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Body, Forces, and Paths: Metaphor and Embodiment in Jean-Philippe Rameau's Conceptualization of Tonal Space*

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ABSTRACT: Studies by George Lakoff and Mark Johnson in the field of cognitive linguistics give rise to a theory of meaning that bestows a central role on metaphorical thinking and the body. This essay explores the ramifications of physical embodiment on Jean-Philippe Rameau's conceptualization of tonal harmony. My examination will show that Johnson's theory of the bodily basis of metaphor is not sufficiently adequate to account for all the aspects of Rameau's harmonic theory, and additional sources for metaphorical projection should be taken into account for its full rendering.

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1. Introduction

[1.1] The most influential account of the nature of musical meaning is probably to be found in Eduard Hanslick's *Vom Musikalisch-Schönen* of 1854. In this famous essay, the music critic argues that the meaning of music lies in its form rather than in its affective aspects. He criticizes the romantic aesthetics that take emotion to be an authority in matters of art and suggests that the unique beauty of music should be investigated using the methods of the natural sciences. In his words, he aims "to get alongside the thing itself, seeking whatever among our thousandfold flickering impressions and feelings may be enduring and objective."(1) That being said, he goes on to assert that in music the stable and objective factors are the "tonal moving forms" that are present in musical composition independent of the listener or observer who perceives them. To be sure, Hanslick does not deny the ability of music to arouse feelings but this ability, in his opinion, has no relation to artistic value. Music is pure form and therefore one should evaluate its significance in terms of its technical means.

[1.2] To a great extent, Hanslick's assumption regarding the objective nature of the musical structure defines the interests of music theorists up to the present day.(2) In recent years, however, an alternative view of the nature of formalistic preoccupation with music has emerged. The studies of the linguist George Lakoff and the philosopher Mark Johnson in the field of cognitive linguistics were conducive in this development. In a series of publications, both joint and independent,(3) they propose a theory of meaning that bestows a central role on metaphorical thinking and the body.(4) This theory undermines the objectivist notion of musical meaning as something that is inherent in the music itself and suggests a new framework for the analytical discussion of music, as well as a refreshing perspective on traditional theoretical models.

[1.3] This essay focuses on Johnson's theory of embodied meaning and its application to eighteenth-century harmonic

theory. First, I will discuss the role of metaphor in Roger Scruton's aesthetics of music and the work of Lakoff and Johnson on metaphor, which supports some of Scruton's conclusions. Later, I will present the theory of embodied meaning and explore the ramifications of physical embodiment on musical thinking through a close inspection of Jean-Philippe Rameau's conceptualization of tonal harmony. This examination will emphasize the interplay between metaphors of various sources in Rameau's musical discourse.

2. Metaphor and Music as an Intentional Object

[2.1] In his article "Understanding Music," the neo-Kantian philosopher Roger Scruton claims that the understanding of music *as music* necessarily involves metaphorical thinking, a claim that is based on an assumption regarding experience and its verbal representation.(5) Scruton says that the descriptive language of listeners discloses the concepts and categories they apply while listening to music. Accordingly, he distinguishes between two forms of understanding reflected in the difference between the description of material (or acoustic) characteristics of sound and *musical* description: scientific understanding, and a type of understanding that he calls, following the phenomenologists, "intentional understanding."(6) Scientific understanding approaches the world as a material object and seeks to explain it in terms of causal connections; intentional understanding, on the other hand, considers the world as it appears to our direct awareness (in Husserl's idiom, *Lebenswelt*) and brings to light only those connections and relations that are already implied in one way or another by our concepts. "Because all our perception is informed by concepts," says Scruton, "and those concepts in their turn determine our understanding and practical reasoning, a critic or philosopher can bring system to an appearance, by drawing out the implications of the concepts through which it is described. This description need not be one that the person who perceives with understanding can provide. But when he understands it, he will recognize it immediately as a description of the experience that is his."(7)

