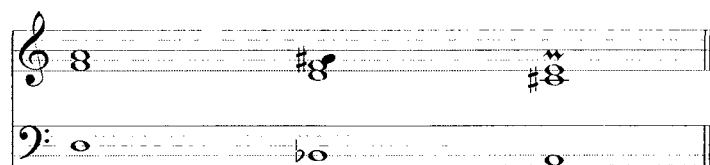
This same augmented sixth also has more important and finer uses in harmonic

³² Appropriately in A minor, rather than C major, since, as Rousseau insists, the chord appears only in the minor mode (OC, V, 1102).

Modulations détournées par des passages enharmoniques, en ce qu'elle peut se prendre indifféremment dans la pratique pour la Septième bémolisée par le signe β , de laquelle cette Sixte dièlée diffère très-peu dans le calcul et point du tout sur le Clavier. Alors cette Septième ou cette Sixte, toujours consonnante, mais marquée tantôt par Dièse et tantôt par Bémol, selon le Ton d'où l'on sort, et celui où l'on entre, produit dans l'Harmonie d'apparentes et subites métamorphoses, dont, quoique régulières dans ce *Système*, le Compositeur auroit bien de la peine à rendre raison dans tout autre; comme on peut le voir dans les exemples I, II, III, de la Planche M [Ex. 5.6], surtout dans celui marqué +, où le *fa* pris pour naturel, et formant une Septième apparente qu'on ne sauve point, n'est au fond qu'une Sixte superflue, formée par un *mi* Dièse sur le *sol* de la Basse; ce qui rentre dans la rigueur des règles. (OC, V, 1103-1104)

progressions diverted by enharmonic passages, in that it can be taken indifferently in practice for the seventh lowered by the sign β , from which this sharpened sixth differs very little in its ratio and not at all on the keyboard. Thus this seventh or sixth, always consonant but marked sometimes with a sharp and sometimes with a flat, depending upon the key being left and that being entered, produces sudden and striking metamorphoses in the harmony that, however regular they are in this system, composers would have a hard time explaining in any other; as can be seen in examples I-III of plate M [Ex. 5.6], and especially in that marked +, where the F natural forming an apparent seventh does not resolve and is in fact an augmented sixth formed by E# against the G in the bass; something entirely in accordance with the rules.

Ex. 5.5. *Dictionnaire*, Pl. K, fig. 14



Ex. 5.6. *Dictionnaire*, Pl. M, fig. I-III

Chiffres équivoques, et modulations détournées

Ex. 5.6 presents three musical examples, labeled I, II, and III, each with a treble and bass staff. Example I is marked with a '+' and shows a modulation where a natural F in the treble (forming a seventh with G in the bass) is reinterpreted as an augmented sixth (E#) when the key changes. Example II shows a similar enharmonic shift. Example III illustrates another modulation. Below the staves, numerical ratios (chiffres) are provided for each example, such as 8/5, 7/4, and 6/5, indicating the mathematical relationships between the notes.

The second is the Greek enharmonic genus. As we saw in Chapter 3, Rameau's theory disallows melodic motions through successive quarter-tones since such motions

cannot be constructed over fundamental-bass motions through fifths and thirds.³³

Tartini's system, however, claims to find an acoustical explanation for the enharmonic genus:

Quoique, eu égard au Diatonique, tout le *Système* harmonique soit, comme on a vu, renfermé dans la raison sextuple; cependant les divisions ne sont pas tellement bornées à cette étendue qu'entre la dix-neuvième ou triple Quinte $\frac{1}{6}$, et la Vingt-deuxième ou quadruple Octave $\frac{1}{8}$, on ne puisse encore insérer une moyenne harmonique $\frac{1}{7}$ prise dans l'ordre des aliquotes, donnée d'ailleurs par la Nature dans les Cors de chasse et Trompettes marines, et d'une intonation très-facile sur le Violon.

Ce terme $\frac{1}{7}$, qui divise harmoniquement l'Intervalle de la Quarte *sol ut* ou $\frac{6}{8}$, ne forme pas avec le *sol* une Tierce mineure juste, dont le rapport seroit $\frac{5}{6}$, mais un Intervalle un peu moindre, dont le rapport est $\frac{6}{7}$; de sorte qu'on ne sauroit exactement l'exprimer en Note; car le *la* Dièse est déjà trop fort: nous le représenterons par la Note *si* précédée du signe β , un peu différent du Bémol ordinaire.

L'Échelle augmentée, ou, comme disoient les Grecs, le genre épaisi de ces trois nouveaux Sons places dans leur rang, sera donc comme l'exemple 12, Planche K [Ex. 5.7]. (OC, 1100-1101)

Even though we have seen that, with respect to the diatonic [genus], the entire harmonic system is contained in the sextuple proportion, the divisions are not so limited to that proportion that it is not possible to insert, between the nineteenth or triple third $\frac{1}{6}$ and the twenty-second $\frac{1}{8}$, an additional harmonic mean $\frac{1}{7}$ taken from the series of aliquots that are given by nature in hunting horns and marine trumpets, and which is very easily sounded on the violin.

This term $\frac{1}{7}$, which divides the interval of the fourth C-G or $\frac{6}{8}$ harmonically, does not form a just minor third in the ratio $\frac{5}{6}$ with G, but a slightly smaller interval whose ratio is $\frac{6}{7}$, so that it cannot be expressed exactly in notes; for A# is already too high. We will represent it by the note B preceded by the sign β , which is slightly different from the ordinary flat.

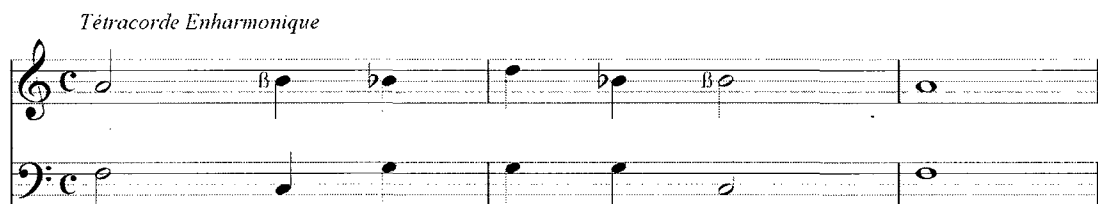
The augmented scale, or, as the Greeks called it, the compressed genus formed by these three pitches placed in order is shown in Plate K, example 12 [Ex. 5.7].

The ascending enharmonic tetrachord, on this interpretation, consists of the notes A, B ^{β} , Bb and D, where B ^{β} stands above C in the ratio 4:7. The intervals from A to B ^{β} and from

³³ See pp. 167-75 above.

B[♮] to B[♭], 20:21 and 63:68 respectively, correspond to none of the ratios given Greek writers, but nonetheless provide reasonable approximations to quarter-tones.³⁴

Ex. 5.7. *Dictionnaire*, Pl. K, fig. 12



In sum, Tartini's theory promised to account for at least some of the difficulties and anomalies in Rameau's system that Rousseau had identified in his *Encyclopédie* articles of 1749. It did so, moreover, by appealing to acoustical phenomena that Rameau had ignored (difference tones) or dismissed (the natural seventh). In this sense, the claims of Tartini's system clearly demanded Rousseau's attention in the 1750s. Still, it is curious that Rousseau's initial enthusiasm for Tartini seems to have survived the more detailed study of the *Trattato* that he undertook in preparing his article "Système." As even a cursory reading of that text reveals, Tartini is engaged in very much the same enterprise as Rameau: namely the attempt to ground tonal harmony in universal rational and physical principles. An unsympathetic reader might add both that he did so with a degree of obfuscation and obscurity that makes Rameau's writing scintillate with Voltairean clarity by comparison and that the end result of these contortions is not even a workable practical account of harmony (which after all is the great merit of Rameau's). That Rousseau never really acknowledged these facts is among the most curious features later musical writings.

5.3. Rousseau's *esquisse de l'histoire de l'harmonie*

By the time he entered the article "Harmonie" into the Neuchâtel manuscript of his *Dictionnaire de musique*, Rousseau had come to regard harmony as a peculiarity of

³⁴ On the other hand, the lower interval ends up being the larger, which violates one of Aristoxenos' basic stipulations on the tuning of tetrachords.

European musical culture. Yet if harmony is indeed the result of contingencies unique to the development of European music, then it would seem follow that a science of harmony founded upon universal principles is impossible. Such a science would, by hypothesis, stipulate laws binding upon any musical practice, past or present. But such laws could not be the kinds of structural norms that Rameau's theory of harmony describes, for these latter are of merely local application. Tonal harmony cannot therefore be explained by appeal to natural principles. But it does not follow that it cannot be explained. If tonal harmony is merely an idiosyncrasy of one particular musical culture, what becomes necessary is a historical inquiry into the series of developments that have given that culture its particular form. In his later musical writings, Rousseau undertakes to provide precisely that account.

The most familiar version of Rousseau's narrative appears in the *Essai sur l'origine des langues*. In that text, Rousseau traces music and language to a common origin. In the beginning, music and language were one: the accents of impassioned speech were the first melodic inflections, its rhythms the first musical meter. Rousseau situates this originary speech-song in a distant, quasi-mythic past approximately equivalent to the Second Discourse's *âge des cabanes*.³⁵ Already one step removed from their natural state, human beings were dispersed across the breadth of the earth, with no social bonds beyond the family, and no language beyond gesture and inarticulate cries. In hot, desert climates, they encountered each other primarily around the wells they required both for their own sustenance and for the sustenance of their flocks, and these encounters lead to the first extra-familial social bonds:

[D]ans les lieux arides où l'on ne pouvoit avoir de l'eau que par des puits, il falut bien se réunir pour les creuser ou du moins	In arid climates, where water was available only from wells, it was necessary to come together in order to dig them or at least to
-----------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------

³⁵ See Rousseau, *Discours sur l'origine de l'inégalité parmi les hommes*, OC, III, 165-171. This golden age follows upon the original state of nature and precedes the degradations of the civilized state: "quoique les hommes fussent devenus moins endurans, et que la pitié naturelle eût déjà souffert quelque alteration, ce période du développement des facultés humaines, tenant un juste milieu entre l'indolence de l'état primitif et la pétulante activité de notre amour propre, dut être l'époque la plus heureuse, et la plus durable. Plus on y réfléchit, plus on trouve que cet état étoit le moins sujet aux révolutions, le meilleur à l'homme, et qu'il n'en a du sortir que par quelque funeste hazard qui pour l'utilité commune eût dû ne jamais arriver. L'exemple des Sauvages qu'on a presque tous trouvés à ce point semble confirmer que le Genre-humain étoit fait pour y rester toujours, que cet état est la véritable jeunesse du Monde, et que tous les progrès ultérieurs ont été en apparence autant de pas vers la perfection de l'individu, et en effet vers la décrépitude de l'espèce" (OC, III, 171).

s'accorder pour leur usage. Telle du être l'origine des sociétés et des langues dans les pays chauds.

Là se formèrent les premiers liens des familles; là furent les premiers rendez-vous des deux sexes. Les jeunes filles venoient chercher de l'eau pour le ménage, les jeunes hommes venoient abruver leurs troupeaux. Là des yeux accoutumés aux mêmes objets dès l'enfance commencèrent d'en voir de plus doux. Le coeur s'émut à ces nouveaux objets, un attrait inconnu le rendit moins sauvage, il sentit le plaisir de n'être pas seul. L'eau devint insensiblement plus nécessaire, le bétail eut soif plus souvent; on arrivoit en hâte et l'on partoît à regret. Dans cet âge heureux où rien ne marquoit les heures, rien n'obligeoit à les compter; le tems n'avoit d'autre mesure que l'amusement et l'ennui. Sous de vieux chênes vainqueurs des ans une ardente jeunesse oubloit par degrés sa férocité, on s'appriivoisoit peu à peu les uns avec les autres; en s'efforçant de se faire entendre on apprit à s'expliquer. Là se firent les premières fêtes, les pieds bondissoient de joye, le geste empressé ne suffisoit plus, la voix l'accompagnoit d'accens passionnés, le plaisir et le desir confondus ensemble se faisoient sentir à la fois. Là fut enfin le vrai berceau des peuples, et du pur cristal des fontaines sortirent les premiers feux de l'amour. (OC, V, 405-406)

come to terms about their use. This must have been the origin of societies and languages in warm countries.

It was there that the first links between families were formed; there that the first meetings between the sexes occurred. Young women came to find water for the household; young men came to water their flocks. There, eyes accustomed to the same objects from infancy began to see others that were more touching; the heart was moved by them; an unknown attraction made it less savage; it sensed the pleasure of not being alone. Water became gradually more necessary; the animals were more often thirsty; one arrived in haste and parted with regret. In this happy age when nothing marked the hours, nothing made it necessary to count them; time had no measure but amusement or boredom. Under the old, ageless, cherry trees, an ardent youth gradually forgot its ferocity; little by little each tamed the other; in wanting to be understood, they learned to explain themselves. The first festivals were there; feet bounded with joy; animated gesture no longer sufficed; the voice accompanied it with impassioned accents; pleasure and desire were confounded together and felt at the same time. There, in sum, was the true cradle of peoples, and from the pure crystal came the first fires of love.

Elsewhere in the *Essai*, Rousseau carefully traces the contours of the music-language whose birth he here attends. This original language was figural not literal, had few consonants and many vowels, contained multiple pitch-inflections (*accents*), and had great rhythmic vitality. In short, "l'on chanteroit au lieu de parler" ("one sang instead of speaking," OC, V, 383).³⁶

³⁶ "Comme les voix naturelles sont inarticulées, les mots auroient peu d'articulations; quelques consonnes interposées effaçant l'hiatus des voyelles suffiroient pour les rendre coulantes et faciles à prononcer. En revanche les sons seroient très variés, et la diversité des accens multiplieroit les mêmes voix: La quantité le rythme seroient de nouvelles sources de combinaisons; en sorte que les voix, les sons, l'accent, le nombre,

Autours des fontaines dont j'ai parlé les premiers discours furent les premières chansons; les retours périodiques et mesuré du rythme, les inflexions mélodieuses des accens firent naître la poésie et la musique avec la langue, ou plutôt tout cela n'étoit que la langue même pour ces heureux climats et ces heureux tems où les seuls besoins pressans qui demandoient le concours d'autrui étoient ceux que le cœur faisoit naître. (OC, V, 410)

Around the fountains of which I have spoken, the first discourses were the first songs; the periodic and measured repetitions of rhythm, the melodious inflections of accents gave birth to poetry and music together with language, or rather all this was nothing but language itself in those happy climates and happy times where the only pressing needs that demanded the concurrence of others were those born of the heart.

From this original symbiosis, music and language suffered a slow and inexorable decline. Rousseau traces that decline in the *Essai*'s nineteenth chapter ("Comment la musique a dégénéré"), which, as Marie-Elisabeth Duchez and Robert Wokler discovered in the early 1970s, is drawn all but verbatim from "Du Principe de la mélodie." "Du Principe" also anticipates the *Essai*'s sketch of the original language, though with some salient differences. In the *Essai*, Rousseau's treatment of the original language moves in a kind of mythic timelessness. Though he cites Arabic, Greek and the Chinese languages, these are evoked heuristically rather than historically; they function, that is to say, to help Rousseau's readers imagine the language that he imagines, rather than to convince them of its historical reality.³⁷ In "Du Principe de la mélodie," the original language is far more closely identified with (pre-)Homeric Greek. The first language, as Rousseau writes in "Du Principe," must have been both resonant and accented ("Du Principe," 448). But of all known languages, "la Grecque [est] sans difficulté celle qui avoit le plus de résonnance et d'accent" ("Greek is surely the one having the most resonance and accent," "Du Principe," 450). It follows, therefore, that Greek is the language "où le discours doit être le plus semblable au chant" ("in which speech must be most similar to song," "Du Principe," 450).

When he wrote "Du Principe de la mélodie" in 1755, Rousseau had come to recognize that the musical structures (*systemata*) described by Greek harmonic theorists were fundamentally different from those of eighteenth-century European practice. The

qui sont de la nature, laissant peu de chose à faire aux articulations qui sont de convention, l'on chanteroit au lieu de parler: la plupart des mots radicaux seroient des sons imitatifs, ou de l'accent des passions, ou de l'effet des objets sensibles: L'onomatopée s'y feroit sentir continuellement" (OC, V, 383).

³⁷ The original language "ressembleroit à la langue chinoise à certains égards, à la greque à d'autres, à l'arabe à d'autres" (OC, V, 383).

grain of this insight was already present in the *Encyclopédie* articles of 1749, as we saw in Chapter 3.³⁸ Nonetheless, the point receives its first forceful elaboration in Rousseau's 1755 draft:

[L]a constitution des divers systèmes des Grecs prouve évidemment que leurs auteurs n'étoient guidés par aucun vrai sentiment d'harmonie, et quiconque oseroit soutenir le contraire seroit bientôt accablé de preuves et réduit au silence et au desaveux. Si l'on a disputé si longtems sur la science harmonique des Grecs, c'est que ces disputes se passoient entre des Litterateurs peu versés dans l'art qui s'imaginoient que de légères notions de nôtre musique devoient suffire pour juger de celle des Grecs au lieu qu'avec un peu plus de connoissance ils auroient vu que ce deux arts n'ont et ne peuvent avoir aucune parties communes par lesquelles ils puissent être exactement comparés. ("Du Principe," 452)

The constitution of the diverse Greek systems clearly proves that their authors were not guided by any true sentiment of harmony, and whoever dares to insist on the contrary will soon be overwhelmed with proofs and reduced to silence and disavowal. If we have disputed for so long concerning the harmonic science of the Greeks, it is because these disputes occurred between literary men little versed in the art [of music] who imagined that some superficial acquaintance with our music would suffice for judging that of the Greeks, whereas with more knowledge they would have seen that the two arts do not and could not have any common parts by which they could be exactly compared.

The Greeks, Rousseau had written already in the *Encyclopédie*, made no use of harmony in the modern sense.³⁹ He now goes further. Not only did Greek music make no use of chords or harmonic progressions, its scales and modes were organized by principles totally distinct from those governing "modern" music.

Rousseau's most sustained elaborations of this argument come in the entry "Tétracorde" from *Dictionnaire de musique* and in the eighteenth chapter ("Que le système musical des grecs n'avoit aucun rapport au nôtre") of the *Essai sur l'origine des langues*. In the former, Rousseau places particular emphasis on the structural role played by the fourth in both the greater and lesser perfect systems:

Cette division du système des Grecs par *Tétracordes* semblables, comme nous divisions le nôtre par Octaves semblablement divisées, prouve, ce me semble, que ce système n'avoit été produit

This division of the Greek system into similar tetrachords, just as we divide ours into similar octaves, seems to me to prove that their system was not produced by any sentiment of harmony, but that they tried to

³⁸ See above, pp. 156-74.

³⁹ "Il paroît encore démontré qu'ils ne connoissoient point la *musique* à plusieurs parties, le contre point, en un mot l'harmonie dans le sens que nous lui donnons. S'ils employoient ce mot, ce n'étoit que pour exprimer une agreeable succession de sons" (MUSIQUE, X:900).

par aucun sentiment d'Harmonie, mais qu'ils avoient tâché d'y rendre par des Intervalles plus serrés les inflexions de voix que leur langue sonore et harmonieuse donnoit à leur récitation soutenue, et surtout à celle de leur Poésie, qui d'abord fut un véritable Chant; de sorte que la Musique n'étoit alors que l'Accent de la parole et ne devint un Art séparé qu'après un long trait de tems. Quoi qu'il en soit, il est certain qu'ils bornoient leurs divisions primitives à quatre Cordes, dont toutes les autres n'étoient que les Répliques, et qu'ils ne regardoient tous les autres *Tétracordes* que comme autant de répétitions du premier. D'où je conclus qu'il n'y a pas plus d'analogie entre leur système et le nôtre qu'entre un *Tétracorde* et une Octave, et que la marche fondamentale à notre mode, que nous donnons pour base à leur système, ne s'y rapporte en aucune façon. (OC, V, 1119-20)

reproduce, by means smaller intervals, the vocal inflections that their sonorous and harmonious language gave to their sustained recitation, and above all the recitation of their poetry which was at first a true singing, so that at that point music was merely the accent of speech and became a separate art only after a long interval of time. However that may be, it is certain that they limited their basic divisions to four degrees, of which the others were repetitions, and that they regarded all the other tetrachords as so many repetitions of the first. From this, I conclude that there is no more analogy between their system and ours than there is between a tetrachord and an octave, and that fundamental progressions after our fashion, which we give as the basis of their system, have no relation to it.

The scales employed by the Greeks, that is to say, were periodic at the fourth, not at the octave. Rousseau reiterates the argument in the *Essai*:

Les Grecs divisoient leur Diagramme par tétracordes comme nous divisons nôtre clavier par octaves, et les mêmes divisions se répétoient exactement chez eux à chaque tétracorde comme elles se répètent chez nous à chaque octave; similitude qu'on n'eut pu conserver dans l'unité du mode harmonique et qu'on n'auroit pas même imaginée. Mais comme on passe par des intervalles moins grands quand on parle que quand on chante, il fut naturel qu'ils regardassent la répétition des tétracordes dans leur mélodie orale comme nous regardons la répétition des octaves dans nôtre mélodie harmonique. (OC, V, 423)

The Greeks divided their scale into tetrachords as we divide our keyboard into octaves, and the same divisions were repeated exactly among their tetrachords as they are repeated among our octaves, a similarity that we could not have preserved in a single mode nor would even have imagined. But as one passes through smaller intervals in speaking than in singing, it was natural that they regarded the repetition of tetrachords in their oral melody as we regard the repetition of octaves in our harmonic melody.

Unfortunately, Rousseau's argument is not especially compelling. Only the lesser perfect system is strictly periodic at the fourth, and then only if its lowest three tetrachords are considered in isolation (Ex. 5.8). The greater perfect system is periodic at the octave

thanks to the tone of disjunction separating *mēsē* from *paramēsē*. Moreover, even if its conclusion were granted, Rousseau's argument would not show that the two *systemata* could not in principle have been generated by fundamental bass motions through fifths and thirds. In fact, as we saw in Chapter 3, Rameau had already shown how the greater perfect system could be so constructed in his *Génération harmonique*.

Fortunately, Rousseau has a better argument to offer. In the *Essai*, as before in the *Encyclopédie*, Rousseau points out that the Greeks did not regard sixths and thirds as consonances: “[les Grecs] n’ont reconnu pour consonances que celles que nous appelons consonances parfaites; ils ont rejeté de ce nombre les tierces et les sixtes,” (The Greeks recognized only those consonances that we call perfect; they rejected thirds and sixths from their number,” OC, V, 423). He undermines the argument, though, by introducing a weak explanation for that fact that he culled from Rameau's *Nouveau système* (Cf. CTW, II, 58).

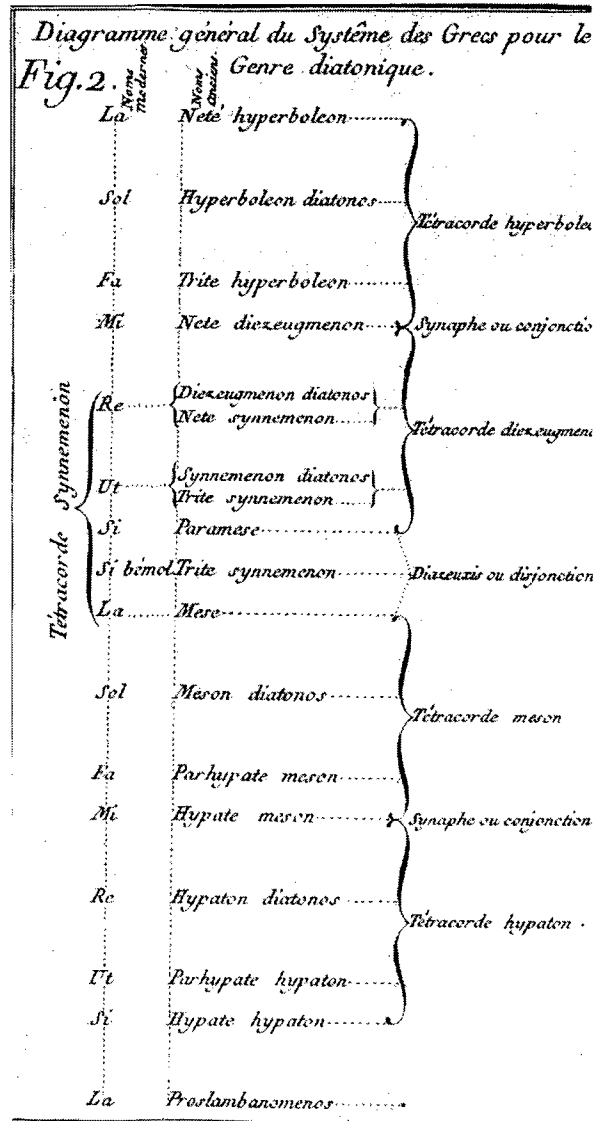
Pourquoi cela? C'est que l'intervalle du ton mineur étant ignoré d'eux ou du moins proscrit de la pratique, et leurs consonances n'étant point tempérées, toutes leurs tierces majeures étoient trop fortes d'un comma, leurs tierces mineures trop faibles d'autant, et par conséquent leurs sixtes majeures et mineures réciproquement altérées de même. (OC, V, 423-24)

Why so? It is because they did not know about the minor tone, or at least did not use it in practice, and since their consonances were not tempered, all their major thirds were too large by a comma, and their minor thirds too small by the same amount, and their major and minor sixths were reciprocally altered as well.

The Greeks, Rousseau claims, did not regard thirds as consonances because their thirds were ditones (64:81) rather than pure thirds (4:5). There are two difficulties here. First, the claim is false: Ptolemy's syntonic-diatonic, for instance, contains thirds in the ratio 4:5.⁴⁰ Second, Rousseau's claim implies that had the Greeks heard just thirds, they would have regarded them as consonances. Manifestly, however, the Greeks had heard such intervals (for they appear in their scales) but still did not treat them as consonances. Thus, the argument is potentially much stronger than Rousseau makes it: one of the basic structural elements of tonal harmony—the consonant third, whether major or minor—was not a consonance in Greek music; hence that music was organized along principles fundamentally different from those of tonal harmony.

⁴⁰ See pp. 159-60.

Ex. 5.8. *Dictionnaire de musique*, Pl. H, fig. 2



There is, of course, a third argument open to Rousseau. We have seen it sketched in Chapter 3 above.⁴¹ The Greek enharmonic genus, requiring as it does two successive quarter-tones, cannot be constructed by means of fundamental-bass motions through fifths and thirds. Condillac had raised the issue in his *Essai sur l'origine des connoissances humaines*, and d'Alembert had clearly delineated the problem it posed for Rameau in an addendum to Rousseau's article *GENRE, en Musique*. But strangely, Rousseau does not adopt the argument in the *Dictionnaire de musique*: the entry "Genre"

⁴¹ See pp. 173-74 above.

does not incorporate any material from d'Alembert's addendum, and its ideas do not appear elsewhere in the text.⁴²

Yet despite the weakness of the arguments he musters in its defense, Rousseau's conclusion is undoubtedly both correct and prescient: Greek music was organized in ways fundamentally different from eighteenth-century European music, and Rousseau was one of the first commentators to recognize the distinction and to insist upon it. That the norms of tonal harmony did not govern Greek musical practice shows that they are not universal. Rousseau, however, drew a far more sweeping conclusion. Not only are those norms not universally binding, they apply exclusively to recent European music. The musical practices systematized in Rameau's writings, that is to say, are not the norm, but the exception.

That contention left Rousseau with two basic questions to answer. If not by harmony, then by what principles were Greek scales and modes governed? And how did these principles come to be replaced by harmony? How, in other words, did harmony in the modern sense arise?

We have already begun to see Rousseau's eventual answer to the first problem. Greek music, he believed, was intimately bound up with the Greek language. Its rhythms derived from Greek prosody (its patterns of long and short syllables) and its meters from those of Greek poetry. Its melodic intervals (and their eventual ossification into scales and modes) derived from the pitch inflections of the spoken language. It is, however, Rousseau's answer to the second question—how modern harmony arose—that is primarily of interest here.⁴³ Rousseau devotes a significant part of "Du Principe" to resolving that question, and his answer, which subsequently became chapter 19 of the *Essai sur l'origine des langues*, is worth quoting in full:

Enfin arriva la fatale catastrophe qui devoit annéantir tous les progrès de l'esprit	Finally, the fatal catastrophe came that would annihilate all the human spirit's
-----------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------

⁴² One possible explanation is that Rousseau was convinced by Tartini's derivation of the enharmonic, which he summarizes in "Système." See pp. 244-45 above.

⁴³ Commentators on the *Essai* have been understandably drawn to Rousseau's account of the original music. The passages that treat it—especially the famous scene around the fountains in the *Essai*'s ninth chapter—are so pregnant with significance, so rich in resonances spanning the range of Rousseau's writings that they have fired the imaginations of the *Essai*'s readers. Rousseau's primeval goatherds and maidens are not the only ones who have been seduced *autours ces fontaines pures*. Yet for theorists and historians of music, the second part of Rousseau's account—the tale he tells of music's decline—is of greater interest.

humain. L'Europe inondée de Barbares et asservie par des ignorans perdit à la fois ses sciences, ses arts et l'instrument universel des uns et des autres savoirs la langue harmonieuse perfectionnée. Ces hommes grossiers que le nord avoit engendrés accoutumèrent insensiblement toutes les oreilles à la rudesse de leur organe. *Au rapport de Julien*, ils croassoient pour ainsi dire au lieu de parler et *leur* voix dure et denuée d'accent étoit bruyante sans être harmonieuse. Toutes leurs articulations étant d'ailleurs rudes et sourdes et leurs voyelles peu sonores, ils ne pouvoient donner qu'une sorte de douceur à leur chant qui étoit de renforcer le son des voyelles pour couvrir l'abondance et la dureté des consonnes.

Ce chant bruyant joint à l'inflexibilité de l'organe obligea ces nouveaux venus et les peuples subjugués qui les imitèrent de ralentir les sons pour leur donner plus d'éclat; l'articulation pénible et les sons renforcés concoururent également à chasser de la mélodie tout sentiment de mesure et de rythme; comme ce qu'il y avoit de dur étoit toujours le passage d'un son à l'autre on n'avoit rien de mieux à faire que de s'arrêter sur chacun le plus qu'il étoit possible; le chant ne fut donc plus qu'une suite ennuyeuse et lente de sons trainés *et criés* à pleine tête sans douceur, sans mesure et sans grâces; et si quelques savans observoient de tems en tems qu'il falloit faire des longues et des brèves dans le chant latin, il est sur au moins qu'il ne fut *Presque* plus question de *pièdes* et de rythme ni d'*aucune espèce de chant mesuré*.

Le chant ainsi dépouillé de toute mélodie et consistant uniquement dans la force et la durée des sons dut suggérer enfin les moyens pour le rendre plus sonore encore à l'aide des consonances. Car plusieurs voix traînant sans cesse à l'unisson des sons d'une durée indéfinie, le hasard leur fit

progress. Europe, inundated by barbarians and subjugated by the ignorant simultaneously lost its sciences, its arts, and the universal instrument of the one and the other, namely its perfect, harmonious language. These rough men born of the north gradually accustomed all ears to the rudeness of their speech. According to Julian, they croaked, so to speak, rather than talking and their hard voices, devoid of accent, were forceful rather than harmonious. All their articulations moreover were muddled and uncouth and their vowels lacked sonority, so that they could give only one kind of softness to their singing, namely that of reinforcing the sound of the vowels in order to cover the abundance and the hardness of the consonants.

This noisy singing, joined to the inflexibility of their voices, obliged these newcomers and the people they subjugated, who imitated them, to slow down the sounds so as to give them more force; their difficulty with articulation and their redoubled sounds served equally to chase all sense of rhythm and meter from melody. Since what they found difficult was to pass from one sound to another, they could think of nothing better than to stop for as long as possible on each one. Singing thus became nothing more than a slow, dull succession of drawn-out, full-voiced shouting that lacked all sweetness, measure and grace. And if some savants noted from time to time that it was necessary to observe the longs and short syllables when singing in Latin, it is certain at least that it was no longer a question of feet and of rhythm or of any kind of measured singing.

This singing, devoid of all melody and consisting solely in the forced, hard sounds must finally have suggested a means of making it still more sonorous with the help of the consonances. For many voices in

naturellement trouver quelques accords dont les vibrations diversifiées renforçoient le bruit, tandis que les mêmes vibrations réunies le rendoient agréable, et c'est ainsi que commença la première pratique du Discant et du Contrepoint.

On ne sauroit dire combien de siècles les Musiciens tournèrent autour des questions frivoles que l'effet connu d'une cause ignorée leur fit agiter si longtemps. Le plus infatigable lecteur ne peut supporter dans Jean de Muris le verbiage de huit ou dix grands chapitres pour savoir dans l'intervalle de l'octave coupé par deux consonances si c'est la quinte ou la quarte qui doit être au grave et quatre cents ans après on trouve encore dans Bontempi des *énumérations* non moins ennuyeuses de toutes les basses qui doivent porter la sixte au lieu de la quinte. Cependant l'harmonie prenoit insensiblement les routes que lui prescrit la nature jusqu'à l'invention du mode mineur et des dissonances *en un mot de tout l'arbitraire dont elle est pleine* et que *le seul préjugé* nous empêche d'apercevoir.

C'est ainsi que la mélodie étant nulle et l'attention du musicien s'étant tournée entièrement vers l'harmonie, tout se dirigea vers ce nouvel objet; les Genres, les modes, l'échelle, tout prit insensiblement une face nouvelle; ce furent les successions harmoniques qui réglèrent la marche des parties, cette marche ayant pris le nom de mélodie on ne peut méconnoître en effet dans cette prétendue mélodie les traits de la mère qui l'a fait naître; *et notre système musical étant ainsi devenu purement harmonique, ce n'est pas une merveille que la mélodie en ait souffert et que la musique ait perdu pour nous une grande partie de l'énergie qu'elle avoit autrefois.*

Voilà comment le chant devint par degrés un art entièrement séparé de la langue dont il tire son origine, comment le sentiment du son et de ses harmoniques y

unison ceaselessly drawing out sounds of an indefinite duration must by chance have struck certain intervals whose diverse vibrations reinforced the noise while at the same time making it agreeable, and it was thus that the first practice of discant or counterpoint began.

It is impossible to say for how many centuries musicians busied themselves with frivolous questions that the observed effects of an unknown cause made them ponder. The most indefatigable reader cannot stand the verbiage of eight or ten long chapters in Jean de Muris that ask whether, in an octave divided into two consonances, the fifth should be below or the fourth, and four hundred years later we still find in Bontempi no less dull enumerations of the various basses that should carry a sixth instead of a fifth. Nonetheless, harmony gradually took on the routes that nature prescribed it up until the invention of the minor mode and of dissonances and in a word of all the arbitrariness of which it is full and which prejudice alone prevents us from seeing.

Thus, with melody being nothing and the attention of musicians turned entirely towards harmony, everything oriented itself towards this new object; the genera, the modes, the scale, gradually took on a new aspect; it was harmonic successions that regulated the progression of the parts, and that progression having taken the name of melody, one could [méconnoître] in that alleged melody, the traits of the mother that had given birth to it; and our musical system having become purely harmonic, it is no marvel that melody should have suffered and that our music should have lost a great part of the energy that it once had.

That is how song became by degrees an art entirely separated from the language in which it originated, how the sensation of sound and its harmonics took the place of

fit perdre celui de l'accent oral, de la quantité numérique et par conséquent de la mesure et du rythme, et comment enfin, bornée à l'effet purement physique du concours des vibrations, la musique se trouva tout à fait dépourvue des effets moraux qu'elle avoit produits quand elle étoit doublement la voix de la nature. ("Du Principe," 457-461)

vocal accent, of numerical quantity and consequentially of measure and rhythm, and how finally, confined to the purely physical effect of the concurrence of vibrations, music found itself stripped of the moral effects that it had produced when it was doubly the voice of nature.

There are two crucial transitions in Rousseau's narrative. The first is the decline and Christianization of Rome, which in effect substituted liturgical plainchant for Greek monody. The second is the invention of counterpoint, which severed the connection between music and language and substituted musical structures derived from harmony for the original melodic ones. The account Rousseau gives of these two transitions in "Du Principe de la mélodie" can be amplified by turning to the *Dictionnaire de musique*.

Plainchant, Rousseau tells us in the article devoted to that subject, is "un reste bien défiguré, mais bien précieux, de l'ancienne Musique Greque, laquelle, après avoir passé par les mains des barbares, n'a pû perdre encore toutes ses premières beautés" ("a much disfigured but still most precious remnant of ancient Greek music, which, after having passed through the hands of the barbarians, still did not lose all of its original beauties," OC, V, 983). In the hands of the Christian civilization that rose from Rome's embers music suffered still further depredations:

Les Chrétiens s'étant saisi de la Musique dans l'état où ils la trouvèrent, lui ôtèrent encore la plus grande force qui lui étoit restée ; sçavoir, celle du Rythme et du Mètre, lorsque, des vers auxquels elle avoit toujours été appliquée, ils la transportèrent à la prose des Livres Sacrés, ou à je ne sais quelle barbare Poésie, pire pour la Musique que la prose meme. Alors l'une des deux parties constitutives s'évanouit, et la Chant se traînant, uniformement et sans aucune espèce de Mesure, de Notes en Notes presque égales, perdit avec sa marche rythmique et cadencée toute l'énergie qu'il en recevoit. Il n'y eut plus que quelques Hymnes dans lesquelles, avec la Prosodie et la quantité des Pieds,

The Christians, seizing music in the state in which they found it, deprived it of its greatest remaining resource, namely its rhythm and meter, when they transported it from the verses to which it had always been applied to the prose of the holy scriptures, or to a barbarous poetry that was even worse for music than prose. Thus one of music's two constitutive parts vanished and singing, drawn out uniformly and without any kind of measure and from equal note to equal note, lost all the energy it had once received from its rhythmic, cadenced progress. Only in certain hymns that conserved their prosody and the quantity of their [poetic] feet was it still possible to sense the cadence of verse in

conservés, on sentit encore un peu la cadence du vers ; mais ce ne fut plus là le caractère général du *Plain-Chant*, dégénéré le plus souvent en une Psalmodie toujours monotone et quelquefois ridicule, sur un Langue telle que la Latine, beaucoup moins harmonieuse et accentuée que la Langue Grecque. (OC, V, 983)

some small way. But that was not the general character of plainchant, which most often degenerated into a psalmody that was often monotonous and sometimes ridiculous, in a language such as Latin, itself far less harmonious and accented than Greek.

Latin chant did, however, preserve a precious remnant of Greek music's melodic inflections:⁴⁴

Malgré ces pertes si grandes, si essentielles, le *Plain-Chant* . . . offre encore aux connoisseurs de précieux fragmens de l'ancienne Mélodie et de ses diverses Modes, autant qu'elle peut se faire sentir sans Mesure et sans Rhythme, et dans le seul Genre diatonique . . . Les divers Modes y conservent leurs deux distinctions principales; l'une par la différence des Fondamentales ou Toniques, et l'autre par la différentes position des deux semi-Tons, selon le Degré du système Diatonique naturel où se trouve la Fondamentale, et selon que le Mode Authentique ou Plagal représente les deux Tétracordes conjoints ou disjoints. (OC, V, 983-84)

Despite these great and essential losses, plainchant . . . provides connoisseurs with precious fragments of the ancient melody and its diverse modes, to the extent that it can be sensed in the absence of meter and rhythm, and solely in the diatonic genus . . . The diverse modes preserve their two principal distinctions, the one by the difference between fundamentals or tonics, and the other by the different positions of the two semitones, according to the degree of the natural diatonic system on which the fundamental is found, and according to whether the authentic or plagal mode presents the two tetrachords as conjoined or disjoined.

In sum, Rousseau thought that plainchant preserved the contours of the ancient Greek *tonoi*, and that its melodic system thus rested on principles entirely distinct from the modern one.⁴⁵

⁴⁴ Compare the following passage from the entry "Mesure": "La *Mesure* tomba dans l'oubli, quoique l'Intonation fût toujours cultivée, lorsqu'après les victoires des Barbares les Langues changèrent de caractère et perdirent leur Harmonie. Il n'est pas étonnant que le Mètre qui servoit à exprimer la *Mesure* de la Poésie, fût negligee dans des tems où on ne la sentoit plus, et où l'on chantoit moins de vers que de prose. Les Peuples ne connoissoient guères alors d'autre amusement que les cérémonies de l'Eglise, ni d'autre Musique que celle de l'Office, et comme cette Musique n'exigeoit pas la régularité du Rhythme, cette partie fut enfin tout-à-fait oubliée. Gui [Guido of Arezzo] nota sa Musique avec des points qui n'exprimoient pas des quantités différentes, et l'invention des Notes fut certainement postérieure à cet Auteur" (OC, V, 890).

⁴⁵ "Ces Modes, tells qu'ils ont été transmis dans les anciens Chants Ecclésiastiques, y conservent une beauté de caractère et une variété d'affections bien sensible aux connoisseurs non prévenus, et qui ont conservé quelque jugement d'oreille pour les systèmes mélodieux établis sur des principes différens des nôtres" (OC, V, 984). On the identification of the Greek *tonoi* with the church modes, see also "Mode,"

The event that severed modern music entirely from its origins was the invention of polyphony. Because medieval plainchant lacked meter and fixed rhythms, singers had difficulty keeping together. As a result, distinct pitches were sometimes heard simultaneously, as some singers pushed ahead and others lagged behind. Occasionally, these superimposed pitches formed consonances, and these consonances began to be cultivated. Rousseau suggests in the entry “Organiser” that one of the first devices to have been introduced consisted in adding thirds at the terminations of phrases: “de sorte, par exemple, qu’une partie du Choeur chantant ces quatre Notes, *ut re si ut*, l’autre partie chantoit en même tems ces quatre-ci, *ut re re ut*” (“so that, for example, one part of the choir sang these four notes, C D B C, while the other sang these at the same time C D D C,” OC, V, 965). From these humble beginnings, more ornate practices arose. Singers began to accompany chants in parallel fourths or fifths, practices that Rousseau briefly describes in the articles “Quarter” and “Quinter.” They began also to improvise accompanying lines above chant melodies:

DISCANT ou DÉCHANT, *s. m.*: C’étoit, dans nos anciennes Musiques, cette espèce de Contre-point que composoient sur le champ les Parties supérieures en chantant impromptu sur le Tenor ou la Basse ; ce qui fait juger de la lenteur avec laquelle devoit marcher la Musique, pour pouvoir être exécutée de cette manière par des Musiciens aussi peu habiles que ceux de ce tems-là. *Discantat*, dit Jean de Muris, *qui simul cum uno vel pluribus dulciter cantat, ut ex distinctis Sonis Sonus unus fiat, non unitate simplicatis, sed dulcis concordisque mixtionis unione.* (OC, V, 763)

DISCANT or DÉCHANT, masculine noun: was, in our ancient music, a kind of counterpoint composed on the spot by the upper parts in improvising above the tenor or bass, which suggests the slow tempo at which this music must have progressed so as to be executed in this way by musicians of so little accomplishment as those of that time. “He sings discant,” Jean de Muris says, “who sings sweetly with one or many, so that a single sound is made from distinct sounds, not by simple unity, but by the union of a sweet and concordant mixture.

More complex experiments in counterpoint eventually necessitated the invention of new systems of rhythm and meter so that the different parts might keep together: “on sent bien,” Rousseau writes in the entry “Contre-point,” “que tout cela ne peut se faire qu’à l’aide de la Mesure, et que ce Plain-Chant devient alors de véritable Musique” (“one clearly senses that all this cannot be done without the aid of measure, and that plainchant

OC, V, 903, and “Tons de l’église,” OC, V, 1125. On the distinction between the modes and scales and keys in the modern sense see “Tons de l’église,” OC, V, 1127.

thus becomes true music,” OC, V, 733). From these beginnings, “l’harmonie prit insensiblement la route qui prescrit la nature.” At this point, the *Essai* presents a significant and helpful variant, for in place of “nature,” it attributes the subsequent progress of music to “l’analyse” (OC, V, 426). We can guess, from our study of Condillac’s and Diderot’s conjectures concerning music history in Chapter 1, what that contention means. The consonances having been discovered, they were eventually used to construct triads. From the intervals comprising these triads, certain rudimentary harmonic progressions were formed by allowing the bass to progress by consonant interval, and so on “jusqu’à ce qu’enfin l’invention du mode mineur et des dissonances y eut introduit l’arbitraire dont [l’harmonie] est pleine” (“until the invention of the minor mode and of dissonances introduced the arbitrariness of which harmony is full,” OC, V, 426-27).