[2.2] Musical understanding is thus a special case of intentional understanding.(8) As such, it is dependent on our intellectual abilities, education, concepts, analogies and expectations, whose origins are in the musical culture. The understanding that we acquire from this culture is not expressed only in the way we think of music, but also in the way we hear it. This is reflected in the way we hear, for instance, the change of a note in a phrase as "melodic motion"; when we perceive a note as being "low" or "high"; or when we interpret a combination of individual notes as "harmony." In all these cases, the object of the description is not material fact but a phenomenal aspect of our musical experience. This idiosyncrasy leads Scruton to the conclusion that music belongs exclusively to the intentional sphere and not to the scientific realm.(9)

[2.3] Scruton invokes metaphor in order to account for the intentional character of musical experience. What appears in all the above mentioned cases, in which auditory events are understood in terms of musical categories, is metaphorical transference, that is, taking concepts from one domain and applying them to another. At the basis of our musical understanding, Scruton argues, lies a complex system of metaphor that causes us to hear tones (as opposed to sounds) as being in motion. Scruton rejects various suggestions according to which this motion is in fact literal;(10) yet, he stresses that one cannot dispense with it. The metaphor of space and motion within it is an integral part of the intentional object of our musical understanding and without it a true description of musical experience is not possible.(11) Therefore, he establishes, against the traditional formalistic view, that "any analysis of music must be an exercise in intentional rather than scientific understanding."(12) His conclusion finds empirical confirmation in the cognitive studies of Lakoff and Johnson who claim in *Metaphors We Live By* (1980) that metaphor is the *modus operandi* of our thought as a whole.

3. Metaphor and the Construction of Meaning

[3.1] Lakoff and Johnson begin by drawing attention to the fact that metaphor is not restricted to literary usage, as is often supposed, but it is actually a prevalent element in ordinary language as well. Consider for instance the expression "I have no time," suggesting that time is a material thing, or "your claim is indefensible," assuming that the claim is taking part in a battle. Such expressions are so much a part of our daily speech that we tend to forget that they are really metaphorical. But metaphor is not just a matter of words. From the discovery of the frequency of metaphor in day-to-day language, Lakoff and Johnson go on to argue that metaphor structures and defines our conceptual system, and, as a result, also has an effect on our behavior. Their claim is supported by analysis of linguistic expressions that reveal a shared deep-structure called "conceptual metaphor." I shall demonstrate this through the conceptual metaphor LOVE IS A JOURNEY.

[3.2] It is well known that love is an emotion or a feeling, not a "journey" in the literal sense of the word. Nevertheless, we tend to describe this emotion and its development in terms of a "journey." We say of those who are in love that they are in a state of "smooth sailing"; or that they are "on the rocks"; they are likely to "pass through the years" or to "go their separate

ways"; they might "get stuck in a rut" or find that their relationship is "going nowhere." Underlying all these expressions is an association of the emotion of love with a journey. LOVE IS A JOURNEY is therefore a conceptual metaphor that defines a broad range of linguistic metaphors.(13)

[3.3] The example of LOVE IS A JOURNEY proves that we systematically borrow terms from one domain, a "source domain," in order to clarify aspects of another, the "target domain," with the first domain usually being concrete and familiar (a journey, for instance) while the second is abstract and ambiguous (such as love).(14) This phenomenon indicates the metaphorical character of our conceptual system, and influences our functioning; our concepts, which are partly metaphorical, structure our perceptions, our behavior, and the way we communicate with one another. It can be assumed that in a society in which love is understood primarily as "war" and not as a "journey," successful couplehood would have a different meaning from the one we are familiar with. I will examine this somewhat monolithic interpretation of metaphor more closely in my discussion of Rameau's harmonic theory.

4. Musical Space and Orientational Metaphors

[4.1] In the case of LOVE IS A JOURNEY, a certain concept has been structured metaphorically in terms of another concept. Another type of metaphorical concept is one that organizes a whole system of concepts with respect to one another. Lakoff and Johnson call these cases "orientational metaphors" because most of them have to do with spatial orientations such as up-down, in-out, front-back, on-off, deep-shallow, central-peripheral. These spatial orientations arise from the way our bodies are constructed and function in our physical environment. Orientational metaphors give a concept spatial orientation. A number of orientational metaphors and some linguistic expressions derived from them follow:

HAPPY IS UP; SAD IS DOWN
I'm feeling *up*. That *boosted* my spirits. My spirits *rose*. You're in *high* spirits. Thinking about her always gives me a *lift*. I'm feeling *down*. I'm *depressed*. He's really *low* these days. I fell into a *depression*. My spirits *sank*.

HEALTH AND LIFE ARE UP; SICKNESS AND DEATH ARE DOWN
He's at the *peak* of health. Lazarus *rose* from the dead. He's in *top* shape. As to his health, he's *up* there. He *fell* ill. He's *sinking* fast. He came *down* with the flu. His health is *declining*. He *dropped* dead.(15)

[4.2] Orientational metaphors are evident in our ideas about musical space as well. Like Scruton, Lawrence Zbikowski, a theorist influenced by Lakoff and Johnson, points out that our characterization of the relative height of a pitch does not rest on empirical data related to actual location in space, but on metaphorical transference; there is no literal significance to the statement that D4 on the piano is "higher" than C3; after all, both of them are located on the same horizontal plane of the keys.(16) The same applies to "vertical" instruments: to play the "higher" D4 on the cello, we have to slide our left hand downwards, in such a way that in fact brings it closer to the ground. Zbikowski's conclusion is that our culturally induced conceptualization of musical space is based on the conceptual metaphor PITCH RELATIONSHIPS ARE RELATIONSHIPS IN VERTICAL SPACE which maps spatial orientations such as "up-down" onto the pitch continuum.(17) The cognitive theory of metaphor therefore confirms Scruton's fundamental insight regarding the metaphorical character of musical understanding and paves the way towards its explanation.

5. Image Schemas and Physical Embodiment

[5.1] Metaphorical transference plays a central role in the constitution of meaning but in itself is insufficient to provide a comprehensive explanation of the nature of our understanding. Immediately, questions arise: Why does the metaphorical mapping happen to be from a concrete domain to an abstract one? How is the understanding of the source domain possible in the first place? In *The Body in the Mind*, Mark Johnson approaches these questions with a surprising suggestion, one with far-reaching implications for the philosophical discussion of the problem of body and mind: the ultimate grounding of our understanding, he claims, lies in the body, in its movements and orientations.

[5.2] According to Johnson, our perception of the world involves image schemas, which are experiential gestalts emerging from fixed patterns of our physical activity.(18) Image schemas operate at a pre-conceptual level and provide the fundamental framework on which concepts and relationships that are essential to metaphor are based. The hypothesis of image schemas whose source is physical explains the direction taken by metaphorical mapping (from the concrete to the abstract), and offers a platform for understanding the constraints that determine our understanding of reality. In order to better comprehend the notion of image schemas, two examples will be presented below: the path schema and the force schema. The diagrams are

for demonstration purposes only—to concretize the principal elements of the schemas; they imply nothing about mental pictures or representations we "carry" in our heads.

[5.3] As in any image schema, the path schema (**Figure 1**) has an inner logic or structure loyal to its source in physical experience. Paths are a very familiar thing for us. There is a path that leads from the bedroom to the bathroom, from the fridge to the kitchen table, from the Earth to the Moon, from the master's degree to the doctorate, and from the doctorate to a professorship; some of these paths are real and some exist only metaphorically. In which case, they all share a recurring image-schematic pattern with a definite internal structure: (1) a source, or starting point; (2) a goal, or end-point; and (3) a sequence of contiguous locations connecting the source with the goal.

[5.4] As a consequence of these parts and their relations, the path schema has certain typical characteristics:

a. Continuity. Because the beginning and end points of a path are connected by a series of contiguous locations, it follows that, if you start at point A and move along a path to a further point B, then you have passed through all the intermediate points in between.
b. Directionality. Paths are not inherently directional—a path connecting point A with point B does not necessarily go in one direction. However, since human beings have purposes in traversing paths, they tend to experience them as directional.
c. Temporality. I start at point A (the source) at time T_1, and move to point B (the goal) at time T_2. In this way, there is a time line mapped onto the path. Such a linear spatialization of time gives rise to one important way we understand temporality. (19)

[5.5] While the path schema drives from our experience of paths, the second, the force schema, derives from our experience of forceful activity. Johnson says:

> In order to survive as organisms, we must interact with our environment. All such causal interaction requires the exertion of *force*, either as we act upon other objects, or as we are acted upon by them. Therefore, in our efforts at comprehending our experience, structures of force come to play a central role. (20)

[5.6] The force schema is in fact a number of image schemas that constitute a radial category, that is, a category that contains a prototype or typical member and a number of less typical members. (21) Johnson lists the following features of the force schema prototype: (1) interaction; (2) vector or directionality; (3) path of motion; (4) origins or sources; (5) degrees of power or intensity; and (6) a structure or sequence of causality. **Figure 2** shows the visual representations of the most common members of the force schema category: compulsion, blockage, diversion, removal of restraint, enablement, and attraction. The solid lines represent actual force vectors and broken lines represent potential force vectors. In all the illustrated schemas, some elements of the prototype are maintained, but others may change.