With that, Rousseau’s narrative seems to rejoin Diderot’s and Condillac’s conjectural history of music, albeit on a far more compressed temporal span. Whereas for Diderot and Condillac the logic of Rameau’s system governed the entire development of Western music from its Greek beginnings to its full flourishing in eighteenth-century France, for Rousseau, Rameau’s system presides over music’s decadence, from the catastrophic, “gothic” invention of harmony through to the final terminus of the art’s decline.⁴⁶ There is also a further salient difference between Rousseau’s version and Diderot and Condillac’s. Whereas latter two *philosophes* were content to present their history of music in entirely conjectural terms, Rousseau insists on the factual veracity of his. In “Du Principe de la mélodie,” the transition from Rousseau’s initial conjectures

⁴⁶ In “Du Principe de la mélodie,” though not in the *Essai*, Rousseau goes on to describe the rebirth of Greek monody in Neapolitan opera: “Mais quand introduisant la Musique sur nos theaters on l’a voulu rétablir dans ses anciens droits et en faire un langage imitativo et passionné; c’est alors qu’il a fallu la rapprocher de la langue grammaticale dont elle tire son premier être et que, réglant les modulations de la voix chantante sur les inflexions diverses que les passions donnent à la voix parlante, la mélodie a trouvé pour ainsi dire une nouvelle existence et de nouvelles forces dans ses conformités avec l’accent oratoire et passionné. Alors déjà soumis aux marches harmoniques qu’on n’en a du ni voulu séparer, le chant rigoureusement assujéti par la langue et gene doublement par le système harmonique et par la declamation, a pris en chaque país le caractère de la langue dont il tiroit la forme, il est devenu d’autant plus melodieux et varié que cette langue avoit plus de rythme et d’accent, et dans celles qui ayant peu de l’un et de l’autre ne sont pour ainsi dire que l’organe de la raison ce même chant est resté languissant et froid, comme *est* le ton des personnes qui ne font que raisonner. Dans ces regions faites pour la sagesse ou le jugement a plus d’empire que les passions vives, la melodie ayant acquis peu d’ascendant, l’harmonie a conservé tout le sien, et c’est là que le plaisir physique suppleant au plaisir moral on préfère les accords au chant et les sons bruyans d’une voix forte ou d’un grand *choeur* aux sons touchans d’une voix tendre et passionné” (“Du Principe,” 461-62).

concerning music's origin to his consideration of Greek music is marked by a significant shift: "Des cet instant," Rousseau writes, "nous voici hors du païs des conjectures et nous pouvons marcher d'un pas plus ferme dans la recherche de la vérité" ("from this moment on we are out of the land of conjectures and we can march with a firmer step in the search for truth," "Du Principe," 450). The entire digression on the origin of melody is introduced by the injunction "recherchons, s'il y a moien, la veritable origine de la mélodie, et voyons si l'idée que M. Rameau en a conçue s'accord à celle que nous fournit l'exacte observation des *faits*" ("let us look, if there is a way, for the true origin of melody, and let us see if the idea that M. Rameau has conceived of it accords with that furnished by the exact observation of the facts," "Du Principe," 448). Finally, Rousseau concludes his historical overview with the insistence that "[t]out cet historique est appuyé sur des faits et fournit comme on voit des conclusions directement contraires au Système de M. Rameau" ("all of this history is supported by the facts and furnishes, as we can see, conclusions that are directly contrary to the system of M. Rameau," "Du Principe," 462).⁴⁷ These claims raise two important questions. What are the facts supporting Rousseau's narrative? And in what sense does that narrative furnish conclusions that are directly contrary to *le système de M. Rameau*?

The preface to the *Dictionnaire de musique* offers a clue to the first question.

Writing about the early stages of his work on the *Dictionnaire*, Rousseau warmly acknowledges the assistance he received from the abbé Sallier at the Bibliothèque du Roi:

<p>Vivant au milieu des Artistes et des Gens-de-Lettres, je pouvois consulter les uns et les autres. M. l'Abbé Sallier me fournissoit, de la Bibliothèque du Roi, les livres et manuscrits dont j'avois besoin, et souvent je tirois, de ses entretiens, des lumières plus sûres que de mes recherches. (OC, V, 606)</p>	<p>Living among artists and men of letters, I could consult both the one and the other. M. the abbé Sallier furnished me with the books and manuscripts that I needed from the Bibliothèque du Roi, and I often found his conversation more sure and more enlightening than my own research.</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

⁴⁷ Obviously, these passages are in striking contrast to the Second Discourse's notorious injunction: "Commençons donc par écarter tous les faits, car ils ne touchent point à la question" (OC, III, 132). One way to reconcile "Du Principe" with the Second Discourse might be to appeal the following methodological reflection from the end of the latter text's first part: "[D]eux faits étant donnés comme réels à lier par une suite des faits intermédiaires, inconnus ou regardés comme tels, c'est à l'histoire, qu'on l'a, de donner les faits qui les lient; c'est à la Philosophie à son défaut, de déterminer les faits semblables qui peuvent les lier" (OC, III, 162-63). The Second Discourse, on this interpretation, would be an exercise in *philosophie*, "Du Principe de la mélodie" in *histoire*.

A passage from the *Confessions* refers equally to Rousseau's work in the Bibliothèque du Roi:

J'avois . . . eu la precaution de me pourvoir aussi d'un travail de cabinet pour les jours de pluie. C'étoit mon *Dictionnaire de musique* dont les matériaux épars, mutilés, informes, rendoient l'ouvrage necessaire à reprendre presque à neuf. J'apportoï quelques livres dont j'avois besoin pour cela; j'avois passé deux mois à faire l'extrait de beaucoup d'autres qu'on me prêtoit à la Bibliothèque du Roi et dont on me permit même d'emporter quelques uns à l'hermitage. (OC, I, 410)

I had taken the precaution of giving myself some indoor work for rainy days. This was my *Dictionnaire de musique*, whose scattered, mutilated, and unformed materials almost made it necessary to begin the work over again. I brought with me certain books that I needed for that [end]; I had passed two months in making extracts of many others that I borrowed from the Bibliothèque du Roi, some of which I was permitted to take with me to the Hermitage.

Since Rousseau left Paris for the Hermitage on April 9, 1756, the two months' work referred to in the *Confessions* must have taken place in early 1756. These visits, however, were certainly not his first, for already in the *Encyclopédie* articles of 1749, Rousseau refers to "des manuscrits de musique du quatorzieme siecle qui sont à la bibliothèque du roi" ("fourteenth-century musical manuscripts that are in the Bibliothèque du Roi").⁴⁸

Rousseau's musical researches in the Bibliothèque du Roi must therefore have begun in the late 1740s and were carried on intermittently until 1756. Though it does not seem possible to reconstruct the chronology of his studies in any comprehensive way, a portion of the notes and extracts that Rousseau made do survive amongst his papers in Neuchâtel, and using these documents together with the various citations given in the *Dictionnaire*, it is possible to gain some purchase on the scope of Rousseau's studies (Table 5.1).⁴⁹

Table 5.1. Notes, Extracts and Fragments on Music

⁴⁸ VALEURS DE NOTES, *en Musique*, XVI:818. In the entry LIGATURE, (*Musique*.), Rousseau announces a projected transcription of these manuscripts: "A la traduction de quelques manuscrits de Musique du xiiij. & xiv. Siecle, qu'on se propose de donner bientôt au public, on y joindra un sommaire des anciennes regles de la Musique, pour mettre chacun en état de la déchiffrer par soi-même; c'est là qu'on trouvera suffisamment expliqué tout ce qui regarde les anciennes *ligatures*" (IX:519). See also MOTET, *en Musique*, X:756, and VOIX, *en Musique*, XVII:436.

⁴⁹ The library's *Registres des livres prêtés* are missing for much of that period. See Jean-Pierre le Bouler, "Les Emprunts de Rousseau à la Bibliothèque du Roi," *Annales Jean-Jacques Rousseau* 38 (1969-71): 241-58; and Jean-Pierre le Bouler and Catherine Lafarge, "Les Emprunts de Mme Dupin à la Bibliothèque du Roi dans les années 1748-1750," *Studies on Voltaire and the Eighteenth Century* 182 (1979): 107-85.

ms. R. 66	<p>f. 1r-5r. [partial draft of "Système" (from "voyons maintenant quels sons peuvent être ajouté à ceux de l'échelle diatonique pour la formation des genres chromatique et enharmonique" (OC, V, 1100) to end)]</p> <p>f. 5v. "Exemple de changemens de tons par des modulations subites detournées et inattendues"</p> <p>f. 6r-7v. [fragments]</p> <p>f. 8r-8v. [extracts from Tartini <i>Trattato di musica</i>]</p>
ms. R. 67	<p>f. 1r-4r. "Extraits de Bontempi [<i>Historia musica</i>]"</p> <p>f. 4v-7r. "J. de Muris tractatus de musica theorica et pratica in 7^{em} libros divijus qui inscribitur speculum musica n. 7207" [with 6v blank]</p> <p>f. 7r. [extracts from Gauffurio, <i>Harmonicorum instrumentalis</i>]</p> <p>f. 7v. [blank]</p> <p>f. 8r. "Hieronymus mei; de Musica ad Petrum Victorium"/"Trattato di Musica fatto dal sig.ⁿ Hyeronimo Mei gentilhuomo fiorentino"</p> <p>f. 8r-10v. [continuation of ms. R. 68, extracts a "Dissertation sur les parties de la Musique ancienne," with f. 8v, 9v blank]</p> <p>f. 11r-14r. "Suite de l'extrait de Bontempi"</p> <p>f. 14v. "Vocabulaire de la partie instrumentale pour les anciens"</p> <p>f. 15r-18r. [blank]</p> <p>f. 18v-19r. "Lydii modi nota secundum genus diatonum"</p>
ms. R. 68	<p>f. 1r-5v. "Dissertation sur les parties de la Musique ancienne"</p> <p>f. 6r-6v. [notes and extracts from Tartini <i>Trattato di musica</i>]</p> <p>f. 7r-20r. [early partial draft of "Système" corresponding to OC, V, 1084-1100, with 10r blank]</p> <p>f. 20v. "tempéramment"</p> <p>f. 22r-22v. [fragments]</p>
ms. R. 70	<p>f. 1r-2v. "Musique" [extracts from Pierre Burnette's commentary on the Plutarchan <i>Dialogue sur la musique</i> in the <i>Mémoires de littérature . . . de l'Académie royale des inscriptions et belles-lettres</i> 17 (1751): 61-106]</p>
ms. R. 71	<p>f. 1r-2r. [fragmentary review of an unidentified work on music theory]</p> <p>f. 3r-6v. [autograph of NOTES, <i>en Musique</i> for the <i>Encyclopédie</i>]</p>
ms. R. 72	[69 brief fragments on music]

One fragment preserved at Neuchâtel is particularly helpful in this regard.

Among the various notes and drafts grouped together as ms. R. 71, there appears (as

⁵⁰ The table is from Samuel Baud-Bovy, "Note sur la musique greque antique dans le *Dictionnaire de musique*," in OC, V, 1661-62, supplemented by my own observations.

fragment no. 55) a single scrap of paper containing fourteen numbers in a single column. We know, thanks to Marie-Elisabeth Duchez, that the numbers are shelf-marks identifying fourteen manuscripts that Rousseau consulted, or meant to consult, at the Bibliothèque du Roi.⁵¹ Of the manuscripts listed in Table 5.2, Rousseau made extensive use of the *Speculum musicae* (7207, 7207a) then attributed to Johannis of Muris, which he cites repeatedly in the *Dictionnaire*, and appears also to have consulted Guido's *Micrologus* (7211, 7369, 7461), Gauffurio's *De harmonia musicorum instrumentorum* (7208) and Mei's *Trattato di musica* (7209).⁵² These researches, Duchez convincingly argues, were a part of Rousseau's attempt to trace the origins of polyphony (excepting Mei's *Trattato*).

Table 5.2. Manuscripts listed in ms. R. 72, fr. 55 (after Duchez)⁵³

7207	Codex membranaceus, quo continetur speculum musicae, sive <i>Joannis de Muris</i> tractatus de musica, libris septem. Is codex decimo quarto saeculo videtur exaratus.
7207a	Codex chartaceus, olim Mazarinaeus. Ibi continetur speculum musicae: authore <i>Joanne de Muris</i> .
7208	Codex chartaceus, quo continentur <i>Franchini Gafurii</i> , Laudensis, de harmonia instrumentali libri tres: ad calcem subjicitur authoris vita. Is codex anno 1500. absolutus est.
7209	Codex chartaceus, olim Colbertinus. Ibi continentur: 1.º <i>Hieronymi Mei</i> tractatus de musica, ad Petrum Victorium 2.º <i>Trattato di musica</i> , fatto dal signor <i>Hieronimo Mei</i> , Gentilhuomo Fiorentino. 3.º <i>Del verso Toscano trattato del medesimo Mei</i> . Is codex saeculo decimo sexto videtur exaratus.
7210	Codex membranaceus, olim Colbertinus. Ibi continetur tractatus cujus titulus: liber enchiriadis de musica, sive, theorica musicae: authore anonymo: finis desideratur. Is codex saeculo undecimo videtur exaratus.
+7211	Codex membranaceus, olim Colbertinus. Ibi continentur: 1.º Liber enchiriadis de musica: authore anonymo. 2.º <i>Guidonis Arentini</i> , Monachi, micrologus. 3.º <i>Idem de sex motibus vocum à se invicem, & dimensione earum</i> .

⁵¹ See, on this point, Duchez's foundational article "Jean-Jacques Rousseau historien de la musique," in *La Musique du théorique au politique*, ed. Hugue Dufourt and Joël-Marie Fauquet (Paris: Aux Amateurs des livres, 1991), p. 79.

⁵² Duchez, "Rousseau historien," 79.

⁵³ The descriptions are reproduces from the *Catalogus codicum manuscriptorum bibliothecae regiae* (Paris: Imprimerie Royale, 1744), part 3, vol. 4, 326-27, 347-48, 362, 382.

-
- 4.^o Ejusdem rhythmus.
 5.^o Ejusdem liber de musica.
 6.^o Ejusdem epistola ad Michaëlem.
 7.^o *Odonis* dialogus de musica.
 8.^o Anonymi versus contra pravo Monachos.
 9.^o Anonymi liber de musica & instrumentis musicis: accedunt figurae; initium & finis desiderantur.
 Is codex partim duodecimo, partim decimo tertio saeculo videtur exaratus.
- 7212 Codex membranaceus, olim Colbertinus. Ibi continentur:
 1.^o Liber enchiriadis de musica: authore anonymo; praemittuntur *Honorii*, Papae II. ad Matthaëum, Albanensem Episcopum, litterae pro monasterio Luxonviensi, cum *Matthaei* responso.
 2.^o Ordo modorum, sive tonorum; cum eorumdem proportionibus.
 Is codex duodecimo saeculo videtur exaratus.
- 7369 Codex membranaceus, olim Mazarinaeus. Ibi continentur:
 1.^o *Joannis de Muris* tractatus de musica, in epitomen contractus.
 2.^o Ars cantus mensurabilis, mensurata per modos juris: authore anonymo.
 3.^o *Hothbi*, Anglici, proportiones musicae
 4.^o *Joannis de Muris* musica speculativa.
 5.^o *Odonis*, Abbatis, enchiridion de musica.
 6.^o Micrologus artis musicae: authore *Guidone Aretino*.
 7.^o Anonymi tractatus de musica
 8.^o *Isidori* musica.
 9.^o *Horatii* ars poëtica
 Is codex anno 1471. exaratus est.
- 7370 Codex membranaceus, olim Colbertinus. Ibid continetur anonymi tractatus de musica.
 Is codex saeculo decimo quarto exaratus videtur.
- 7371 Codex chartaceus, olim Colbertinus. Ibi continentur:
 1.^o Anonymi tractatus de musica.
 2.^o Libellus à Magistris theologiae facultatis oblatus concilio Constantiensi, adversus condemnationem novem assertionum Magistri Joannis Petit, factam ab Episcopo Parisiensi.
 3.^o Liber cujus titulus: *Vade mecum*, scriptus à Fratre *Joanne de Rupescissa*, ordinis Minorum, carceri addicto Avenione anno 1353.
 4.^o Quaestio; an Presbyter nocturno somnio pollutus cessare debeat à celebrando missam.
 5.^o Anonymi componendi quadrantem novum.
 6.^o Summa brevis circa confessionem.
 7.^o Paraphrasis orationis Dominicae.
-

-
- 8.° Anonymi tractatus de Inferno.
- 9.° Sancti *Cypriani*, Epsicopi Carthaginensis, liber de unitate Ecclesiae.
- 10.° Excerpta ex libris S. Hildegardis, Prophetissae.
- 11.° Revelationes *Joannis de Petra-seissa*, sive de *Rupescissa*.
- 12.° Prophitia Maguntina.
- 13.° Anonymi commentaries super Ecclesiasten Salomonis.
- 14.° Anonymi sermo factus in conventu Monachorum.
- 15.° Excerpta è commentaries Caesaris, & è Ptolemaei geographia.
- 16.° Notitia civitatum & provinciarum.
- 17.° Declaration de mots qui ne sont point de propre françois, ou qui autrement ont mestier de declaration en la traduction de Titus Livius.
- 18.° *Nicolai Orseme* tractatus de uniformitate & diformitate intentionum.
- 19.° Ejusdem tractatus de proportionibus proportionum, sive, ut nunc louuntur, de proportionibus rationum.
- 20.° Ejusdem ars sermocinandi.
- 21.° Sermo pour le jour de l'assomption de la sainte Vierge.
- 22.° Narratio de his quae Petrus de Alliaco, Cardinalis Cameracensis, egit apud Saonam pro unitate Ecclesiae anno 1407.
- 23.° Anonymi glossae, sive postillae in epistolas Pauli.
- 24.° Anonymi postillae in Canticum canticorum.
- Is codex decimo quinto saeculo videtur exaratus.
- 7372 Codex chartaceus, olim Colbertinus. Ibi continetur anonymi tractatus de musica.
- Is codex decimo quinto saeculo videtur exaratus.
- 7659<61> Codex chartaceus, olim Mazarinaeus. Ibi continentur:
- 1.° *Sextus Pompeius Festus* de verborum significatione.
- 2.° Fratris *Bonaventurae* oratio, in adventu Ferdinandi Regis anno 1475. habita.
- 3.° Anonymus de Romanorum Magistratibus.
- 4.° *Isidori* differentiarum fragmentum.
- Is codex decimo quinto saeculo exaratus videtur.
- 7461 Codex membranaceus, olim Colbertinus. Ibi continentur:
- 1.° *Guidonis Arentini* micrologus, sive libri duo de musica.
- 2.° Ejusdem epistola de musica, ad Michaëlem Pomposianum, Monachum.
- 3.° Anonymi Carmen de mensuris & ponderibus.
- 4.° Interrogata & responsa de musica.
- Is codex decimo tertio saeculo videtur exaratus.
- 7462 Codex chartaceus, olim Colbertinus. Ibi continetur *Francisci Maurolyci* theoriae musices fragmentum: insertae sunt nonnullae ejusdem epistolae.
-

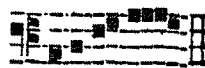
Of course, Rousseau also relied upon various print sources. For instance, his deflating contention that harmony first arose from accidental consonances struck by choirs having difficulty keeping time probably stems from an imaginative reading of a passage in Lebeuf's *Traité historique et pratique sur le chant ecclésiastique* (1741):

Or qu'étoit-ce qu'organiser le Chant?
C'étoit y insérer de tems en tems des
accords à la tierce. Dans l'*organum* tout
simple qui s'exécutoit par deux Chantres,
l'un disoit par exemple:



Alle-luia.

& l'autre difoit
en même tems:



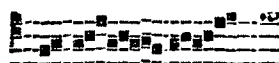
Alleluia.

[while the other sang:]

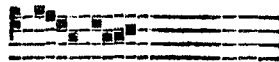
Il est besoin de donner un exemple d'un
Répons-Graduel en entier. Voici l'*Alleluia*
du Dimache de *Quasimodo* de l'ancien
Graduel.

It is necessary to give an example of a
Response-Gradual in its entirety. Here is
the Alleluia for the Sunday of Quasimodo
from the old gradual.

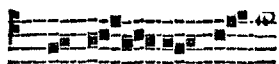
Partie d'un Chantre.



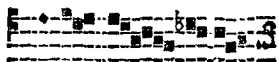
Alle- lu-



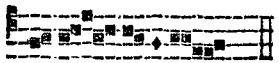
ia.



ψ. Surre - xit Do-



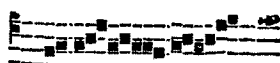
minus ve - re,



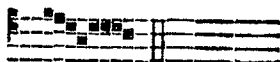
& ap - pa-ruit

Chorus
Petro.

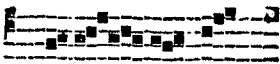
Partie d'un autre Chantre.



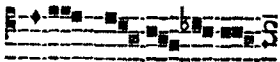
Alle - lu-



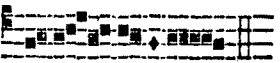
ia.



ψ. Surre - xit Do-



minus ve - re,



& ap - paruit

Chorus
Petro.

Il est visible que deux Chantres
Bassecontres chantans en même tems ces
deux parties, qui sont un peu différentes sur
les dernières syllabes des mots *Alleluia*,
Dominus, *verè*, *apparuit*, il résultera de ces
différences un accord à la tierce. C'est ce

It is evident that with two *bassecontres*
singing these two parts, which are slightly
different on the last syllables of the words
Alleluia, *Dominus*, *vere*, *apparuit*, at the
same time, thirds will result from these
differences. This is what was called

que dans le douzième siècle & les précédens, on appella *Organum*.⁵⁴

organum in the twelfth and preceding centuries.

The idea subsequently made it into Rousseau's entry "Organiser," already quoted in part above:

ORGANISER le Chant, v. a.: C'étoit, dans le commencement de l'invention du Contrepoint, insérer quelques Tierces dans une suite de Plain-Chant à l'unison: de sorte, par exemple, qu'une partie du Choeur chantant ces quatre Notes *ut re si ut*, l'autre partie chantoit en même tems ces quatre-ci, *ut re re ut*. Il paroît par les exemples cités par l'Abbé le Beuf et par d'autres, que l'*Organisation* ne se pratiquoit guère que sur la Note sensible à l'approche de la finale; d'où il suit qu'on n'*organisait* presque jamais que par une Tierce mineure. (OC, V, 965)

ORGANISER le Chant, verb [a ?], was, in the stages of the invention of polyphony, to insert certain thirds in a succession of unison plainchant: so that, for example, one part of the choir sang these four notes, C D B C, while the other sang these four, C D D C. It seems from the examples given by the abbé Lebeuf and some others, that *Organisation* was practiced only on the leading tone when it approached the final, from which it follows that the interval involved was almost always a minor third.

It is easy enough to imagine such a practice having first arisen through faulty ensemble. As for parallel singing in fourths or fifths, as described in the entries "Quarter" and "Quinter," Rousseau had descriptions of parallel organum in both Guido's *Micrologus* and the *Speculum musicae*. The latter text seems also to have driven home the point that the invention of counterpoint would necessitate a new, purely musical meter. As Rousseau notes amid his extracts from that text: "il témoigne que la mesure n'a été introduite que pour l'accord des parties" ("he says that meter was introduced to coordinate the parts," ms. R. 67, f. 4v).⁵⁵

From these beginnings, as the *Essai sur l'origine des langues* puts it, "l'harmonie prit insensiblement la route qui lui prescrit l'analyse." The initial, accidental discovery of simultaneous consonances provided the seed from which harmony sprang. Rousseau does not claim to have been able to chart each stage in the course of its development ("J'ignore combine de siècles les musiciens tournèrent autour des vaines questions que l'effet connu d'une principe ignoré leur fit agiter"). But as examples of these *vaines questions*, Rousseau cites the discussion of the harmonic versus arithmetic division of the

⁵⁴ Jean Lebeuf, *Traité historique et pratique sur le chant ecclésiastique* (Paris, 1741), 76-78; Duchez, "Rousseau historien," 74.