[5.7] The path schema and the force schema offer a basis for a wide variety of metaphorical interpretations in different fields, among them, as Janna Saslaw has shown expansively, the field of music theory. (22) In what follows, I will examine the role of the path schema and the force schema in Jean-Philippe Rameau's *Traité de l'Harmonie* of 1722, while taking issue with Lakoff and Johnson's theory of embodied meaning and its assumptions. (23) My examination will show that the hypothesis of image-schema is not sufficiently adequate to account for all the aspects of Rameau's theory, and additional sources for metaphorical projection should be taken into account for its full rendering.

6. Metaphor and Embodiment in Rameau's *Traité de l'Harmonie*

[6.1] Rameau's musical conception includes both the force schema and the path schema. (24) Both are expressed in his general view of music as an interaction between physical entities we call chords following one another in temporal succession. (25) Chords and the relationships between them play a central role in Rameau's musical thinking. He conceives harmony as the cause of voice leading, not its product. Chord progressions govern the melodic events and facilitate the course of music. In Book 2 of the *Traité*, he says:

> Harmony then is generated first, and it is from harmony that the rules of melody must be derived; indeed, this is what we do by taking separately the aforementioned harmonic intervals, and forming from them a fundamental progression which is still not a melody. But when these intervals are put together above one of their component sounds, they naturally follow a diatonic course. (26)

[6.2] According to Rameau, the source of harmony in music is the undivided string.[27] Its division produces the perfect chord (*accord parfait*) or "consonant harmony";[28] the addition of a third above it produces the seventh chord, or "dissonant harmony." All harmony is based on the perfect chord, the seventh chord, or an inversion of either of them.[29] The voice leading is guided by the progression between these sonorities which are structured as self-contained, yet functionally related, entities. Thus, Rameau's conception of musical motion invokes the force schema and the path schema by means of two conceptual metaphors: HARMONIES ARE OBJECTS IN INTERACTION and HARMONIC PROGRESSION IS PATH. These define Rameau's approach to cadences, dissonances and other aspects of composition.

[6.3] Before we proceed, it is necessary, however, to examine the actual relationships between these metaphors and Rameau's theory. As previously noted, Johnson's theory of conceptual metaphors posits that the body is the ultimate source of metaphor with embodied image schemas working as a limiting framework for concepts. This hypothesis is not without difficulties when applied to Rameau's harmonic theory. For one, it is unable to account for all of Rameau's theoretical concepts.[30] The problem we face in attempting to apply Johnson's hypothesis to Rameau's theory, and to music theory in general, is twofold: on the one hand, there is an obvious need to account for all the peculiarities of a theoretical model if one is not to avoid its special features; on the other hand, the metaphor theory will lose much of its explanatory force if it cannot be proven that musical conceptions are constructed by metaphorical operations in any systematic way. In order to solve this problem, I will attempt to distinguish between those aspects of Rameau's theory that are presumably grounded in embodied experience, and those which seem to suggest other, or additional, sources for their projection.

[6.4] Rameau's harmonic theory cannot be adequately understood without his notion of inversion. As is well known, one of Rameau's central tenets is that certain harmonies are in fact "inversions" of some chord or other consisting of a pile of thirds.[31] At the bottom of this pile is the fundamental tone, or the root, of the chord. A succession of root tones gives rise to the "fundamental bass" (*basse-fondamentale*), the theoretical bass line that clarifies the harmonic progression. As Allan Keiler has observed, this part has two conceptual aspects: on the one hand, it may appear as an actual voice in the musical texture; on the other, it serves as an underlying structural foundation that explains the other parts.[32] The notion of "inversion" is a metaphorical concept (chords are not objects to be inverted), consistent with Rameau's conceptualization of chords as objects in space.