⁵⁵ Duchez, "Rousseau historien," 83-87.

octave in the *Speculum musicae* and Bontempi's *Historia musica*. While I have not been able to locate the passage from Bontempi that Rousseau refers to here,⁵⁶ his discussion makes it clear that the general reference is to the *regola dell'ottava* given in various forms by seventeenth-century Italian thorough-bass theorists and introduced into France by François Campion.⁵⁷ The *regola*, to recall, was rule-of-thumb for accompanying from unfigured basses that stipulated, in its early forms, that a $\frac{5}{3}$ chord should be assumed except *sopra mi* (i.e. above the third or seventh scale degree, both solmized as *mi* in the Guidonian system) where a $\frac{6}{3}$ chord should be played instead. Rousseau apparently inferred from such descriptions that the music they were meant to cover must have been exclusively triadic. Consider, for instance, the following passage from the entry

“Accompagnement”:

Comme l'ancienne Musique n'étoit pas si composée que la nôtre, ni pour le Chant, ni pour l'Harmonie, et qu'il n'y avoit gueres d'autres Basse que la fondamentale, tout l'*Accompagnement* ne consistoit qu'en une suite d'Accords parfaits, dans lesquels l'Accompagnateur substituoit de tems en tems quelque Sixte à la Quinte, selon que l'oreille le conduisoit . . . Aujourd'hui qu'on a varié les Modulations, renversé les Parties, surchargé, peut-être gâté l'Harmonie par des foules de Dissonances, on est contraint de suivre d'autre regles. (OC, V, 619)

Since the old music was not as complex as ours, neither in its melody nor its harmony, and since it had no bass notes that were not fundamentals, its accompaniment consisted solely of successions of triads, in which the accompanist sometimes substituted a sixth for the fifth to the extent that the ear suggested it . . . Today when we vary the progressions, invert the parts, charge and perhaps overburden the harmony by a crowd of dissonances, we must follow other rules.

An almost identical description appears in the entry “System”:

Les Compositeurs du quinzième siècle, excellens Harmonistes pour la plûpart, employoient toute l'Échelle comme Basse-fondamentale d'autant d'Accords parfaits qu'elle avoit de Notes, excepté la Septième, à cause de la Quinte-fausse; et cette Harmonie bien conduite eût fait un fort grand effet, si l'Accord parfait sur la Médiant n'eût été rendu trop dur par ses deux fausses Relations avec l'Accord qui le

Fifteenth-century composers, excellent harmonists for the most part, employed each note of the scale as the fundamental bass of as many triads as there were notes, excepting the seventh because of the diminished fifth, and this harmony, well conducted, would have made a very good effect, if the triad on the mediant were not made too harsh by its two false relations with the chords that precede and follow it.

⁵⁶ Could the reference be to the automatic composition method that Bontempi describes at *Historia musica* (Perugia: Costantini, 1695), 190-97?

⁵⁷ See pp. 121-23 above.

précède et avec celui qui le suit. Pour rendre cette suite d'Accords parfaits aussi pure et douce qu'il est possible, il faut la réduire à cette autre Basse-fondamentale, (Fig. 8) [Ex. 5.9] qui fournit, avec la précédente, une nouvelle source de variétés. (OC, V, 1098)

In order to make this succession of triads as pure and sweet as possible, it is necessary to reduce it to this other fundamental bass (figure 8) [Example 5.9] which offers, with the preceding one, a new source of variety.

In this second instance, Rousseau is closely paraphrasing Tartini's *Trattato*, where the original passage runs as follows:

[I] Compositori del secolo decimoquinto, uomini eccellentissimi nell'arte, usarono per Basso fondamentale la scala seguente costituita quasi tutta di prime basi.

Fifteenth-century composers, men most accomplished in the art, used the following scale, which consists almost entirely of chord roots.



La regola principale di questa scala è l'armonia, o sia l'accompagnamento possibile di terza (o maggiore, o minore), di quinta naturale, et di ottava in qualunque nota della scala.

The principle rule of this scale is harmonization, or accompaniment, of each note by the third (whether major or minor), the perfect fifth, and the octave.

L'ottava acuta vi s'intende

The upper octave is shown here:



Resta escluso Bmì, come prima base, perchè la di lui quinta naturale non vi è (vuol dire la quinta, o sia sesquialtera nella sua forma di 3, 2; o come si conta in pratica, composta di tre tuoni, e un semituono); ma in vece ha una quinta diminuita di un semituono, ch'è in ragione di 128, 135[.] (*Trattato*, 107-109)

Only the B-natural is excluded as a root since its fifth is not perfect (I mean the fifth or sesquialtera in its from 3:2, or as one reckons in practice, as composed of three tones and a semitone) but instead is diminished by a 128:135 semitone.

Ex. 5.11. *Dictionnaire de musique*, Pl. K, fig. 8



These, more or less, are the "facts" undergirding Rousseau's account of the origin and development of harmony. Undoubtedly, they fall well short of what a modern historian would consider adequate documentary evidence, though Rousseau might

perhaps be allowed some latitude insofar as he was writing before Burney, Hawkins and Forkel. But what is significant about Rousseau's music-historical research is the fact that he felt compelled to undertake it at all. Condillac and Diderot, by way of comparison, seem to have felt no analogous compunction. For them, Rameau's system—as the *vrai système de l'harmonie*—fixed in advance the course that music's history must, in principle, have followed. That Rousseau thought otherwise bespeaks a very different conception both of harmony and of history.

In “Du Principe de la mélodie,” Rousseau claimed not only that the narrative he presented was confirmed by the factual record but also that the whole complex—the facts and the narrative drawn from them—served as a refutation of Rameau's system.⁵⁸ Rousseau never fully elaborates the terms of this opposition. But its details can, I think, be extrapolated from what he does say. The issue hinges on the kind of thing that harmony is. Rameau's account takes harmony as a natural phenomenon. Harmony is therefore amenable to the same techniques of study that might be applied to any other object in the natural world. Rousseau counters by emphasizing harmony's artificiality and contingency:

Quand on songe que, de tous les peuples de la terre qui tous ont une Musique et un Chant, les Européens sont les seuls qui aient une *Harmonie*, des Accords, et qui trouvent ce mélange agréable; quand on songe que le monde a duré tant de siècles, sans que, de toutes les Nations qui ont cultivé les beaux Arts, aucune ait connu cette *Harmonie*; qu'aucun animal, qu'aucun oiseau, qu'aucun être dans la Nature ne produit d'autre Accord que l'Unisson, ni d'autre Musique que la Mélodie; que les langues orientales, si sonores, si musicales; que les oreilles Grecques, si délicates, si sensibles, exercées avec tant d'Art, n'ont jamais guidé ces peuples voluptueux et passionnés vers notre *Harmonie*; que, sans elle, leur Musique avoit des effets si prodigieux; qu'avec elle la nôtre en a de si foibles; qu'enfin il étoit réservé à des Peuples du

When we imagine that, of all the people in the world, all of whom have music and song, the Europeans are the only ones who have harmony, and chords, and who find that mixture agreeable; when we imagine that the world has persisted through so many centuries without any of the [other] nations that have cultivated the fine arts having known this harmony; that no animal, no bird, no being in nature produces any chord by the unison, any music but melody; that the oriental languages, so sonorous and musical; that the ears of the Greeks, so delicate and sensitive, and exercised with so much art, never guided these voluptuous and passionate peoples towards our harmony; that without it, their music had such prodigious effects; that with it ours has such feeble ones; that finally it was reserved for northern people with hard and

⁵⁸ See above, p. 260.

Nord, dont les organes durs et grossiers sont plus touchés de l'éclat et du bruit des Voix, que de la douceur des accens et de la Mélodie des inflexions, de faire cette grande découverte et de la donner pour principe à toutes les règles de l'Art; quand, dis-je, on fait attention à tout cela, il es bien difficile de ne pas soupçonner que toute notre *Harmonie* n'est qu'une invention Gothique et barbare, dont nous ne nous fussions jamais avisés, si nous eussions été plus sensibles aux véritables beautés de l'Art, et à la Musique vraiment naturelle. (OC, V, 850-51)

inflexible voices touched more by the shouts and noise of voices than by the sweetness of accents and the melody of inflections, to make this great discovery and to give it out as the principle of all the rules of the art; when, I say, one pays attention to all that, it is very difficult not to suspect that all of our harmony is merely a gothic and barbarous invention that we would never have thought of if we had been more sensitive to the true beauties of the art and to truly natural music.

Harmony, that is to say, is unique to European music. The point is not merely that other peoples, whether outside of Europe or belonging to Europe's past, did not practice harmony in the eighteenth-century sense. Diderot, Condillac and even Rameau granted that. The point is rather that the musical systems they cultivated were organized along entirely different principles. And that is an idea whose possibility neither Diderot, nor Condillac, nor Rameau was prepared to countenance. For Rameau, the theory of harmony derived from the *corps sonore* offered a series of norms binding for any musical culture. In Diderot and Condillac's historicizing appropriation of Rameau's system, the structure of his system provides an outline for the historical development of music. The Greeks, for instance, were guided on Diderot and Condillac's account by a kind of unconscious *sentiment* for harmony that shaped their musical systems without their being aware of its operation.

Rousseau had expressed skepticism regarding such universalizing tendencies already in 1749. At one point in the head-article MUSIQUE from the *Encyclopédie*, in a passage later reproduced unaltered in the *Dictionnaire*, Rousseau writes (à propos of the four examples of extra-European music reproduced as Ex. 5.13):

On trouvera dans tous ces morceaux une conformité de modulation avec notre *musique*, qui pourra faire admirer aux uns la bonté & l'universalité de nos règles, & peut-être rendre suspecte à d'autres la fidélité ou l'intelligence de ceux qui ont transmis ces airs. (X:902)

One will find in these pieces a conformity with the modulation of our music that will make some admire the goodness and universality of our rules, and will perhaps make others suspect the fidelity or the intelligence of those who transmitted these airs.

That Rousseau himself belonged to the skeptical camp is no doubt clear enough. Should there be any doubt, the following passage from the *Essai sur l'origine des langues* will serve to dispel it:

Tous les peuples qui ont des instrumens à cordes sont forcés de les accorder par des consonances, mais ceux qui n'en ont pas ont dans leurs chants des inflexions que nous nommons fausses parce qu'elles n'entrent pas dans nôtre système et que nous ne pouvons les noter. C'est ce qu'on a remarqué sur les chants des sauvages de l'Amerique, et c'est ce qu'on aurait dû remarquer aussi sur divers intervalles de la musique des Grecs, si l'on eut étudié cette musique avec moins de prévention pour la nôtre. (OC, V, 423)

All people who have string instruments are forced to tune them by means of the consonances, but those who have none have intervals in their music that we call out of tune because they do not enter into our musical system and because we cannot write them down. This has been noted in the songs of the savages of America, and it would also have been noted in the diverse intervals of Greek music, if that music had been studied with less predisposition for our own.

Ex. 5.13. *Encyclopédie*, Pl III, fig. 4, Pl. IV, fig. 1-3

AIR CHINOIS



AIR PERSAN

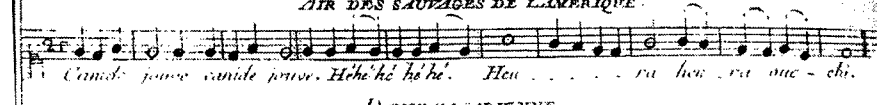


TRADUCTION

Votre tint est vermeil comme la fleur de grenade; Votre parler, un parfum dont je suis l'inséparable ami. Le monde n'a rien de Stable: Tout y passe.

Refrain. Apportez des fleurs de Senteur pour ranimer le cœur de mon Roy.

AIR DES SAUVAGES DE L'AMÉRIQUE



DANSE CANADIENNE



Harmony, therefore, is an idiosyncrasy of recent European music. It arose in the first place from a historical accident: groups of monks, struggling to keep together while singing plainchant, accidentally struck simultaneities that appealed to them. These simultaneities then began to be cultivated, and tonal harmony arose in the way that Rousseau describes. Tonal harmony takes the form it does only as a result of the vicissitudes of its history, of the particular historical accidents that have made it what it is. We would say, in terms foreign to Rousseau but applicable nonetheless to his account, that harmony is historically constituted.

The crucial point is that such an object—a system shaped solely by its own unique historical development—cannot be the object of the Condillacian science that the *Encyclopédie*'s editors originally envisioned. This is the sense in which Rousseau's *historique* leads to conclusions directly contrary to Rameau's system. If, as Rousseau comes to imply, harmony is a historically constituted system dependent for its characteristics only upon the accidents of its own development, then harmony cannot be the object of a Condillacian science with the *corps sonore* or any other acoustical "fact" as its principle. This is so because acoustical facts transcend historical and cultural boundaries. The properties of sounding bodies are for all relevant purposes the same in classical Athens and eighteenth-century France. If these properties are to be the principles from which musical laws are derived, then the resultant laws can be no less universal than the substratum on which they depend. But the norms and regularities governing tonal harmony are geographically and historically circumscribed. Since it is these latter that a theory of harmony must be concerned with, such a theory cannot be drawn solely from acoustical principles. A Condillacian science of harmony such as the *philosophes* imagined on the eve of the *Encyclopédie* is a chimera.

Conclusion

In the late 1740s and early 1750s, Diderot, d'Alembert and Condillac thought that Rameau had discovered the true system of harmony. A system, it will be recalled, is an arrangement of the parts of a given discipline in such a way that the earlier parts account for and explain the later ones. The first parts, those from which all the others are ultimately seen to derive, are the system's principles. The principles of a true system

must be well-attested facts. The particular “fact” that plays this role in Rameau’s system is the resonance of the *corps sonore*. That resonance, for Rameau, encompasses two phenomena: the production of overtones and the sympathetic vibration of certain strings when the fundamental is sounded, including the alleged vibration of strings tuned to the twelfth and seventeenth below the fundamental. First in the *Encyclopédie*, and then more exhaustively in “Du Principe de la mélodie” and the *Dictionnaire de musique*, Rousseau argued that Rameau’s principle could not furnish the musical structures that his required: neither the minor triad, the subdominant, dissonant chords, harmonic progressions, nor, in the end, the major triad, can be consistently derived from the *corps sonore*. In “Du Principe de la mélodie” and in the *Dictionnaire de musique*, Rousseau also attacked Rameau’s account of acoustical resonance: the overtone series contains partials beyond the sixth, and strings tuned below the fundamental do not vibrate sympathetically along their entire length. For these reasons, Rameau’s theory of harmony is not the *vrai système* that the *philosophes* originally took it for. Yet Rameau’s system nonetheless provides a good description of eighteenth-century French harmonic practice. Though Rousseau criticizes certain omissions and inconsistencies, he acknowledges that Rameau’s theory offers an impressive rationalization and systematization of thorough-bass theory. The implication is not, therefore, that Rameau’s practical theory should be dismissed, but merely that its warrant is not to be found in its alleged acoustical moorings. Having rejected Rameau’s “science” of harmony along with Diderot and d’Alembert’s Condillacian appropriation of it, Rousseau was left with the question of what kind of system Rameau’s theory was. Like Diderot and d’Alembert, he sometimes suggested that Rameau had advanced a *système abstrait*, a web of errors and confusions stitched together by analogical, symbolic thinking. In other places, he presented Rameau’s theory as a *système hypothétique*—not itself a science of harmony, but a valuable first step towards such a science. That construal of Rameau’s achievement implies that the way forward in music theory is to continue Rameau’s enterprise while abandoning some or perhaps all of its particular realization in Rameau’s writings. In that light, Tartini’s system, with its introduction of difference tones and higher partials as acoustical principles, seemed to suggest a means of further progress. But Rousseau also responded to the failure of Rameau’s system in a way that neither d’Alembert nor Diderot

envisioned. In emphasizing the contingency and particularity of tonal harmony, Rousseau sometimes began to suggest that no science of harmony was possible at all. This is so because harmony is an idiosyncrasy of recent European musical practice. Harmony cannot, therefore, have any universal foundation, for it is a local, not universal phenomenon. It follows that to explain harmony must be to search out, in the historical record, the particular developments that have made it what it is. In the research he conducted in the Bibliothèque du Roi in the 1750s, research that received its fullest expression in "Du Principe de la mélodie" and the historical articles of the *Dictionnaire de musique*, Rousseau attempted to do just that. Though he cannot be said to have explicitly defended the conception of tonal harmony as a historically constituted system and though that conception cannot be reconciled with his apparent enthusiasm for Tartini's *Trattato di musica*, that conception nonetheless constitutes Rousseau's most significant legacy to music theory.

Epilogue:

Rousseau and Fétis

In the first chapter of his *Untersuchungen über die Entstehung der harmonischen Tonalität* (1966), Carl Dahlhaus casts Fétis and Riemann as the archetypal embodiments of two diametrically opposed attitudes towards tonality:

Der Begriff der Tonalität wurde 1844 von François-Joseph Fétis, der den Terminus “tonalité” prägte, als “collection des rapports nécessaires, successifs ou simultanés, des sons de la gamme” definiert. Aus der Verschiedenheit geschichtlicher und ethnischer Voraussetzungen resultiere eine Vielfalt tonaler Typen (“types de tonalités”). Allerdings beschränkte sich die Theorie, die Fétis entwickelte, auf die “tonalité moderne.”

Im Gegensatz zu Fétis war Hugo Riemann überzeugt, daß die “types de tonalités” auf ein einziges “natürliches System,” das der Akkordfunktionen Tonika, Dominante und Subdominante, reduzierbar seien. Die Auffassung der Töne als Repräsentanten der Tonika, Dominante oder Subdominante sollte als von Natur gegebene Norm des musikalischen Hörens gelten.¹

“Tonality” was defined in 1844 by François Joseph Fétis, who coined the term, as the “collection of necessary relationships, whether successive or simultaneous, between the sounds of the scale.” From cultural and ethnic differences, a variety of types of tonality result. The theory that Fétis developed is however confined to “modern tonality.”

In opposition to Fétis, Hugo Riemann was convinced that all types of tonality could be reduced to a single “natural system”—that of the tonic, dominant and subdominant chord-functions. The interpretation of pitches as representing the tonic, dominant, or subdominant should count as a naturally given norm of musical hearing.

On the one side, Riemann the universalist; on the other, Fétis the relativist. For Riemann, tonality emerges from the dynamic interplay of harmonic functions, and the logic of that interplay is the hidden law that governs all music. For Fétis, tonality inheres primarily in the scale, in the collection of relationships that obtain between its constituent pitches; because different cultures and epochs employ different and incompatible scales, it follows that tonality has been actualized in diverse and incompatible ways. The gap between Riemann and Fétis is therefore the chasm “zwischen ‘natürlicher’ und

¹ Carl Dahlhaus, *Gesammelte Schriften*, ed. Hermann Danuser (Laaber: Laaber Verlag, 2001), vol. 3, 11. In fact, Fétis took the term from his contemporary Alexandre Choron.

‘geschichtlich-ethnischer’ Begründung der Tonalität . . . zwischen dem Anspruch auf umfassende und der Beschränkung auf eine begrenzte Geltung der Theorie” (“between a natural and an ethno-cultural grounding of tonality . . . between theory’s claim to all-encompassing sphere of application and the restriction to a limited sphere.”)²

Thanks to the influence of Dahlhaus’ *Untersuchungen*, Fétis has come widely to be regarded as the first “historicist” amongst music theorists—the first theorist to claim that the tonal system is but one system among others and that the theory of tonal harmony consequently stipulates not universal laws but local norms. Dahlhaus’ characterization of Fétis can, of course, be disputed. Fétis himself calls *tonalité* “[un] principe . . . purement métaphysique,” and Dahlhaus’ gloss of “metaphysical” as “anthropological” (“unter ‘Metaphysik’ versteht Fétis Anthropologie”) is at least open to question.³ Rosalie Schellhous has argued for instance that Fétis’ *principe métaphysique* is modeled loosely on Kant’s “pure concepts of the understanding” (*reine Verstandsbegriffe*).⁴ Certainly, *tonalité* bears a general resemblance to a Kantian category—or better, a pure intuition (*reine Anschauung*)—in that the relationships between scale degrees that constitute it are not properties of the sounds themselves but are instead contributed by the auditor. The relationships that constitute *tonalité moderne*, for instance, are not properties that inhere in sounds prior to their interpretation by a listener, but are instead introduced by that listener into the perception of those sounds.

Kant’s pure concepts and pure intuitions, however, as conditions of possible experience, are clearly meant to apply to any object perceived or known by any knower. If Fétis’ *tonalité* were really intended in the Kantian sense that Schellhous imputes to it, it would follow that “tonality . . . remains invariant and universal, true for all people and for all time.”⁵ Fétis, however, says that *tonalité* is “une consequence de notre conformation et de notre éducation.”⁶ Thus, perception of tonal relationships has in part a physiological foundation (*notre conformation*) and in part a cultural one (*notre*

² *ibid.*, 18.

³ François-Joseph Fétis, *Traité complet de la théorie et de la pratique de l’harmonie*, 9th ed. (Paris: G. Brandus & S. Dufour, 1867), 249; Dahlhaus, *Untersuchungen*, 14.

⁴ Rosalie Schellhous, “Fétis’s *Tonality* as a Metaphysical Principle: Hypothesis for a New Science,” *Music Theory Spectrum* 13 (1991): 225-30.

⁵ As Brian Hyer infers in his article “Tonality,” in *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (Cambridge: Cambridge University Press, 2002), 747.

⁶ Fétis, *Traité complet*, 249.

éducation). The implication is that *tonalité* takes different forms at different times, and that implication is consistent both with Fétis' explicit pronouncements and with the history of *tonalité* that he sketches in the *Esquisse de l'histoire de l'harmonie*.⁷

Fétis famously distinguishes four types of *tonalité* in the *Esquisse*: the *ordre unitonique*, *ordre transitonique*, *ordre pluritonique*, and *ordre omnitonique*. The first, which Fétis also calls *la tonalité du plain-chant*, is operative from the earliest medieval sources through to Palestrina. Its basic scales are the church modes, and the expressive resources latent in those modes reach their highest actualization in the music of the high Renaissance. The transition from the *ordre unitonique* to the *ordre pluritonique* was effected by Monteverdi. The harmonic vocabulary of Palestrina's era had consisted solely of triads and $\frac{6}{3}$ chords both of which may be enlivened by suspensions.⁸ Monteverdi introduced the dominant seventh chord as an autonomous harmonic sonority, and as a result the major-minor system replaced the old church modes. For the first time, it became possible to modulate between scales by exploiting the dominant seventh chord, and in particular the "appellative consonance" between its leading tone and seventh.⁹ Not content with these means alone, however, composers began to introduce new chords by means of "alteration." The most significant of these chords was the augmented-sixth chord, which arose from the $\frac{6}{3}$ chord on the minor submediant. By raising, for example, the D \flat in the $\frac{6}{3}$ chord F-A-D to D \sharp , composers introduced a new appellative consonance between tonic and the raised fourth of the minor scale. Since, moreover, that tritone could be enharmonically reinterpreted to form part of the dominant seventh chord of another key (i.e. A-D \sharp in A minor, reinterpreted as A-E \flat belongs in the dominant seventh chord F-A-C-E \flat of B \flat), composers now had a means of moving rapidly between distantly related keys. In this way, the *ordre pluritonique* gave way to the *ordre*

⁷ For instance: "Mais quoi! n'avons-nous pas la preuve que la tonalité n'a pas été la même partout et dans tous les temps? Ne savons-nous pas qu'aujourd'hui même elle n'est pas identique chez tous les peuples, et qu'en Europe elle se formule d'une manière très différente dans les chants de l'église et dans ceux de la scène?" (*Traité complet*, xi). One way to resolve the apparent tension might be to claim that *tonalité* is universal in the sense that any auditor perceives *some* set of relationships between the pitches of *some* scale, but that what these relationships are and in what scale they inhere is historically and culturally variable.