[6.5] Though the notes of the fundamental bass can appear anywhere in the musical texture, Rameau insists that the fundamental bass is "always the lowest and deepest part."[33] In support of his claim, he quotes from Gioseffo Zarlino's *Le institutioni harmoniche*, interpreting the Italian theorist's "bass" as fundamental bass:

> Just as the earth is the foundation for the other elements, so does the bass have the property of sustaining, establishing, and strengthening the other parts. It is thus taken as the basis and foundation of harmony and is called the bass—the basis and support, so to speak . . . if the bass were to disappear, the whole piece of music will be filled with dissonance and confusion.[34]

Rameau's employment of the quotation from Zarlino suggests that the fundamental bass, whether or not it occurs as an actual voice, supports all the harmonic and melodic events and determines the functional relations between the chords. Like the earth, the fundamental bass functions as a coordinating force which keeps everything above it in harmony.

[6.6] Rameau argues that the progression of the fundamental bass is based on the structure of the vertical sonorities. Arnold Schoenberg once described the "two or more dimensional space in which musical ideas are presented" as a "unit."[35] He was referring to the notion that the totality of events in a composition, whether melodic, rhythmic, or harmonic, derive from the same source and reveal their structural meaning through their interaction.

[6.7] Rameau applies a similar notion of unity to the relation between chords and the fundamental bass. In his view, the progression of the fundamental bass and the chord structures are based on the same divisions of the monochord. As he says:

> When we give a progression to the part representing this undivided string [i.e. the fundamental bass], it can only proceed by those consonant intervals obtained from the first divisions of this string. Each sound will consequently harmonize with the sound preceding it. As each can bear in its turn a chord similar to the chord obtained from the first divisions, it will easily represent the undivided string, the source and foundation of the chord.[36]

Rameau conceptualizes musical space as a homogeneous field in which the intervals of the harmonic progression derive from the structures of the vertical sonorities. He maintains that the most natural progression of the fundamental bass is

carried out in those intervals from which the chords are constructed, the third and the fifth.[37]

[6.8] The equation of the vertical structures of the chords with the horizontal progressions of the fundamental bass contradicts our experience of physical space as well as the phenomenal character of music.[38] From a bodily perspective, moving along a horizontal path would seem to be vastly different from moving up against the force of gravity. Similar structural differentiation exists also among parts in a musical texture. Under normal conditions, musical space is not at all homogenous but rather fraught with formal distinctions, which might suggest a deeper connection with gravity. Manfred Bukofzer once noted that "It is no mere metaphor if tonality is explained in terms of gravitation. Both tonality and gravitation were discoveries of the baroque period made at exactly the same time."[39]

[6.9] Admittedly, Bukofzer's aim was to point out two analogous manifestations of the Baroque culture in order to emphasize its essential coherence; yet the suggestion is significant here for pointing out the hierarchical nature of both musical and physical spaces. The experience of high and low in music has already been indicated. It is important to note that in the context of tonal music this distinction has consequences for the functional significance of the parts in the texture. There is no question of the importance of the bass part, in comparison to other parts, in establishing harmonic sense and directionality. Rameau's geometrical view of musical space clearly does not admit such distinctions despite his appeal to the metaphor of the fundamental bass as "earth."

[6.10] Given Rameau's acknowledgment of the importance of the bass as the carrier of harmony, it might be interesting to ask why he adheres to a conception of musical space that runs contrary to both experiential space and aural perception of tonal music. Put differently, what is the source of Rameau's notion of musical space? According to the theory of embodied meaning, the choice of a source domain for metaphorical mapping is determined by body-based experience which correlates a concrete source domain with an abstract target domain. "Schemas that structure our bodily experience preconceptually," says Lakoff, "have a basic logic. Preconceptual structure correlations in experience motivate metaphors that map that logic onto abstract domains."[40] The contradiction between Rameau's view of musical space and our common experience of physical space suggests an alternative basis for metaphorical mapping.