⁸ *Revue et Gazette musicale* 7 (1840), no. 20, 158.

⁹ *ibid.*, 190-91.

transitonique, a development that Fétis associates primarily with the music of Mozart.¹⁰ Finally, in the wake of Mozart, composers such as Beethoven, Cherubini, Weber, and Rossini introduced new combinations resulting from additional substitutions and suspensions. The result was the *ordre omnitonique* in which any note, given the right harmonic setting, could open the way to another key.¹¹

It is clear from Fétis' historical schema, that *tonalité* can manifest itself in at least two fundamentally different ways: in the *tonalité ancienne* typified by the *ordre unitonique* or in the *tonalité moderne* exemplified in the *ordres pluritonique, transitonique, and omnitonique*.¹² In this sense, Fétis can rightly be called a historicist. The precise character of his historicism, however, is more difficult to pin down. In a recent article, Thomas Christensen casts Fétis' history of harmony as an exercise in Hegelian, or perhaps pseudo-Hegelian, dialectic.¹³ On Christensen's reading, Fétis' *tonalité* is a kind of music-theoretical analog to Hegel's *Weltgeist*: a gradually self-actualizing ideal whose development can be traced across the course of music history and which reaches its highest expression on the music of Fétis' immediate precursors. Fétis himself, however, insisted that "l'art ne progresse pas, mais qu'il se transforme" ("the art [of music] does not progress, but is transformed").¹⁴ Like most, that slogan requires some contextualization: Fétis clearly does imply in the *Esquisse* that Palestrina's music, say, is superior to medieval organum because it more exhaustively exploits the expressive possibilities inherent in the church modes, but he does not claim that Monteverdi's music, or Mozart's, is better than Palestrina's; there is progress, that is to say, within a particular *tonalité* but not from one *tonalité* to another. I am inclined to think, therefore, that Fétis' historical schema does not really carry the implication of inexorable progress that Christensen's Hegelian interpretation implies. This suggestion is consistent, moreover, with one of its most notable features. In contrast to Hegel's account of world

¹⁰ *ibid.*, 7 (1840), no. 75, 633.

¹¹ *ibid.*, 634.

¹² The difference between these two *tonalités* lies in the differing relationships obtaining between the notes of their respective scales: "Pour moi, je dirai que la tonalité reside dans l'ordre où sont places les sons de la gamme dans leurs distances respectives et dans leurs relations harmoniques. La composition des accords, les circonstances qui les modifient, et les lois de leurs succession sont les resultants necessaries de cette tonalité" (*Revue et Gazette musicale* 7 [1840], no. 77, p. 653).

¹³ Thomas Christensen, "Fétis and Emerging Tonal Consciousness," in *Music Theory in the Age of Romanticism*, ed. Ian Bent (Cambridge: Cambridge University Press, 1996), 37-56, esp. 49-53.

¹⁴ *Bulletin de l'Académie Royale de Belgique* 13/2, 242.

history, which is not noted for its mustering of documentary evidence, Fétis' *Esquisse* is remarkable precisely for its attention to archival sources. (Indeed, it is that attention to documentary support—more typical, perhaps, of Comte's positivism—that arguably comprises Fétis' most enduring legacy to musicology.) Yet if Fétis' history were really concerned to narrate the inexorable unfolding of *tonalité* according to determinate, rationally accessible, laws, then such archival fastidiousness would have been essentially superfluous.

Beyond these general considerations, I cannot illuminate the character of Fétis' historicism with any great precision here. That work, it seems to me, remains to be done. In bringing this study to its end, I wish simply to point out a certain family resemblance between Fétis' history of harmony and Rousseau's. That resemblance quite obviously does not lie in the details or even in the general contours of their respective narratives. It lies instead in the conception of harmony that both their narratives presuppose. For both Rousseau and Fétis believed that musical systems differed fundamentally across time and place; they believed that the musical systems of different cultures, or of different epochs within the same culture, were fundamentally incompatible. In contrast to Rameau or Riemann, they postulated no underlying laws applicable to all musical cultures. Instead, they saw different musical cultures as distinct traditions demanding to be understood on their own terms. From these convictions, a number of corollaries follow. The first is that tonal harmony, with all its attendant structures, is unique to a particular musical culture that flourished at a particular time and place. As a result, the theory of tonal harmony “n'est autre chose que l'exposé systématique de l'art” (“is nothing but the systematic exposition of the art”).¹⁵ To explain tonal harmony must therefore be to inquire into the historical developments that have shaped it. Since no intrinsic logic governs those developments, and there is thus no rationally accessible template according to which music must have developed, the only possible procedure is to search out their traces in the documentary record that remains. Fétis did this in his *Esquisse de l'histoire de l'harmonie*, and Rousseau did it also in “Du Principe de la mélodie” and the historical articles of his *Dictionnaire de musique*. For this endeavour, and for the critical engagement with *ramiste* theory that arguably led him to it, Rousseau deserves a place in

¹⁵ *Traité complet*, 251.

the history of music theory, both as an early and insightful critic of Rameau and as a precursor to Fétis.

Bibliographical Essay

In my introduction, I claimed that the neglect Rousseau's musical writings have suffered among historians of music theory is due in part to their reception amongst musicologists and students of Rousseau. This essay is intended as an overview of that reception.

As a rule, musicologists have concentrated on the public exchange encapsulated in Rousseau's *Lettre sur la musique française* (1753) and Rameau's *Observations sur notre instinct pour la musique* (1754). Discussion of these texts typically arises in the course of a general survey of the *Querelle des Bouffons*, itself usually approached as part of the larger history of opera in eighteenth-century France.¹ The critical and historical interpretation of the *Querelle* has been an equally long-standing musicological enterprise. Among the earliest and most influential treatments of the *Querelle* is Eugen Hirschberg's foundational 1903 study *Die Encyclopädisten und die Französische Oper im 18. Jahrhundert*.² For Hirschberg, Gluck's arrival at the Opéra is the climax towards which the entire development of eighteenth-century French opera tends. The significance of the *Querelle*, in Hirschberg's figural reading, lies in the extent to which the *philosophes* prepared the way for Gluck:³

¹ The first attempt to assert bibliographical control over the pamphlets comprising the *Querelle* appeared in the supplement (1881) to Fétis' *Biographie universelle*, in Ernest Thoinan's entry on Rousseau. See *Biographie universelle des musiciens et bibliographie générale de la musique: supplément et complément*, ed. Arthur Pougin (Paris: Firmin-Didot et Cie, 1881), vol. 2, 449-54 (s.v. "Rousseau, Jean-Jacques"). Thoinan's bibliography was subsequently eclipsed by Louisette Reichenburg's *Contribution à l'histoire de la Querelle des Bouffons* (1937), a text in turn superseded by Denise Launay's three volume facsimile edition (1973) of the texts. See Louisette Reichenburg, *Contribution à l'histoire de la "Querelle des Bouffons"* (Philadelphia: n.p., 1937); *La Querelle des Bouffons: texte des pamphlets*, ed. Denise Launay, 3 vols. (Geneva: Minkoff, 1973).

² Eugen Hirschberg, *Die Encyclopädisten und die Französische Oper im 18. Jahrhundert* (Leipzig: Breitkopf & Härtel, 1903). Among early accounts of the *Querelle*, see also Jules Carlez "Grimm et la musique de son temps," *Mémoires de l'Académie nationale des sciences, arts et belles-lettres de Caen* (1872): 199-237. Adolphe Julien, *La Musique et les philosophes au dix-huitième siècle* (Paris: J. Baur, 1873).

³ Hirschberg's study is the foundation for Roman Rolland's famous insistence that "la révolution de Gluck . . . ne fut pas l'oeuvre du seul génie de Gluck, mais de tout un siècle de pensée. Elle était préparée, annoncée, attendue depuis vingt ans par les Encyclopédistes" (*Musiciens d'autrefois* [Paris: Hachette, n.d.], 207).

Um das Jahr 1752 entbrannte nun auf dem Gebiete der Musik dieser Gegensatz zu einem heftigen Kampfe der nationalen Eifersucht zwischen der französischen und italienischen Oper, der sogenannte Buffonisten-Streit und 24 Jahre später der Streit zwischen den Piccinnisten und Gluckisten, welcher mit dem Siege der letzteren endete.

Es wird die Aufgabe dieser Arbeit sein, nachzuweisen, wie weit dieser Sieg durch Schriftsteller der großen französischen Encyclopädie vorbereitet und begründet war.⁴

In the year 1752, this opposition ignited in the sphere of music into a violent struggle of national jealousies between French and Italian opera, the so-called Buffoon war, and 24 years later the conflict between the *piccinnistes* and *gluckistes*, which ended with the victory of the latter.

It will be the task of this work to show to what extent this victory was justified and prepared by the writers of the great French *Encyclopédie*.

Seen against this background, Rousseau appears as "die einflußreichsten Verfechter der italienischen Musik und Tadler der Rameau'schen Musikdramen" ("the most influential advocate of Italian music and critic of Rameau's music dramas").⁵ Accordingly, Hirschberg devotes the bulk of his chapter on Rousseau's musical writings to the *Lettre sur la musique française*.

The idea that the core of Rousseau's musical thought is to be found in the *Lettre sur la musique française* has since become a commonplace amongst musicologists. It receives forceful expression, for instance, in Paul Henry Lang's *Music in Western Civilization*:

Everything served to speed [Rousseau] on his course: his insufficiency in the technical aspects of music, his complacency as a self-taught musician, his acute personal antagonism toward Rameau, and also his sincere desire for reform. This explains the tone of his famous *Lettre sur la Musique Française* . . . The publication of this pamphlet (November, 1753) represents a decisive point both in the history of opera and in Rousseau's musical life; it is his capital manifesto concerning the sense, means of realization, and the future of the art of music. His other musical

⁴ Eugen Hirschberg, *Die Encyclopädisten*, vi-vii. Cf. Reichenburg: "la querelle des 'Bouffons' . . . ne fut en vérité que le prélude de celle, plus importante, des Gluckistes et des Piccinnistes en 1774" (*Contribution*, 9).

⁵ Hirschberg, *Die Encyclopädisten*, 13. Hirschberg's chapter on Rousseau occupies pp. 66-82. While it is true that Hirschberg gives some attention to the *Lettre à Grimm*, the *Essai sur l'origine des langues* and isolated articles from the *Dictionnaire de musique*, he mines these texts primarily for parallel passages glossing positions enunciated in the *Lettre sur la musique française*.

writings, however numerous and bulky, have only secondary importance.⁶

Which of Rousseau's writings have capital, and which secondary, importance, however, obviously depends upon the interpreter's perspective. That perspective, in turn, is defined by the particular scholarly program being brought to bear on the material. Musicologists writing about Rousseau, Rameau, and the *Querelle* have typically been interested in the history of eighteenth-century French opera. By general musicological consensus, the central drama in that history is the slow incursion of Italian music into France along with its attendant literary skirmishes. As Lionel de la Laurencie put it in his 1923 survey "La musique française de Lulli à Gluck (1687-1789)": "D'un façon générale, on peut dire que, durant le XVIII^e siècle, l'esthétique française et l'esthétique italienne ne cessèrent de se combattre" ("In general, it can be said that the French and Italian aesthetics confronted one another unceasingly across the eighteenth century").

[M]ais la lutte ne fut pas continue; elle prodéca par crises successives, dont la première remonte aux polémiques de l'abbé Ragueneau et de Lecerf, dont la seconde caractérise l'état d'esprit des Lullistes, qui traitent Rameau d'italien, dont la troisième éclate à propos des *Bouffons*, et dont la quatrième s'est appelée *Guerre des Gluckistes et des Piccinistes*.⁷

But the struggle was not continuous. It preceded by successive crises, the first of which was the polemic between the abbé Ragueneau and Le Cerf, the second characterizing the state of mind of the *lullistes*, who treated Rameau as Italian; the third broke out because of the *Bouffons*, and the fourth is known as the war of the *gluckistes* and *piccinistes*.

Seen against this backdrop, the dispute between Rameau and Rousseau appears as yet another episode in the seemingly endemic quarrel between the *goût français* and *goût italien*. The effect of this scholarly fixation has been to direct musicologists' attention towards the *Lettre sur la musique française*, where the

⁶ Paul Henry Lang, *Music in Western Civilization* (New York: Norton, 1941), 548.

⁷ Lionel de la Laurencie, "La musique française de Lulli à Gluck (1687-1789)," in *Encyclopédie de la musique et dictionnaire du conservatoire*, ed. Albert Lavignac and Lionel de la Laurencie (Paris: Delagrave, 1923), vol. 2, 1393.

quarrel over operatic traditions is paramount, and away from Rousseau's other musical writings, where other concerns predominate.⁸

A similar phenomenon appears in the scholarly literature on Rousseau. Despite the appearance of Albert Jansen's foundational study *Jean-Jacques Rousseau als Musiker* in 1884, Rousseau *musicien* attracted little mainstream attention until the 1970s.⁹ The primary catalyst for this shift was the publication of Jacques Derrida's *De la grammatologie* (1967). For a variety of reasons, Derrida devoted almost half of his book to the *Essai sur l'origine des langues*, a text that had previously been relegated to the margins of Rousseau's *oeuvre*. Since Chapters 13 through 19 of the *Essai* deal directly or tangentially with Rameau's theory of harmony, Derrida gives significant attention to the dispute between Rousseau and Rameau.¹⁰ The terms in which he casts that dispute, moreover, have defined the horizon within which most subsequent interpretation of the exchange has been content to move.

Unsurprisingly, Derrida reads Rousseau's quarrel with Rameau under the auspices of the general "logic of supplementarity" (*logique de la supplémentation*) that he finds expressed throughout Rousseau's writings. *Supplément*, as Derrida was the first commentator to emphasize, is a recurring word in Rousseau: writing supplements speech; masturbation supplements sex; industry supplements pastoral idyll; the nurse supplements the mother, and so on.¹¹ Most crucially for present purposes, harmony supplements melody.

The word *supplément*, however, is significantly bivalent:

<p>Car le concept de supplément . . . abrite en lui deux significations dont la cohabitation est aussi étrange que nécessaire. Le supplément s'ajoute, il est un surplus, une plénitude enrichissant une autre plénitude, le comble de la présence. C'est ainsi que</p>	<p>The concept of the supplement . . . harbours two significations whose cohabitation is as strange as it is necessary. The supplement adds itself; it is a surplus, a plenitude enriching another plenitude, the very summit of presence. It is thus that art, <i>technē</i>, the</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

⁸ Despite the wide variety of approaches to the *Querelle* sketched in the more recent musicological literature, this basic understanding of the polemic between Rameau and Rousseau has remained essentially unchanged. See, e.g., the essays collected in Andrea Fabiano, ed., *La Querelle des Bouffons dans la vie culturelle française du XVIII^e siècle* (Paris: CNRS, 2005).

⁹ Albert Jansen, *Jean-Jacques Rousseau als Musiker* (Berlin: Reimer, 1884).

¹⁰ Jacques Derrida, *De la grammatologie* (Paris: Éditions de Minuit, 1967), 298-309.

¹¹ The examples are Derrida's; see *Grammatologie*, 207-18.

l'art, la *technè*, l'image, la représentation, la convention, etc., viennent en supplément de la nature et sont riches de toute cette fonction de cumul.

.....

Mais le supplément supplée. Il ne s'ajoute que pour remplacer. Il intervient ou s'insinue *à-la-place-de*; s'il comble, c'est comme on comble un vide. S'il représente et fait image, c'est par le défaut antérieur d'une présence. Suppléant et vicaire, le supplément est un adjoint, une instance subalterne qui *tient-lieu*.¹²

image, representation, convention, etc., come to supplement nature and are the riches of that accumulation.

.....

But the supplement supplants. It adds itself only to replace. It intervenes or insinuates itself *in-the-place-of*; if it is the summit, it is the summit of a void. If it represents and is an image, it is thanks to the prior absence of a presence. Supplanting and vicarious, the supplement is an adjunct, a subaltern instance that *takes-place*.

The supplement, that is to say, both augments and usurps; it is both an embellishment and a perversion. What is supplemented, in Derrida's reading of Rousseau, is "nature": the artificial supplements the natural. Yet in so doing, it reveals a fundamental and original "lack." Only because nature is lacking is the supplement required, and what it lacks is what the supplement supplies. Crucial to Derrida's reading, then, is the claim that the *supplément*—in Derrida's portentously Heideggerian locution—is in this sense "always-already" (*toujours-déjà*) present in what it supplements.

Harmony is one such *supplément*: "Selon une logique avec laquelle nous sommes maintenant familiarisés, Rousseau va au devant de ce danger *en opposant la bonne forme à la mauvaise forme*, la forme de vie à la forme de mort, la forme *mélodique* à la forme *harmonique*"; "l'harmonie est le supplément originaire de la mélodie" ("In accordance with a logic that is now familiar, Rousseau goes beyond this danger in opposing a good form to a bad form, the form of life to the form of death, the form of melody to the form of harmony"; "harmony is the original supplement of melody").¹³ Rousseau means to say by such formulations that

¹² *ibid.*, 208.

¹³ *ibid.*, 298, 309.

melody is natural, harmony artificial.¹⁴ What he ends up inadvertently saying is that melody “always-already” involves harmony.

Rousseau préfère croire que la grammaire *aura (it) dû* être comprise, au sens de la confusion, dans la mélodie. Il *aura (it) dû* y avoir plénitude et non manque, présence sans différence. Dès lors le supplément dangereux, la gamme ou l’harmonie, *vient de l’extérieur s’ajouter comme le mal et le manque* à l’heureuse et innocente plénitude.

.....

Qu’est-ce que Rousseau dit sans le dire, voit sans le voir? Que la suppléance a toujours déjà commencé[.]¹⁵

Rousseau prefers to believe that grammar will (would) have had to be contained, in the sense of a confusion, in melody. There will (would) have had to be plenitude and not lack, presence without difference. Afterwards, the dangerous supplement, the scale or harmony, comes from the exterior and adds itself like an evil and a lack to the happy and innocent plenitude.

.....

What does Rousseau say without saying, see without seeing? That supplementation has always already begun.

The crucial tension lies in the gap between what Rousseau means to say and what he ends up saying in spite of himself. Rousseau wants to say that melody is full, complete, natural, self-sufficient. He ends up saying the opposite.

Derrida’s reading of these chapters of the *Essai* can of course be disputed.¹⁶ At issue here, however, is not the intrinsic merit of his interpretation but rather its subsequent influence. To that end, three general features of Derrida’s account require particular emphasis. First, Derrida reconstructs Rousseau’s side of the dispute almost exclusively from the *Essai sur l’origine des langues*.¹⁷ Second, he takes the nature of harmony and melody and the relationship between the two as the primary point at issue between Rousseau and Rameau. Third, he seizes on this particular issue, I would suggest, because of all

¹⁴ Rousseau does not actually say, in the *Essai*, that harmony supplements melody. He says it in the *Lettre sur la musique française* (OC, V, 293), but in the *Lettre*, Rousseau still regards harmony as natural: “L’harmonie ayant son principe dans la nature, est la même pour toutes les Nations” (OC, V, 292).

¹⁵ Derrida, *Grammatologie*, 308.

¹⁶ The weak link is the claim that the original melody was already harmonic, which Derrida draws from the article “Chromatique” in the *Dictionnaire de musique*. But Rousseau distinguishes, in that entry, between the Greek *genre chromatique* and Rameau’s. The passage Derrida cites concerns the latter, not the former.

¹⁷ Derrida cites the entries “Chromatique” and “Harmonie” from the *Dictionnaire de musique*, but uses them to amplify passages from the *Essai*.

the points of dispute between Rousseau and Rameau it is the one that fits most readily into his global interpretation of Rousseau.

Shortly after Derrida's book appeared, two scholars working independently at the Bibliothèque publique et universitaire de Neuchâtel unearthed a previously unnoticed fragment on the origin of melody in an early version of Rousseau's *Examen de deux principes avancés par M. Rameau*. The fragment, comprising f. 8r-17r of a manuscript entitled "Du Principe de la mélodie" (ms. R. 60), was excised from the text before the definitive version of the *Examen* was prepared in 1765 and partly incorporated into the *Essai sur l'origine des langues*, where it forms part of Chapter 18 ("Que le système musical des grecs n'avoit aucun rapport au nôtre") and the whole of Chapter 19 ("Comment la musique a dégénéré"). One effect of the fragment's discovery was to bring an end to the century-long debate over the date of the *Essai*'s composition.¹⁸ Another effect was to link the genesis of the *Essai* firmly to the quarrel with Rameau (since "Du Principe de la mélodie" was drafted in 1755 as a response to Rameau's *Erreurs sur la musique dans l'Encyclopédie*). Both of the scholars responsible for the discovery—Marie-Elisabeth Duchez and Robert Wokler—published transcriptions of the fragment in 1974 together with extended commentary.¹⁹

In her commentary on the fragment, Duchez rightly emphasizes the text's centrality in Rousseau's dispute with Rameau. She does so however, at the expense of the *Encyclopédie* articles, which she wrongly denigrates as "dispersés et sans cohésion" and the *Dictionnaire de musique*, which she misleadingly characterizes as an elaboration of the views and positions espoused in the *Examen*

¹⁸ The debate is summarized in Charles Porset, "L'Inquiétant étrangeté de l'*Essai sur l'origine des langues*: Rousseau et ses exégètes," *Studies on Voltaire and the Eighteenth Century* 154 (1976): 1714-58. See also Robert Wokler, "L'*Essai sur l'origine des langues* en tant que fragment du *Discours sur l'inégalité*: Rousseau et ses 'mauvais' interprètes," in *Rousseau et Voltaire en 1778: actes du colloque international de Nice (juin 1978)* (Geneva: Slatkine, 1978), 145-69.

¹⁹ Marie-Elisabeth Duchez, "'Principe de la mélodie' et *Origine des langues*: un brouillon inédit de Jean-Jacques Rousseau sur l'origine de la mélodie," *Revue de musicologie* 60 (1974): 33-86; Robert Wokler, "Rameau, Rousseau and the *Essai sur l'origine des langues*," *Studies on Voltaire and the Eighteenth Century* 117 (1974): 179-238.

and *Essai*.²⁰ For Duchez, the issues animating the quarrel are precisely the *deux principes* of the *Examen*'s title: (1) Rameau's claim that harmony is the foundation of melody; (2) his claim that the "accompagnement" represents the *corps sonore*.²¹ As Duchez correctly notes, the second claim is the more fundamental, for "c'est parce que l'harmonie représente le corps sonore qu'elle est le fondement de la musique et que la mélodie en dérive" ("it is because harmony represents the sounding body that it is the foundation of music and that melody derives from it.")²² Duchez goes on, however, to dismiss Rousseau's criticism of the second, more fundamental, claim as superficial and maladroit.²³ We are left, therefore, with Rousseau's rebuttal to the first claim, and Duchez accordingly devotes the remainder of her discussion to Rousseau's arguments for the primacy of melody.

As Duchez construes it, the priority that Rousseau assigns to melody is a matter of private predilection. Rousseau's "vive sensibilité mélodique," his "amour du chant," receive vehement expression but little explicit justification in the *Lettre sur la musique française*. In Duchez's view, the fragment on the origin of melody is an exercise in *post hoc* rationalization in which Rousseau applies the historical method—in her view, purely conjectural—of the *Discours sur l'origine de l'inégalité* to defend positions staked out in the *Lettre*: "A l'opposition statique de la langue accentuée, chantante et de la langue articulée, parlante (opposition derrière laquelle se devine celle de la mélodie et de l'harmonie), sentie et exposée

²⁰ "Jusqu'ici ses reproches à la théorie harmonique de Rameau étaient . . . dispersés et sans cohésion; maintenant, il fait le point [et] trouve la théorie cohérente à opposer à celle de son adversaire"; "Le *Dictionnaire de Musique* . . . où il reprend ses articles de l'*Encyclopédie* (1749), mais augmentés et amplifiés dans les sens du développement de sa pensée esthétique, expose les mêmes vues musicales que l'*Examen* et que l'*Essai sur l'origine des langues*" (Duchez, "Principe," 36-37).

²¹ *ibid.*, 37. Rousseau puts the point as follows in the *Examen*: "Je remarque dans les *Erreurs sur la Musique*, deux de ces principes importants. Le premier qui a guidé M. Rameau dans tous ses Ecrits et, qui pis est, dans toute sa Musique, est que l'Harmonie est l'unique fondement de l'Art, que la Mélodie naissent de la seule Harmonie. L'autre principe, nouvellement avancé par M. Rameau, et qu'il me reproche de n'avoir pas ajouté à ma définition de l'Accompagnement est, que cet *Accompagnement représente le corps sonore*" (OC, V, 351).

²² *ibid.*, 37.

²³ "il critique superficiellement et maladroitement, dans la deuxième partie de l'*Examen*, la théorie musicale (critiquable) de la résonance du corps sonore; il en attaque surtout une conséquence pratique immédiate: le remplissage des accords dans l'accompagnement; mais il consacre sa réflexion et son imagination à la défense de la mélodie" (*ibid.*, 37).

dans la *Lettre sur la musique française*, Rousseau applique le procédé de recherche des origines et la vision historique du *Discours* . . . C'est dans sa réflexion sur l'*Origine de la mélodie* que Rousseau trouve la légitimation des choix de sa sensibilité et le bien-fondé de ses intuitions théoriques: il y fonde historiquement sa théorie de la priorité de la mélodie sur sa théorie de l'origine du langage" ("To the static opposition between accentuated, singing language and articulated, speaking language felt and expounded in the *Lettre sur la musique française*—an opposition behind which that between melody and harmony can be divined—Rousseau applies the historical vision and the search for origins of the *Discours* . . . it is in his reflection on the *origin of melody* that Rousseau finds legitimation for the inclinations of his sensibility and the foundation for his theoretical intuitions: here, he founds his theory of the priority of melody historically on his theory of the origin of language").²⁴

If Duchez's reconstruction of Rousseau's position is correct, then it follows that nothing in Rousseau's writings really impinges on Rameau's theory of harmony. The quarrel between Rameau and Rousseau instead represents a clash between two fundamentally different styles of musical thought that admit no real point of intersection:

Disons rapidement que ces deux systèmes d'explications cherchent leur fondement rationnel dans deux ontologies épistémologiquement différentes: celui de Rameau, base sur la théorie de la resonance du corps sonore cherche 'le pourquoi' physico-mathématique; celui de Rousseau, appuyé sur la théorie accentuelle de l'imitation des passions, décrit 'le comment' phénoménologique.²⁵

Let us briefly say that these two systems of explanation find their rational foundation in two epistemologically different ontologies: that of Rameau, based on the theory of the resonance of the sounding body, looks for the physico-mathematical "why"; that of Rousseau, resting on the theory of accent and the imitation of passions, describes the phenomenological "how."

For Duchez, in sum, the dispute simply opposes humanistic understanding (*Verstehen*) and scientific explanation (*Erklärung*). Indeed, Duchez sees Rousseau's musical writings as part of "une réaction quasi-permanente de la

²⁴ *ibid.*, 47-48.

²⁵ *ibid.*, 58

sensibilité” against scientific music theory that she thinks originates with Aristoxenos.²⁶ Duchez’s own sympathies, it is clear, are with scientific music theory, and she ultimately gives the impression that Rousseau’s writings are of interest not for any bearing they might have on Rameau’s ideas but only for what they tell us about Rousseau.²⁷

Like Derrida, on whose discussion she draws extensively, Duchez presents the dispute over harmony and melody as the main point of contention between Rousseau and Rameau. Though she cannot be said to concentrate exclusively on the *Essai*—her article, after all, is an introduction to the digression on the origin of melody in ms. R. 60—she nonetheless approaches the other musical writings exclusively from the perspective of the *Essai*: “Malgré l’ampleur de l’*Essai* et la brièveté de l’*Origine de la mélodie*,” she writes at one point, “les deux oeuvres possèdent le même fond d’idées et le même theme; elles participent au même courant de pensée et usent de la même méthode” (“The length of the *Essai* and the brevity of the *Origine de la mélodie* notwithstanding, the two works possess the same fount of ideas and the same theme; they participate in the same current of thought and employ the same method).”²⁸

Par sa recherche de l’*Origine de la mélodie*, il semble que Jean-Jacques Rousseau ait déterminé de façon définitive ce que nous pouvons appeler sa philosophie musicale, caractérisée par l’importance donnée à l’expression mélodique: toute son oeuvre musicographe ultérieure sera soutenue par ces vues ou les développera.²⁹

In his search for the origin of melody, it seems that Jean-Jacques Rousseau fixes what we could call his musical philosophy once and for all, a philosophy characterized by the importance given to melodic expression: all of his subsequent work on music will be sustained by these views or will develop them.

In the article that introduces his 1974 transcription of the fragment on the origin of melody, Robert Wokler offers a different interpretation of the quarrel

²⁶ *ibid.*, 58. This is an egregious though common misrepresentation of Aristoxenos. Also, Rousseau defends the Pythagoreans and attacks Aristoxenos in the entry “Intervalle” in the *Dictionnaire de musique*.

²⁷ “Cette philosophie de la musique, liée à son temperament, est, nous l’avons déjà dit, une justification rationnelle de ses reactions sentimentales” (*ibid.*, 56). Duchez tries to soften this implication slightly at p. 57.

²⁸ *ibid.*, 40.

²⁹ *ibid.*, 53.

between Rousseau and Rameau. For Wokler, the question of harmony and melody recedes to the background: the fundamental issue is rather the clash between Rameau's naïve universalism and Rousseau's awareness of individual, historical and cultural difference. As one would expect from a student of Isaiah Berlin, Wokler is acutely sensitive to the note of relativism—or at least of pluralism—that can sometimes be heard in Rousseau's writings.³⁰ On Wokler's reading of Rousseau, "the philosophical presuppositions of Rameau's theory were mistaken, since the principle of the *basse fondamentale* was limited rather than universal in its application . . . The laws of harmony . . . were not to be understood as universal principles, but only as conventions which men must have established in a variety of ways at different times."³¹

Unlike Derrida and Duchez, Wokler gives some attention to Rousseau's *Encyclopédie* articles. He recognizes that the articles reveal an intimate acquaintance with Rameau's writings and comments briefly on three of them.³² Still, Wokler presents Rousseau's exposition as essentially orthodox, even laudatory. The departures from Rameau's position that he correctly and perceptively identifies do not concern the "technical innovations" of Rameau's theory but only its "philosophical principles":

[T]he central reason for Rameau's complaints [in the *Erreurs sur la musique dans l'Encyclopédie*] is, I think, quite clear. For while Rousseau had adopted the technical innovations of his theory with enthusiasm, he had not accepted the philosophical principles from which they were derived. He had expressed doubts about the scope and application of Rameau's ideas, and he had disagreed with Rameau's supposition that there must be fixed and constant rules for every form of musical expression.³³

³⁰ On the distinction, see Isaiah Berlin, "Alleged Relativism in Eighteenth-Century European Thought," reprinted in *The Crooked Timbre of Humanity*, ed. Henry Hardy (Princeton: Princeton University Press, 1990), 70-90. That paper qualifies the position that Berlin had previously taken in articles such as "Montesquieu," reprinted in *Against the Current*, ed. Henry Hardy (Princeton: Princeton University Press, 2001), 130-61.

³¹ Wokler, "Rameau, Rousseau," 193-94.

³² *ibid.*, 186-87, 189-91. The articles Wokler discusses are ACCOMPAGNEMENT, *en Musique*; BASSE FONDAMENTALE; and DISSONANCE, *en Musique*.

³³ *ibid.*, 188.

With that step, Wokler makes exactly the same move as Duchez: Rousseau's dispute with Rameau is removed from the level of technical questions of music theory and placed exclusively on the plane of "philosophy." Accordingly, he devotes the remainder of his article to the fragment on the origin of melody and the *Essai sur l'origine des langues*, texts in which "philosophical" issues predominate.³⁴

The idea that the dispute between Rameau and Rousseau is a conflict between distinct, and perhaps incommensurable aesthetic or philosophical orientations receives its fullest elaboration in the work of Catherine Kintzler. In the introduction to her 1979 edition of selections from Rousseau's musical writings, Kintzler details this "choc de deux esthétiques."³⁵ Writing more under the auspices of Foucault than Derrida (and by a kind of world-historical synecdoche), Kintzler sees Rameau as the archetypical embodiment of "l'esthétique classique" and Rousseau as the augur of a new *sensibilité* that heralds the coming of Romanticism:

[O]n ne peut rien comprendre à l'opposition entre Rameau et Rousseau sans opposer deux esthétiques étrangères l'une à l'autre. . . La Querelle des Bouffons, c'est le choc de deux esthétiques, choc double d'un malentendu. Deux esthétiques: d'une part, l'esthétique classique inspirée par Descartes, théorisée par Boileau, défendue ici par Rameau. D'autre part, l'esthétique de la sensibilité inspirée par les 'idées nouvelles' de la philosophie, théorisée par Dubos, Shaftesbury, Diderot et plus tard par

We cannot understand anything about the opposition between Rameau and Rousseau without opposing two mutually incompatible esthetics . . . The *Querelle des Bouffons* is the collision of two esthetics, the double collision of a misunderstanding. Two esthetics: on the one hand, the classical esthetic inspired by Descartes, theorized by Boileau, and defended here by Rameau. On the other hand, the esthetic of sensibility inspired by the "new ideas" of philosophy, theorized by Dubos, Shaftesbury, Diderot, and later by Herder, defended here by Rousseau.

³⁴ Cf. also Maurice Cranston: "Considered as protagonists in a dispute about music, Rousseau and Rameau must appear very unevenly matched; on the one side a universally revered composer and musicologist, over seventy years old, on the other a self-taught amateur and newcomer to the scene. But the truth of the matter is that, in changing the dispute about music into a debate about philosophy, Rousseau moved it to a level where he could prove himself at least Rameau's equal" (*Jean-Jacques: The Early Life and Works of Jean-Jacques Rousseau, 1712-1754* [Chicago: University of Chicago Press, 1991], 280).

³⁵ Catherine Kintzler, "Rameau et Rousseau: le choc de deux esthétiques," in *Jean-Jacques Rousseau: écrits sur la musique* (Paris, 1979), ix-iii.

³⁶ *ibid.*, xii.

Herder, défendue ici par Rousseau.³⁶

The crux of the opposition, in Kintzler's view lies in the conflict between two distinct senses of the word "nature"—*nature des choses* for Rameau, *nature des hommes* for Rousseau—a conflict that finds expression in the combatants' respective preferences for harmony and melody.³⁷

In her 1983 book, *Jean-Philippe Rameau: splendeur et naufrage de l'esthétique du plaisir à l'âge classique*, Kintzler elaborates both sides of this antithesis. The *esthétique classique*, she now insists, is fundamentally Cartesian. It rests on four "axioms":

Le premier suppose que la vérité de la nature est toujours abstraite et repose en des relations formalisables: c'est l'axiome intellectualiste de la connaissance. Le deuxième rend compte de la fonction de l'illusion comme artifice révélateur de la vérité: c'est l'axiome sensualiste de la fiction théâtrale. Le troisième énonce que la tragédie lyrique fut pensée à la fois comme le double et comme l'inverse de la tragédie dramatique: c'est l'axiome du théâtre des enchantements. Le dernier stipule la constance de la relation matérielle entre la musique et la langue articulée, la co-présence incessante entre les signifiants de la langue et les sons de la musique: c'est la nécessité du récitatif et de l'articulation de la musique.³⁸

The first presumes that the truth of nature is always abstract and rests on relations that can be formally expressed: this is the axiom of the intellectuality of knowledge. The second accounts for the function of illusion as an artifice that reveals the truth: this is the axiom of the sensuality of theatrical fiction. The third announces that the *tragédie lyrique* was considered at once the double and the inverse of dramatic tragedy: this is the axiom of the theater of enchantment. The last insists on the constancy of the material relation between music and articulated language, the incessant co-presence between the signifiers of language and the sounds of music: this is the necessity of recitative and of articulation in music.

In Rousseau's thought, these four axioms are systematically inverted:

La vérité de la nature n'est pas dans une abstraction formelle, mais dans la transparence d'une signification perdue à jamais. La fiction et l'illusion sensible ne peuvent pas renvoyer à la vérité, elles lui font écran. L'opéra

The truth of nature does not lie in formal abstraction but in the transparency of a forever-lost signification. Fiction and illusion cannot point towards truth; they screen it from us. French opera is neither the

³⁷ Kintzler's distinction is anticipated in Louis Striffling, *Esquisse d'une histoire du goût musical en France au XVIII^e siècle* (Paris: Delagrave, 1912), 180-81.

³⁸ Catherine Kintzler, *Jean-Philippe Rameau: splendeur et naufrage de l'esthétique du plaisir à l'âge classique* (Paris: Le Sycomore, 1983), 7-8.

français n'est ni le double ni l'inverse du théâtre, il en est la caricature et en révèle la vanité. Enfin, ce n'est pas la présence matérielle et grimaçante d'un texte articulé qui est nécessaire à la musique, c'est la présence extatique d'une signification émotive.³⁹

double nor the inverse of theatre, it is the caricature that reveals its vanity. Finally, it is not the material presence of an articulated text that is necessary in music; it is the ecstatic presence of an emotive signification.

Kintzler's questionable interpretation of Rameau as an arch-Cartesian has now been largely superseded, notably by Christensen's work.⁴⁰ Her interpretation of Rousseau, in contrast, has been influential and remains compelling in many respects. In expounding it, Kintzler largely abandons the artificial schematism put forward in her introduction (quoted just above) and instead organizes her discussion around a tri-partite historical scheme extrapolated from Rousseau's own writings. The first stage ("la musique telle qu'elle a dû être") describes the original music-language that Rousseau sketches in the *Essai sur l'origine des langues*. The second ("la musique telle qu'elle est") diagnoses the corruption of "modern" music in which music has become separated from language and the expressive force of the original speech-song attenuated. The third ("la musique telle qu'elle peut devenir") offers a prescription for the resuscitation of expressive immediacy within the context of a now irreversible separation of music from language.

Rousseau's original speech-song offers a perfectly transparent mode of expression. As Kintzler puts it, "par le chant-langage primitif, on plonge dans le Coeur de l'autre; il s'agit d'un dévoilement qui ne laisse rien dans l'ombre, dans l'ambiguïté ou le malentendu" ("by means of the original music-language, one plunges into another's heart; what occurs is an unveiling that leaves nothing shadowed, nothing ambiguous, nothing misunderstood").⁴¹ The characteristics that Rousseau assigns to his original music-language (accent, rhythm) are also those of melody. Hence, "l'hypothèse d'une langue primitive se confond chez Rousseau avec celle d'une mélodie idéale" ("in Rousseau, the hypothesis of a

³⁹ *ibid.*, 8.

⁴⁰ See above pp. 45-46.

⁴¹ Kintzler, *Rameau*, 149.

primitive language is confounded with that of an ideal melody").⁴² The prime catalyst for the historical enervation of melody, Kintzler continues, was the invention of harmony: "la dégradation de la musique est essentiellement due à un processus d'harmonisation, parallèle au processus d'articulation subi par le langage" ("the degradation of music is essentially due to a process of harmonization, parallel to the process of articulation undergone by language").⁴³

Le déplorable résultat de ce double mouvement de dégénérescence, c'est la séparation radicale entre la musique moderne, harmonisée, et les langues modernes, articulées. En se dégradant, les unes comme les autres ont perdue ce qui les unissait, l'inflexion passionnée de la mélodie dont elles tirent leurs origines.⁴⁴

The deplorable result of this double movement of degeneration is the radical separation of modern, harmonic music from modern, articulated language. In the course of this degradation, both the one and the other have lost what once united them: the impassioned inflection of melody from which they draw their origin.

For Kintzler, then, the opposition between melody and harmony offers the key to Rousseau's musical thought. Rameau's system stands condemned, in Rousseau's eyes, not because of any intrinsic failings as a theory of harmony but because, in privileging harmony over melody, it participates in the same historical process that has led to melody's current enervation. As Kintzler puts it, "Rousseau ne discute nullement la pertinence et l'exactitude de l'analyse acoustique sur laquelle Rameau se fonde, il en récusé seulement la valeur esthétique" ("Rousseau in no way disputes the pertinence and exactitude of Rameau's acoustical analysis; he merely dismisses its esthetic value").⁴⁵

Once again, Kintzler's analysis is drawn almost entirely from the *Essai sur l'origine des langues*. Though she refers occasionally to the *Lettre sur la musique française*, the *Lettre à d'Alembert*, the late writings on Gluck and *La Nouvelle Héloïse*, it is clear that the *Essai* provides the frame into which all Rousseau's

⁴² *ibid.*, 152.

⁴³ *ibid.*, 159. Cf. p. 160: "L'harmonie s'ajoute à la musique originaire, mais en s'y ajoutant elle lui fait écran: c'est elle qui dépose le voile sur la limpidité de la mélodie, qui en trouble à jamais le cristal."

⁴⁴ *ibid.*, 163.

⁴⁵ *ibid.*, 160.

musical writings must be made to fit.⁴⁶ The texts that could pose significant challenges for Kintzler's interpretation—namely the *Encyclopédie* articles and the *Dictionnaire de musique*—are ignored almost entirely. This tendency to seek the core of Rousseau's musical thought in the *Essai sur l'origine des langues* is a general feature of the recent literature of Rousseau and music. Though Duchez, Wokler, and Kintzler have all gone on to elaborate their respective interpretations in further writings, the emphasis—indeed, over-emphasis—on the *Essai* remains a constant. It is also characteristic of a fourth, and in some ways significantly different interpretation of Rousseau's musical writings: that advanced by Rousseau's English translator John T. Scott.

In a 1998 essay on the place of music in Rousseau's system, Scott locates the crux of Rousseau's dispute with Rameau in the distinction that Rousseau draws between the "physical" and "moral" spheres. It is here, in Scott's view, that the concerns of Rousseau's musical writings intersect most obviously with his philosophy as a whole. "In Rousseau's eyes Rameau's musical theory tends towards the reductionist rationalism and materialism he opposes in his philosophy as a whole."⁴⁷ In Scott's interpretation, this opposition led Rousseau to oppose "a theory of the 'moral effects' of the melody" to "Rameau's 'physical' science of harmony."⁴⁸ Thus, the debate is once again about the nature of musical expression. For Rousseau, "the source of musical expression is the imitation of the passions conveyed through the melody."⁴⁹ Harmony, in contrast, offers a purely physical kind of pleasure.

[Rousseau's] analysis of musical expression rests upon the distinction in the *Second Discourse* between 'physical' and 'moral' passions. The effects of harmony are 'purely physical' and

⁴⁶ Consider, for instance, this remark on the *Lettre sur la musique française*: "Il est impossible, et il serait malhonnête, de lire la *Lettre sur la musique française* sans avoir à l'esprit l'*Essai sur l'origine des langues*. C'est que l'histoire de la dégénérescence de la musique que Rousseau retrace dans ce dernier ouvrage fournit après coup l'étayage théorique sur lequel il fonde ses attaques contre l'opéra français" (ibid., 158).

⁴⁷ John T. Scott, "The Harmony Between Rousseau's Musical Theory and his Philosophy," *Journal of the History of Ideas* 59 (1998): 295.

⁴⁸ ibid., 296.

⁴⁹ ibid., 293.

produce a 'pleasant sensation' but nothing more. The full expressive power of song depends upon the melody[.]⁵⁰

Since melody is intimately tied to language, however, its expressive effects are in every case confined to some particular "musico-linguistic community."

If music is the expression of the social or moral passions as they develop differently among different peoples, then it must be understood as a cultural phenomenon . . . Rousseau's theory of the communication of the passions through melodic accent illuminates his understanding of how the 'moral' dimension of human existence develops from an initially purely 'physical' basis."⁵¹

This "moral dimension" is not, however, reducible to the physical dimension from which it emerges. Rousseau takes issue with Rameau, therefore, because Rameau's account of musical expression attempts to derive the "moral" effects of music directly from the physical properties of sound and so fails to acknowledge the properly cultural dimension that is intrinsic to musical expression.

Scott begins his article by acknowledging that "[Rousseau's] only widely known writing relating to music is the *Essay on the Origin of Languages*"; even that text, however, "has . . . not received a full accounting because it has rarely been interpreted in light of his other musical writings."⁵² Yet for all of its manifest interest, Scott's own interpretation ends up reinforcing precisely that tendency. Scott brackets out Rousseau's *Encyclopédie* articles as "pre-systematic" works that do not reflect Rousseau's "mature musical theory."⁵³ The parameters of the "mature" theory, however, end up being defined by the contents of the *Essai*. Like Kintzler, Scott reads the *Essai* back into the *Lettre sur la musique française*.⁵⁴ As in Verba and Christensen, Rameau's *Erreurs* are presented as a response to the *Lettre* rather than the allegedly innocuous

⁵⁰ *ibid.*, 304.

⁵¹ *ibid.*, 305.

⁵² *ibid.*, 287.

⁵³ *ibid.*, 287.

⁵⁴ "The almost entirely critical approach of the *Letter on French Music* conceals the constructive theory on which Rousseau's criticism is based. He elaborates that theory in his later works, but it can be glimpsed within the *Letter* when his argument about the relationship between music and language is brought together with his digression on the 'unity of melody'" (*ibid.*, 293).

Encyclopédie articles.⁵⁵ The *Dictionnaire de musique*, finally, “represents the literal revision of [Rousseau’s] music theory to make it accord more fully with his philosophy [i.e. the *Essai*].”⁵⁶

It is the *Essai sur l’origine des langues*, therefore, that presents the core of Rousseau’s musical thought, and the other musical writings are to be read in relation to it. This conviction, whether explicitly defended or tacitly assumed, resonates throughout the recent literature on Rousseau’s musical writings.⁵⁷ One reason for its force, no doubt, lies simply in a kind of disciplinary inertia. Scholarly literature breeds more scholarly literature, which must necessarily orient itself in relation to its antecedents. The *Essai*, moreover, is an elusive and problematic text, and it is hardly surprising that it would continue to attract considerable attention. There is, however, a second factor that emerges with particular clarity from Scott’s text. One of the overarching projects of twentieth-century Rousseau scholarship has been to demonstrate, in response to the nineteenth-century’s insistence on Rousseau’s “contradictions,” the essential “unity” of his “system.”⁵⁸ Because of its obvious similarities to the Second Discourse, the *Essai* offers a particularly rich hunting ground for connections between Rousseau’s musical, social, linguistic and political thought. As Scott phrases the point, “the *Essay* belongs to the philosophical project of Rousseau’s Second Discourse as well as to Rousseau’s polemic with Rameau and provides the best view of the links between Rousseau’s musical theory and his philosophy as a whole.”⁵⁹ One result of this background program has been to focus scholars’ attention on the *Essai sur l’origine des langues*. Consequently, the *Encyclopédie* articles have been marginalized and the *Dictionnaire de musique* read, if at all, from the perspective of the *Essai*.

Like musicologists, and for analogous reasons, therefore, Rousseau scholars have focused their attention on one text rather than on the general corpus

⁵⁵ *ibid.*, 294.

⁵⁶ *ibid.*, 306.

⁵⁷ See, for instance, the essays collected in Claude Dauphin, ed., *Musique et langage chez Rousseau* (Oxford: Voltaire Foundation, 2004).

⁵⁸ On this point, see Peter Gay, “Reading about Rousseau,” in *The Party of Humanity: Studies in the French Enlightenment* (New York: Knopf, 1964), 211-61.

⁵⁹ Scott, “Rousseau’s Musical Theory,” 298.

of Rousseau's musical writings. As a result, they have given a one-sided interpretation that, however penetratingly it illuminates that one text, has served to occlude and obscure other aspects of Rousseau's musical thought. The effect, in both cases, has been to give the impression that that thought is essentially exhausted by Rousseau's reflections of musical aesthetics, and that his dispute with Rameau turned on aesthetic questions—whether the merits of French or Italian opera, or the priority of harmony or melody—that are of decidedly secondary importance to historians of music theory. In addition, the longstanding prejudice against Rousseau's musicianship has obviously not encouraged his readers to look for close, technical discussions of music theoretical questions in his works. And the works that contain such discussions are relatively inaccessible and pose numerous interpretative difficulties. It is the collusion of these factors, I would suggest, that has led to the widespread neglect that Rousseau's technical music-theoretical writings have suffered. The aim of the present study has been to remedy that neglect.

There are, of course, exceptions to the general characterizations that I have offered above. In particular, as I noted in my introduction, the task of editing the *Dictionnaire* for inclusion in the Pléiade edition of Rousseau's works encouraged the scholars involved to begin investigating that text on its own terms. Quite clearly, I think, the next phase in scholarship on Rousseau's musical writings will be devoted to Rousseau's *Dictionnaire de musique* and *Encyclopédie* articles. In many respects, the foundations for that work have been laid by Duchez, Eigeldinger, Baud-Bovy, Boccadoro, Bouvier, O'Dea and Cernuschi. If the present study has managed to build upon their work, while also inducing historians of music theory to take a closer look at Rousseau's musical writings, then the ambitions of its author will have amply been met.

Appendix I: Tartini's Proof that the Circle is Harmonic

In the course of his argument, Tartini makes frequent use of something he calls the discrete geometric progression (*proporzione geometrica discreta*). The *Trattato* gives various definitions of this progression, not all of which are mutually consistent. In practice, though, Tartini typically constructs it by multiplying the two terms of a given ratio $x:y$ by their arithmetic mean and then inserting the squares of their geometric and arithmetic means between them. The discrete geometric proportion corresponding to the ratio $x:y$ is therefore given by:

$$\frac{x(x+y)}{2}, xy, \frac{(x+y)^2}{4}, \frac{y(x+y)}{2}$$

One feature of this progression that Tartini particularly exploits is the fact that its second term xy is the harmonic mean of the extremes $\frac{x(x+y)}{2}$ and $\frac{y(x+y)}{2}$.¹

Indeed, that fact plays a central role in his principal argument for the "harmonic" nature of the circle.

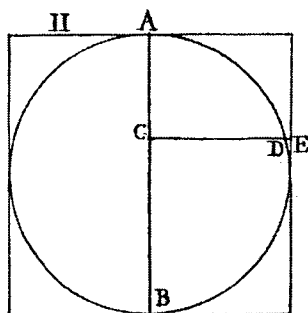
That argument begins as follows. In the diagram shown in Fig. A.1, let $\overline{AC}=3$ and $\overline{CB}=7$. It follows that $\overline{CE}=5$ and that $\overline{CD}=\sqrt{21}$.² Now the discrete geometric proportion corresponding to the ratio 3:7 is 15, 21, 25, 35. Clearly, 21 is the square of the length of CB . But 21 is also the harmonic mean of 15 and 35. From this fact, Tartini infers that the square of the sine CD is the harmonic mean of the ratio according to which the diameter AB of the circle is divided at C , since that ratio is 15:35 or 3:7. By a similar argument, the square of the protracted sine CE is the arithmetic mean of the same ratio (*Trattato*, 22).

¹ Multiplying $x:y$ by $\frac{x+y}{2}$ gives $\frac{x(x+y)}{2} : \frac{y(x+y)}{2}$. The harmonic mean of $x:y$, it will be recalled is given by $\frac{2xy}{x+y}$. Hence, the harmonic mean of $\frac{x(x+y)}{2} : \frac{y(x+y)}{2}$ must be equal to

$\frac{2xy}{x+y}$ multiplied by $\frac{x+y}{2}$, which equals xy .

² The last by Euclid, *Elements*, VI, 13.

Fig. A.1. *Trattato*, fig. II



From this argument, Tartini concludes that the sines of the circle are intrinsically harmonic, whereas its protracted sines (which belong instead to the square in which it is inscribed) are arithmetic. He then purports to show, by means of a similar argument, that chords of the circle are also inherently harmonic. From these two arguments, he concludes that the circle is harmonic and, having already shown that it is “one,” that it is the geometrical figure that his system requires for its rational foundation.³

There is, however, at least one significant problem with Tartini’s proofs. The error can be seen more readily when Tartini’s presentation is recast in algebraic form.⁴ Let x , therefore, denote the length of AC in Fig. 5.1, and let y denote the length of CB . It follows that $\overline{CE} = \frac{x+y}{2}$ and that $\overline{CD} = \sqrt{xy}$.⁵ The discrete geometric proportion constructed from the ratio $x:y$ is given by $\frac{x(x+y)}{2}$, xy , $\frac{(x+y)^2}{4}$, $\frac{y(x+y)}{2}$. Now the two middle terms of this proportion are equal, respectively, to \overline{CD}^2 and \overline{CE}^2 . Thus, \overline{CD}^2 is the harmonic mean of the ratio $\frac{x(x+y)}{2} : \frac{y(x+y)}{2}$. But Tartini infers instead that it is the harmonic mean of $x:y$.

³ “Dunque comparate tra loro le due figure, quadrato circoscritto, e circolo iscritto, in quel rispetto, in cui convengono tra loro per posizione di prima semplicità, si trova il quadrato secondo le due progressioni variamente aritmetico, e contrarmonico, il circolo costantemente armonico” (*Trattato*, 23). For the second argument, see *Trattato*, 22-23.

⁴ I follow Daniel P. Walker in translating Tartini’s arguments into algebraic terms. Tartini himself, by his own admission is ignorant of algebra (“l’Algebra mi è ignota,” *Trattato*, 27), and works instead with numerical examples, which he assumes will generalize.

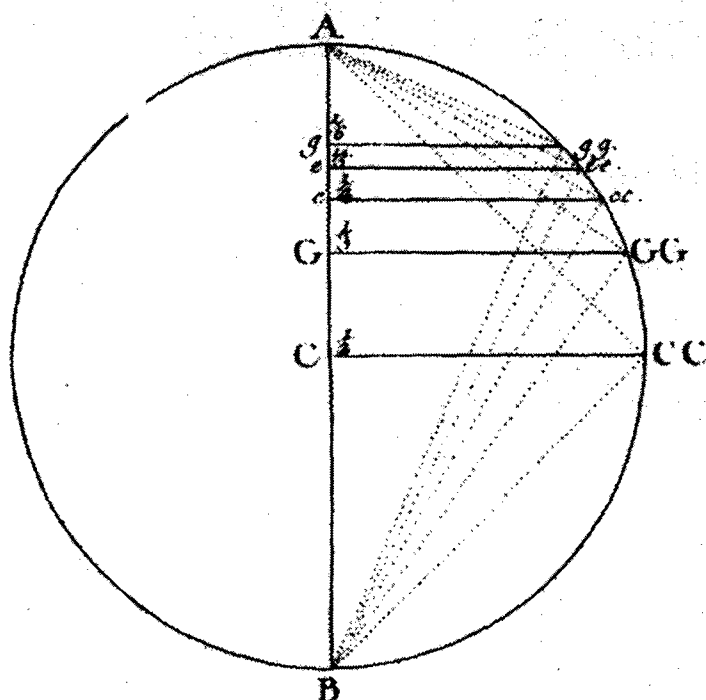
⁵ Euclid, VI, 13.

This latter inference, though, is manifestly untrue. To obtain the harmonic mean of $x:y$, Tartini would have to divide all the terms of his discrete geometric progression by $\frac{2}{x+y}$. The harmonic mean of $x:y$, that is to say, is \overline{CD}^2 divided by $\frac{2}{x+y}$, which gives $\frac{2xy}{x+y}$ (the familiar expression for the harmonic mean of $x:y$). Thus, Tartini's argument rests on a sleight-of-hand that his use of numerical values, rather than algebraic expressions helps to obscure. Rousseau, who rejoins Tartini's exposition at this point, silently corrects the argument in reproducing it.

Appendix II: Tartini's Derivations of the Harmonic and Arithmetic Series and the Series of Dissonances

Tartini begins by dividing the diameter of the circle according to the harmonic series as shown in Fig. A.2. If, for convenience, the length of the diameter AB is set at 60, then $\overline{BC}=30$, $\overline{BG}=20$, $\overline{Bc}=15$, $\overline{Be}=12$, and $\overline{Bg}=10$.

Fig. A.2. *Dictionnaire*, Pl. I, fig. 10



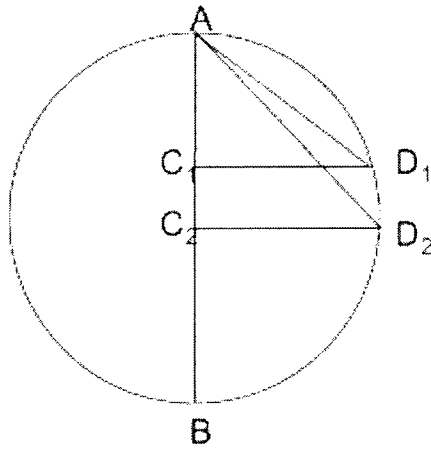
From this basic division, Tartini will proceed to derive the three sequences of pitches shown in Ex. A.1. He derives the first set of pitches (labeled "O") from the ratios of the squares of the chords \overline{BCC} , \overline{BGG} , \overline{Bcc} , \overline{Bee} , and \overline{Bgg} . To do so, he simply calculates each ratio, but it is easy to show in general that the ratios of the squares of the chords will simply reproduce the ratios according to which the diameter was divided in the first place. Let the diameter AB , of length d , be divided at points C_1 and C_2 , and let $\overline{AC_1}=x_1$ and $\overline{AC_2}=x_2$ as shown in Fig. A.3. The length of the sines drawn from C_1 to D_1 and C_2 to D_2 will accordingly be

given by $\sqrt{x_1(d-x_1)}$ and $\sqrt{x_2(d-x_2)}$ respectively. By the Pythagorean theorem, the squares of the lengths of the chords BD_1 and BD_2 will be $x_1^2 + x_1(d-x_1)$ and $x_2^2 + x_2(d-x_2)$. Now consider the ratio of the two terms just derived:

$$\begin{aligned} & x_1^2 + x_1(d-x_1) : x_2^2 + x_2(d-x_2) \\ & dx_1 : dx_2 \\ & x_1 : x_2 \end{aligned}$$

The ratios $\overline{BCC}^2 : \overline{BGG}^2$, $\overline{BGG}^2 : \overline{Bcc}^2$, etc. will therefore equal $\overline{BC} : \overline{BG}$, $\overline{BG} : \overline{Bc}$, etc. The sequence of ratios given by the squared chords (taken pairwise) will thus be 3:2, 4:3, 5:4, 6:5. To rewrite this series as a set of intervals over the fundamental (i.e. 2:1, 3:1, 4:1, 5:1, 6:1), it suffices to set x_2 equal to \overline{AB} in the calculation above.

Fig. A.3



To derive the second line of Ex. A.1, Tartini takes the ratios of the squares of the complements ACC , AGG , Acc , Aee , and Agg . By the arguments advanced in the preceding paragraphs, these ratios will be equal to those between AC , AG , Ac , Ae and Ag . That is, the series $\overline{ACC}^2 : \overline{AGG}^2$, $\overline{AGG}^2 : \overline{Acc}^2$, etc. is equal to the series $\overline{AC} : \overline{AG}$, $\overline{AG} : \overline{Ac}$, etc., or 3:4, 8:9, 15:16, 24:25. Relating each term (\overline{ACC}^2 , \overline{AGG}^2 , \overline{Acc}^2 , etc.) back to the square of the diameter gives 2:1, 3:2, 4:3, 5:4 and 6:5, and thus the pitches given in the second line of Ex. A.1.

Finally, to calculate the last series of pitches (marked “Q” in Ex. 5.4), Tartini takes the squares of the lengths of the sines $\overline{C,CC}$, $\overline{G,GG}$, $\overline{c,cc}$, $\overline{e,ee}$, and $\overline{g,gg}$. Forming the ratios of the successive terms (i.e. $\overline{C,CC}^2:\overline{G,GG}^2$, $\overline{G,GG}^2:\overline{c,cc}^2$, etc.) gives the series 9:8, 32:27, 675:576, and 288:225 (or, comparing each term to the square of the diameter: 4:1, 9:2, 18:3, 25:4, 36:3). These ratios give the pitches shown in the last line of Ex. A.1.

Ex. A.1. *Dictionnaire*, Pl. I, fig. 11



Bibliography

Sources before 1850 (including modern editions and facsimilies):

D'Alembert, Jean Le Rond. *Elémens de musique, théorique et pratique, suivant les principes de M. Rameau*. Paris: David, Le Breton, and Durand, 1752.

_____. *Essai sur les élémens de philosophie*. Paris, 1768. Reprinted Paris: Fayard, 1986.

_____. "Réflexions sur la théorie de la musique." In *Oeuvres et correspondences inédits*. Ed. Charles Henry. Paris: Perrin, 1887. Pp. 131-89.

Aristoxenos. *The Harmonics of Aristoxenus*. Ed. Henry S. Macran. Oxford: Clarendon Press, 1902.

Blainville, Charles Henri de. *Harmonie théorico-pratique: divisée en six parties*. Paris: Ballard, 1746.

Béthizy, Jean-Laurent de. *Exposition de la théorie et la pratique de la musique suivant les nouvelles découvertes*. Paris: Michel Lambert, 1754.

Bontempi, Giovanni Andrea Angelini. *Historia musica*. Perugia: Costantini, 1695.

Brossard, Sébastien de. *Dictionnaire de musique, contenant une explication des Termes Grecs, Latins, Italiens, & François, les plus usitez dans la musique*. 2nd ed. Paris: Ballard, 1705.

Campion, François. *Traité d'accompagnement et de composition selon la règle des octaves de musique*. Paris: G. Adam, 1716.

Catalogus codicum manuscriptorum bibliothecae regiae. Part 3, vol. 4. Paris, 1744.

Chambers, Ephraim. *Cyclopaedia, or An Universal Dictionary of the Arts and Sciences*. 2 vols. London: J. and J. Knapton, 1728.

Condillac, Étienne Bonnot de. *Oeuvres philosophiques*. Ed. George Le Roy. 3 vols. Paris: Presses universitaires de France, 1947-51.

- David, Jacques. *Méthode nouvelle ou principes généraux pour apprendre la musique*. Lyons: Boivin, 1737.
- Delaire, Denis. *Traité d'accompagnement pour le théorbe, et le clavessin*. Paris: n.p., 1690.
- Descartes, René. *Oeuvres*. Ed. Charles Adam and Paul Tannery. 11 vols. Paris: Vrin, 1996.
- Diderot, Denis. *Oeuvres complètes*. Ed. Herbert Dieckmann, Jean Fabre, and Jacques Proust. 25 vols. to date. Paris: Hermann, 1975-.
- [Diderot, Denis]. "Mémoire où l'on expose les fondemens du système de musique théorique et pratique de M. Rameau." Paris, Bibliothèque-Musée de l'Opéra, collection Boissgelou, B. 24, f. 119r-128v. Transcribed in Thomas Christensen. "Rameau, Diderot and Vibrating Strings." *Studies on Voltaire and the Eighteenth Century* 323 (1994): 153-66.
- Encyclopédie, ou dictionnaire raisonné des sciences, des arts, et des métiers*. Ed. Denis Diderot and Jean Le Rond d'Alembert. 17 vols. Paris: Briasson, David, Le Breton, 1751-65.
- Fétis, François-Joseph. *Esquisse de l'histoire de l'harmonie*. Serialized in the *Revue et Gazette Musicale* 7 (1840), no. 9, 69-73; no. 20, 157-60; no. 24, 189-92; no. 35, 295-97; no. 40, 335-38; no. 52, 347-52; no. 63, 535-39; no. 67, 570-72; no. 68, 575-77; no. 72, 607-609; no. 73, 615-17; no. 75, 631-34; no. 76, 640-42; no. 77, 651-56.
- _____. *Traité complet de la théorie et de la pratique de l'harmonie*. 9th ed. Paris: G. Brandus & S. Dufour, 1867.
- _____. *Biographie universelle des musiciens*. 8 vols. Brussels: Leroux, 1835-44.
- Grimm, Friedrich Melchior von. *Correspondance littéraire*. Ed. Maurice Tourneux. 15 vols. Paris: Garnier frères, 1877-82.
- Lebeuf, Jean. *Traité historique et pratique sur le chant ecclésiastique*. Paris: Herissant, 1741.
- Mairan, Jean-Jacques Dortous de. "Discours sur la Propagation du Son dans les différents Tons qui le modifient." *Histoire de l'Académie Royale des*

- Sciences. Année MDDXXXVII. Avec les Mémoires de Mathématiques et de Physique, pour la même Année, Tirés des Registres de cette Académie. Mémoires*, 2-20. Paris: Imprimerie Royale, 1737.
- Mersenne, Marin. *Harmonie universelle*. 3 vols. Paris: Sebastien Cramoisy, 1636.
- Meibom, Marcus, ed. *Antiquae musicae auctores septem: graece et latine*. 2 vols. Amsterdam: Ludovicus Elzevirius, 1652.
- Ptolemy. *Die Harmonielehre des Klaudios Ptolemaios*. Ed. Ingemar Düring. 1930; repr., Hildesheim: Olms, 1982.
- La Querelle des Bouffons: texte des pamphlets*. Ed. Denise Launay. 3 vols. Geneva: Minkoff, 1973.
- Rameau, Jean-Philippe. *Complete Theoretical Writings*. Ed. Erwin R. Jacobi. 6 vols. N.p.: American Institute of Musicology, 1967-72.
- _____. *Nouvelles suites des pieces de clavecin*. Paris: Boivin and Leclerc, 1728.
- _____. "Art de la Basse fondamentale." Bibliothèque publique et universitaire de Genève, ms. fr. 230. Bibliothèque de l'Institut de France, ms. 2474.
- Recueil de planches sur les sciences, les arts libéraux et les arts mécaniques, avec leurs explications*. 11 vols. Paris: Briasson, David, Le Breton, 1762-72.
- Rousseau, Jean-Jacques. *Correspondance complète*. Ed. R. A. Leigh. 52 vols. Oxford: Voltaire Foundation, 1965-98.
- _____. *Oeuvres complètes*. Ed. Bernard Gagnebin and Marcel Raymond. 5 vols. Paris: Gallimard, 1959-95.
- _____. "Du Principe de la mélodie." Neuchâtel, Bibliothèque publique et universitaire, ms. R. 60. Transcribed in Robert Wokler. *Rousseau on Society, Politics, Music and Language*. New York: Garland, 1987. Pp. 437-501.
- Sauveur, Joseph. "Système générale des intervalles des sons, et son application à tous les systèmes et à tous les instrumens de musique." *Histoire de*

- l'Académie Royale des Sciences, Année MDCCI, avec les mémoires de mathématique & de physique pour la même année.* 2nd ed. Paris: Imprimerie Royale, 1719. Pp. 297-364.
- Serre, Jean-Adam. *Essais sur les principes de l'harmonie.* Paris: Prault, 1753.
- Tartini, Giuseppe. *Trattato di musica.* Padua: Giovanni Manfrè, 1754.
- Wallis, John. "A Letter to the Publisher Concerning a New Musical Discovery." *Philosophical Transactions* 12 (April, 1677): 839-42.
- Zarlino, Gioseffo. *Istitutioni harmoniche.* Venice: Francesco de i Franceschi Senese, 1573.
- Works after 1850:
- Anthony, James R. *French Baroque Music from Beaujoyeux to Rameau.* Revised and expanded ed. Portland: Amadeus Press, 1997.
- Arlt, Wulf. "Natur und Geschichte der Musik in der Anschauung des 18. Jahrhunderts: J.-J. Rousseau und J. N. Forkel." *Melos* 2 (1976): 351-56.
- Auroux, Sylvan. "Figures de l'Encyclopédie." In *La Sémiotique des encyclopédistes*, 313-25. Paris: Payot, 1979.
- _____. "Diderot encyclopédiste: le langage, le savoir, et l'être du monde." *Stanford French Review* 8 (1984): 175-88.
- Baud-Bovy, Samuel. "Note sur la musique grecque antique dans le *Dictionnaire de musique*." In *Jean-Jacques Rousseau: oeuvres complètes*. Vol. 5, *Écrits sur la musique, la langue et le théâtre*. Ed. Marcel Raymond and Bernard Gagnebin, 1658-64. Paris: Gallimard, 1995.
- Benrekassa, George. "La Pratique philosophique de Diderot dans l'article ENCYCLOPÉDIE." *Stanford French Review* 8 (1984): 189-212.
- Berlin, Isaiah. *The Crooked Timbre of Humanity.* Ed. Henry Hardy. Princeton: Princeton University Press, 1990.
- _____. *Against the Current.* Ed. Henry Hardy. Princeton: Princeton University Press, 2001.

- Bernard, Jonathan. "The Principle and the Elements: Rameau's Controversy with d'Alembert." *Journal of Music Theory* 24 (1980): 37-60.
- Blum, Stephen. "Rousseau's Concept of *Système musical* and the Comparative Study of Tonalities." *Journal of the American Musicological Society* 39 (1985): 341-61.
- Boccadoro, Brenno. "Il sistema armonico di Giuseppe Tartini nel Secolo Illuminato: due apologie del *Trattato di Musica* nella querelle fra Jean-Adam Serre e gli Enciclopedisti." *Annales suisse de la musicologie* 10 (1990): 73-102.
- _____. "Jean-Adam Serre: un juste milieu entre Rameau et Tartini?" *Revue de musicologie* 79 (1993): 31-62.
- _____. "Tartini, Rousseau, et les Lumières." In *Jean-Jacques Rousseau: oeuvres complètes*. Vol. 5, *Écrits sur la musique, la langue et le théâtre*. Ed. Marcel Raymond and Bernard Gagnebin, 1694-1711. Paris: Gallimard, 1995.
- Bouler, Jean-Pierre le. "Les Emprunts de Rousseau à la Bibliothèque du Roi." *Annales Jean-Jacques Rousseau* 38 (1969-71): 241-58.
- Bouler, Jean-Pierre le and Catherine Lafarge. "Les Emprunts de Mme Dupin à la Bibliothèque du Roi dans les années 1748-1750." *Studies on Voltaire and the Eighteenth Century* 182 (1979): 107-85.
- Bouvier, Xavier. "Rousseau et la théorie ramiste." In *Jean-Jacques Rousseau: oeuvres complètes*. Vol. 5, *Écrits sur la musique, la langue et le théâtre*. Ed. Marcel Raymond and Bernard Gagnebin, 1664-93. Paris: Gallimard, 1995.
- _____. "Réponse à la critique de Rameau des basses de Corelli: un manuscrit inédit de Charles-Henri Blainville (1711-ca 1777)." *Annales suisse de musicologie* 18 (1998): 181-208.
- Burnham, Scott. "Method and Motivation in Hugo Riemann's History of Harmonic Theory." *Music Theory Spectrum* 14 (1992): 1-14.
- Caplin, William E. "The Classical Cadence: Conceptions and Misconceptions." *Journal of the American Musicological Society* 57 (2004): 51-117.

- Carlez, Jules. "Grimm et la musique de son temps." *Mémoires de l'Académie nationale des sciences, arts et belles-lettres de Caen* (1872): 199-237.
- Cassirer, Ernst. *Die Philosophie der Aufklärung*. 1932; repr., Hamburg: Felix Meiner Verlag, 2007.
- Cernuschi, Alain. "L'Arbe encyclopédique des connaissances: figures, opérations, métamorphoses." In *Tous les savoirs du monde: encyclopedies et bibliothèques de Sumar au XXIe siècle*. Ed. Roland Schaer, 277-82. Paris: Bibliothèque national de France, 1996.
- _____. "Rousseau et l'*Encyclopédie*: éléments pour une réévaluation du musicographe-philosophe de 1749." *Bulletin de l'Association Jean-Jacques Rousseau* 54 (1999): 9-23.
- _____. "Entre les articles musicaux de l'*Encyclopédie* et le *Dictionnaire de musique*: une 'Table des mots' énigmatique." *Bulletin de l'Association Jean-Jacques Rousseau* 55 (2000): 27-60.
- _____. *Penser la musique dans l'Encyclopédie: étude sur les enjeux de la musicographie des Lumières et sur ses liens avec l'encyclopédisme*. Paris: Champion, 2000.
- Chailley, Jacques. "Rameau et la théorie musicale." *Revue musicale* 260 (1965): 66-95.
- _____. "Pour une lecture critique du premier chapitre de la *Génération harmonique*." In *Jean-Philippe Rameau: colloque international organisé par la Société Rameau, Dijon—21-24 septembre 1983*. Ed. Jérôme de la Gorce, 279-85. Paris: Champion, 1987.
- Charrak, André. *Raison et perception: fonder l'harmonie au XVIII^e siècle*. Paris: Vrin, 2001.
- _____. "Le Versant physique de la musique selon Rousseau." In *Rousseau et les sciences*. Ed. Bernadette Bensaude-Vincent and Bruno Bernardi, 33-44. Paris: L'Harmattan, 2003.
- _____. *Empirisme et métaphysique: l'Essai sur l'origine des connaissances humaines de Condillac*. Paris: Vrin, 2003.

- Chouillet, Anne-Marie. "Présupposés, contours et prolongements de la polémique autour des écrits théoriques de Jean-Philippe Rameau." In *Jean-Philippe Rameau: colloque international organisé par la Société Rameau, Dijon—21-24 septembre 1983*. Ed. Jérôme de la Gorce, 425-33. Paris: Champion, 1987.
- Christensen, Thomas. "Rameau's 'L'Art de la Basse Fondamentale.'" *Music Theory Spectrum* 9 (1987): 18-41.
- _____. "Eighteenth-Century Science and the *corps sonore*: The Scientific Background to Rameau's Principle of Harmony." *Journal of Music Theory* 31 (1987): 23-50.
- _____. "Music Theory as Scientific Propaganda: The Case of d'Alembert's *Éléments de musique*." *Journal of the History of Ideas* 30 (1989): 409-27.
- _____. "The Spanish Baroque Guitar and Seventeenth-Century Triadic Theory." *Journal of Music Theory* 36 (1992): 1-42.
- _____. "The *Règle de l'Octave* in Thorough-Bass Theory and Practice." *Acta Musicologica* 64 (1992): 91-117.
- _____. *Rameau and Musical Thought in the Enlightenment*. Cambridge: Cambridge University Press, 1993.
- _____. "Diderot, Rameau and Resonating Strings: New Evidence of an Early Collaboration." *Studies on Voltaire and the Eighteenth Century* 323 (1994): 131-66.
- _____. "Fétis and Emerging Tonal Consciousness." In *Music Theory in the Age of Romanticism*. Ed. Ian Bent, 37-56. Cambridge: Cambridge University Press, 1996.
- _____. "Musiktheorie im Kontext: Rameau und die Philosophie der Französischen Aufklärung." In *Musiktheoretisches Denken und kultureller Kontext*. Ed. Dörte Schmidt, 93-106. Schiengen im Markgräflerland: Argus, 2005.
- Clarke, Desmond. *Descartes' Philosophy of Science*. Manchester: Manchester University Press, 1982.

- Cohen, Albert. "La Supposition and the Changing Concept of Dissonance in French Theory." *Journal of the American Musicological Society* 24 (1971): 63-84.
- _____. "Rameau, Equal Temperament, and the Academy of Lyon: A Controversy Revisited." In *French Musical Thought 1600-1800*. Ed. Georgia Cowart, 121-27. Ann Arbor: UMI, 1989.
- Cohen, David E. "'The Imperfect Seeks Its Perfection': Harmonic Progression, Directed Motion, and Aristotelian Physics." *Music Theory Spectrum* 23 (2001): 139-69.
- _____. "The 'Gift of Nature': Musical 'Instinct' and Musical Cognition in Rameau." In *Music Theory and the Natural Order*. Ed. Suzannah Clark and Alexander Rehding. Cambridge: Cambridge University Press, 2001. Pp. 68-92.
- Cranston, Maurice. *Jean-Jacques: The Early Life and Works of Jean-Jacques Rousseau, 1712-1754*. Chicago: Chicago University Press, 1991.
- Dahlhaus, Carl. *Untersuchungen über die Entstehung der harmonischen Tonalität*. Kassel: Bärenreiter, 1968.
- _____. "Was Zarlino Dualist?" *Die Musikforschung* 10 (1957): 286-90.
- _____. *Die Musiktheorie im 18. und 19. Jahrhundert*. Vols. 10 and 11 of *Geschichte der Musiktheorie*. Ed. Frieder Zaminer. Darmstadt: Wissenschaftliche Buchgesellschaft, 1986-89.
- _____. "Unité de mélodie." In *Aufklärungen: Studien zur deutsch-französischen Musikgeschichte im 18. Jahrhundert*. Ed. Wolfgang Birtel and Christoph-Hellmut Mahling, vol. 2, 23-29. Heidelberg: Carl Winter Universitätsverlag, 1986.
- _____. "Ist Rameaus *Traité de l'harmonie* eine Harmonielehre?" *Musiktheorie* 1 (1986): 123-27.
- Dauphin, Claude. *La Musique au temps des encyclopédistes*. Ferney-Voltaire: Centre international d'étude du XVIII^e siècle, 2001.
- _____, ed. *Musique et langage chez Rousseau*. Oxford: Voltaire Foundation, 2004.

- Derrida, Jacques. *De la grammatologie*. Paris: Éditions de Minuit, 1967.
- Des Chene, Dennis. *Physiologia: Natural Philosophy in Late Aristotelian and Cartesian Thought*. Ithaca, NY: Cornell University Press, 1996.
- Didier, Béatrice. "La Réflexion sur la dissonance chez les écrivains du XVIII^e siècle: d'Alembert, Diderot, Rousseau." *Revue des sciences humaines* 76 (1987): 13-25.
- _____. *La Musique des Lumières: Diderot, l'Encyclopédie, Rousseau*. Paris: Presses universitaires de France, 1985.
- Duchez, Marie Elisabeth. "'Principe de la mélodie' et *Origine des langues*: un brouillon inédit de Jean-Jacques Rousseau sur l'origine de la mélodie." *Revue de musicologie* 60 (1974): 33-86.
- _____. "D'Alembert diffuseur de la théorie harmonique de Rameau: déduction scientifique et simplification musicale." In *Jean d'Alembert, savant et philosophe: portrait à plusieurs voix*. Ed. Monique Emery, 475-96. Paris: Éditions des archives contemporaines, 1989.
- _____. "Valeur épistémologique de la théorie de la basse fondamentale de Jean-Philippe Rameau: connaissance scientifique et représentation de la musique." *Studies on Voltaire and the Eighteenth Century* 245 (1986): 91-130.
- _____. "Jean-Jacques Rousseau historien de la musique." In *La Musique du théorique au politique*. Ed. Hugue Dufourt and Joël-Marie Fauquet, 39-111. Paris: Aux Amateurs des livres, 1991.
- Fabiano, Andrea, ed. *La Querelle des Bouffons dans la vie culturelle française du XVIII^e siècle*. Paris: CNRS, 2005.
- Foucault, Michel. *Les Mots et les choses*. Paris: Gallimard, 1966.
- Garber, Daniel. *Descartes' Metaphysical Physics*. Chicago: Chicago University Press, 1992.
- Gas, Catherine. *Autour du projet concernant une nouvelle notation musicale d'après Jean-Jacques Rousseau: les relations entre Jacques David et Jean-Jacques Rousseau*. Nîmes: n.p., 1989.

- Gaukroger, Stephen. *Descartes' System of Natural Philosophy*. Cambridge: Cambridge University Press, 2002.
- Geselle, Cynthia. "The Institutionalization of Music Theory in France: 1764-1802." Ph.D. diss., Princeton University, 1989.
- Gosman, Alan. "Rameau and Zarlino: Polemics in the *Traité de l'harmonie*." *Music Theory Spectrum* 22 (2000): 44-59.
- Gossman, Lionel. "Time and History in Rousseau." *Studies on Voltaire and the Eighteenth Century* 30 (1964): 311-49.
- Groth, Renate. *Die französische Kompositionslehre des 19. Jahrhunderts*. Wiesbaden: Franz Steiner Verlag, 1983.
- Gülke, Peter. *Rousseau und die Musik, oder Von der Zuständigkeit des Dilettanten*. Wilhelmshaven: Heinrichshofenlath, 1984.
- Helbing, Volker. "'Tonalität' in der französischen musiktheorie zwischen Rameau und Fétis." In *Handbuch der systematischen Musikwissenschaft*. Vol 2, *Musiktheorie*. Ed. Helga de la Motte-Haber and Oliver Schwab-Felisch. Laaber: Laaber Verlag, 2005.
- Helmholtz, Hermann. *On the Sensation of Tone*. Trans. Alexander J. Ellis. New York: Dover, 1954.
- Hine, Ellen McNiven. *A Critical Study of Condillac's Traité des systèmes*. The Hague: Martinus Nijhoff, 1979.
- Hirschberg, Eugen. *Die Encyklopädisten und die Französische Oper im 18. Jahrhundert*. Leipzig: Breitkopf & Härtel, 1903.
- Hubert, René. *Rousseau et l'Encyclopédie: essai sur la formation des idées politiques de Rousseau (1742-1765)*. Paris: J. Gamber, 1928.
- Hunt, Thomas Webb. "The *Dictionnaire de musique* of Jean-Jacques Rousseau." Ph.D. diss., University of Texas, 1967.
- Hyer Brian. "'Sighing Branches': Prosopopoeia in Rameau's *Pigmalion*." *Music Analysis* 13 (1994): 7-50.
- _____. "Before Rameau and After." *Music Analysis* 15 (1996): 75-100.

- _____. "Tonality." In *The Cambridge History of Western Music Theory*. Ed. Thomas Christensen, 726-52. Cambridge: Cambridge University Press, 2002.
- Jansen, Albert. *Jean-Jacques Rousseau als Musiker*. Berlin: G. Reimer, 1884.
- Julien, Adolphe. *La Musique et les philosophes du dix-huitième siècle*. Paris: J. Baur, 1873.
- Keiler, Allan R. "Music as Metalanguage: Rameau's Fundamental Bass." In *Music Theory: Special Topics*. Ed. Richard Browne, 83-100. New York: Academic Press, 1981.
- Kintzler, Catherine. "Rameau et Rousseau: le choc de deux esthétiques." In *Jean-Jacques Rousseau: écrits sur la musique*, ix-liv. Paris: Stock, 1979.
- _____. *Jean-Philippe Rameau: splendeur et naufrage de l'esthétique du plaisir à l'âge classique*. Paris: Le Sycomore, 1983.
- _____. "Les Articles 'Cadence' de Jean-Jacques Rousseau dans l'Encyclopédie et dans le Dictionnaire de musique." In *L'Encyclopédie, Diderot, l'esthétique: mélanges en hommage à Jacques Chouillet*. Ed. Sylvain Auroux, Dominique Bourel, and Charles Porset, 267-72. Paris: Presses universitaires de France, 1991.
- _____. *Poétique de l'opéra français de Corneille à Rousseau*. Paris: Minerve, 1991.
- Kleinmann, Sydney. *Le Solmisation mobile de Jean-Jacques Rousseau à John Curwen*. Paris: Heugel, 1974.
- Kling, Henri. "Jean-Jacques Rousseau et ses études sur l'harmonie et le contrepoint." *Rivista musicale italiana* 12 (1905): 40-62.
- Krebhiel, James. "Harmonic Principles of Jean-Philippe Rameau and his Contemporaries." Ph.D. diss., Indiana University, 1964.
- Lang, Paul Henry. *Music in Western Civilization*. New York: Norton, 1941.
- Lester, Joel. *Compositional Theory in the Eighteenth Century*. Cambridge: Harvard University Press, 1992.

- _____. "Rameau and Eighteenth-Century Harmonic Theory." In *The Cambridge History of Western Music Theory*. Ed. Thomas Christensen, 753-77. Cambridge: Cambridge University Press, 2002.
- Lewin, David. "Two Interesting Passages in Rameau's *Traité de l'harmonie*," In *Theory Only* 4 (1978): 3-11.
- _____. "Concerning the Inspired Revelation of F.-J. Fétis." *Theoria* 2 (1987): 1-12.
- Magloire, Jean-Claude. "L'Analyse ramiste du monologue d'*Armide*." In *Musique raisonnée: Jean-Philippe Rameau*. Ed. Catherine Kintzler and Jean-Claude Magloire, 201-15. Paris: Stock, 1980.
- Moomaw, Charles Jay. "Augmented Mediant Chords in French Baroque Music." Ph.D. diss., University of Cincinnati, 1985.
- Moreno, Jairo. "The Complicity of the Imagination: Representation, Subject, and System in Rameau." In *Musical Representations, Subjects, and Objects: The Construction of Musical Thought in Zarlino, Descartes, Rameau, and Weber*, 85-127. Bloomington, IN: Indiana University Press, 2004.
- Oliver, Alfred Richard. *The Encyclopedists as Critics of Music*. New York: Columbia University Press, 1947.
- O'Dea Michael. "Rousseau contre Rameau: musique et nature dans les articles pour l'*Encyclopédie* et au-delà." *Recherches sur Diderot et sur l'Encyclopédie* 17 (1994): 133-48.
- _____. *Jean-Jacques Rousseau: Music, Illusion and Desire*. London: MacMillan, 1995.
- _____. "Consonances et dissonances: Rousseau et d'Alembert face à l'oeuvre théorique de Jean-Philippe Rameau." *Recherches sur Diderot et sur l'Encyclopédie* 35 (2003): 105-30.
- _____. "'Visions inintelligibles' et 'vérités apocalyptiques': théorie et pratique de l'opéra français." *Studies on Voltaire and the Eighteenth Century* 2005:10, 234-46.

- Palisca, Claude. "Scientific Empiricism in Musical Thought." In *Seventeenth-Century Science and the Arts*. Ed. Hedley Howell Rhys, 91-137. Princeton: Princeton University Press, 1961.
- Paul, Charles B. "Jean-Philippe Rameau: (1683-1764): The Musician as *Philosophe*." *Proceedings of the American Philosophical Society* 114 (1970): 140-54.
- Pischner, Hans. *Die Harmonielehre Jean-Philippe Rameaus: ein Beitrag zur Geschichte des Musikalischen Denkens*. Leipzig: Breitkopf & Härtel, 1963.
- Planchart, Alejandro Enrique. "A Study of the Theories of Giuseppe Tartini." *Journal of Music Theory* 4 (1960): 32-61.
- Proust, Jacques. "Diderot et le système des connaissances humaines." *Studies on Voltaire and the Eighteenth Century* 256 (1988): 117-27.
- Reichenburg, Louisette. *Contribution à l'histoire de la Querelle des Bouffons*. Philadelphia: n.p., 1937.
- Riemann, Hugo. *Geschichte der Musiktheorie im IX.-XIX. Jahrhundert*. 3rd ed. Hildesheim: Olms, 1961.
- Robinson, Philip. "Rousseau, Music and the Ancients." In *The Classical Tradition in French Literature*. Ed. H. T. Barnwell, 203-15. London: Grant & Cutler, 1977.
- _____. *Jean-Jacques Rousseau's Doctrine of the Arts*. New York: Lang, 1984.
- Rolland, Romain. *Musiciens d'autrefois*. Paris: Hachette, 1903.
- Schneider, Herbert. "Rameaus musiktheoretisches Vermächtnis." *Musiktheorie* 1 (1986): 153-61.
- _____. *Jean-Philippe Rameaus letzter Musiktraktat: Vérités également ignorés et intéressantes tirées du sein de la nature (1764): kritische Ausgabe mit Kommentar*. Weisbaden: Franz Steiner Verlag, 1986.
- Scott, John. T. "Rousseau and the Melodious Language of Freedom." *Journal of Politics* 59 (1991): 803-29.

- _____. "The Harmony Between Rousseau's Musical Theory and his Philosophy." *Journal of the History of Ideas* 59 (1998): 287-308.
- Shellhous, Rosalie. "Fétis's Tonicity as a Metaphysical Principle: Hypothesis for a New Science." *Music Theory Spectrum* 13 (1991): 219-48.
- Shirlaw, Mathew. *The Theory of Harmony*. 2nd ed. DeKalb, IL: Birchard Coar, 1955.
- Simms, Brian. "Choron, Fétis, and the Theory of Tonicity." *Journal of Music Theory* 19 (1975): 112-39.
- Starobinski, Jean. *Jean-Jacques Rousseau: la transparence et l'obstacle*. 2nd ed. Paris: Gallimard, 1971.
- _____. "L'Arbre du savoir et ses metamorphoses." In *Essais et notes sur l'Encyclopédie de Diderot et d'Alembert*. Ed. Andrea Calzolari and Sylvie Delassus, 285-308. Milan: F. M. Ricci, 1979.
- Striffling, Louis. *Esquisse d'une histoire du gout musical en France au XVIII^e siècle*. Paris: Delagrave, 1912.
- Tiersot, Julien. "Les 'Leçons de musique' de Jean-Jacques Rousseau." *Sammelbände der internationalen Musikgesellschaft* 14 (1913): 253-77.
- _____. *Jean-Jacques Rousseau musicien*. 2nd ed. Paris: Alcan, 1920.
- Thomas, Downing A. *Music and the Origins of Language: Theories from the French Enlightenment*. Cambridge: Cambridge University Press, 1995.
- Vallas, Léon. *Un Siècle de musique et de théâtre à Lyon (1688-1789)*. Lyons, 1932; repr., Geneva: Slatkine, n.d.
- Verba, Cynthia. "The Development of Rameau's Thoughts on Modulation and Chromatics." *Journal of the American Musicological Society* 26 (1973): 69-91.
- _____. *Music and the French Enlightenment: Reconstruction of a Dialogue, 1750-1764*. Oxford: Oxford University Press, 1993.
- Vogel, Martin. *Der Naturseptime: Ihre Geschichte und ihre Anwendung*. Orpheus—Schriftreihe zu Grundfragen der Musik. Vol 61. Bonn: Verlag für systematischen Musikwissenschaft, 1991.

- Waldura, Markus. *Von Rameau und Riepel zu Koch: zum Zusammenhang zwischen theoretischem Ansatz, Kadenzlehre und Periodenbegriff in der Musiktheorie des 18. Jahrhunderts*. Hildesheim: Georg Olms Verlag, 2002.
- Walker, Daniel. "The Musical Theory of Giuseppe Tartini." In *Studies in Musical Sciences in the Late Renaissance*, 132-70. London: Warburg Institute, 1978.
- Wangermée, Robert. *François-Joseph Fétis musicologue et compositeur: contribution à l'étude du goût musical au 19^e siècle*. Brussels: Palais des Académies, 1951.
- Wolker, Robert. "Rameau, Rousseau and the *Essai sur l'origine des langues*." *Studies on Voltaire and the Eighteenth Century* 117 (1974): 179-238.
- _____. *Jean-Jacques Rousseau on Society, Politics, Music and Language: An Historical Interpretation of the Early Writings*. New York: Garland, 1987.