[6.11] As recent studies of Rameau's harmonic theory have demonstrated, the notion of musical space introduced in the *Traité* is based on the Cartesian view that construes physical space as a two or three-dimensional undifferentiated field.[41] This suggests a cultural source in the form of a scientific model for Rameau's notion, rather than one which is grounded in concrete musical and physical experience. The affinity between his and Schoenberg's view of musical space by no means implies otherwise; Schoenberg's compositional conception has been a subject for dispute rather than agreement.[42] From this case, it is clear that selected source domains of metaphorical mapping can contradict expectations derived from common experiences, and even arise from abstract domains such as scientific theories.

[6.12] Though the fundamental bass can move in different ways, Rameau ascribes central importance to cadences. In his harmonic theory, the cadence is not (necessarily) a closing gesture, but a specific progression of the fundamental bass. He recognizes two types of cadences:[43] the "perfect cadence," a leap of a fifth down or a fourth up (from dominant to tonic), the first chord being a seventh and the second a triad;[44] and the "irregular cadence," a leap of fifth up or a fourth down (from tonic to dominant or from the subdominant to the tonic) with the first chord being an added-sixth chord (**Figure 3**).[45] Both kinds of cadences may appear anywhere in the phrase. Music, according to Rameau, is nothing but a chain of cadences in different inversions and variations. In terms of the path schema, they connect adjacent points along the path, and guarantee the continuity of the harmonic process.

[6.13] In the *Traité*, Rameau explains the cadential progressions of the fundamental bass other than by third and fifth due to "license" (Rameau's term for deviation from the norm). In later writings, however, he proposes that the progression of a second between the subdominant (or added sixth chord) and dominant (V) is a result of "double usage" (*double emploi*). The subdominant, he suggests, can be interpreted as a chord on the fourth scale degree, or, alternatively, as the first inversion of a seventh chord on the second degree (II$^6_5$), depending on the context. In a typical cadential progression (in modern terms: I-IV-V-I), the subdominant will function as an added-sixth chord in relation to the tonic and as a second degree first-inversion chord in relation to the dominant. In this way, Rameau establishes a fifth relation with the chords both preceding and following the subdominant.

[6.14] At first sight, Rameau's speculative notion of the double usage was meant to force the subdominant chord into the scheme of fifth-based progressions. To that extent, however, it is revealing for the systematicity of his metaphor of musical motion. In Rameau's theory, cadential progressions function as a model, or a basic category. Music is nothing but a series of

continuous cadential progressions, and a digression from this model calls for correctives. The notion of "double usage" makes it possible for Rameau not only to "assimilate" the problematic aspect of the subdominant into his theory, but also to reinforce the metaphor of harmonic motion as path consisting of interlocking cadences.

[6.15] Rameau's concept of cadences also indicates structuring by the force schema. He claims that each cadence has its typical dissonance: for the perfect cadence it is the seventh of the dominant, and for the irregular cadence, the added-sixth (*sixte ajouté*) of the first chord, which forms a dissonance with the fifth of the bass. In both instances, the dissonance generates the force that propels the chords towards their resolution.

[6.16] Rameau extended this idea to all the harmonic progressions in order to explain the kinetic character of music.(46) "Far from dissonance being an embarrassment in composition," he says, "it facilitates its course;"(47) elsewhere he refers to the seventh chord of the perfect cadence, saying that "It seems that dissonance is needed here in order that its harshness should make the rest which follows more desired."(48) For Rameau, the dissonance is not an exceptional event but a condition for musical continuity. Dissonances, he claims, even if they are not actually present, are present implicitly and drive the music forward.(49)

[6.17] Rameau's view of the function of dissonance attests to the influence of another contemporary intellectual model on his harmonic theory, that is, mechanistic philosophy. For him, dissonances work as a mechanistic force that pushes each chord to the following one. Significantly, this view is compatible with the compulsion schema (**Figure 4**) which complements his cultural source in a way that suggests mutual support between the physical experience of force and his deliberate choice of this intellectual model as a framework for his theory. Rameau's metaphor of dissonance as force is both a metaphorical elaboration of a concept derived from prevalent eighteenth-century scientific ideas and an embodied source domain.

[6.18] Rameau concretizes his view through an analogy between the behavior of dissonances and that of colliding objects.(50) In the "Supplement" part of the *Traité*, Rameau quotes two propositions from a text on physics by Ignace-Gaston Pardies, a famous seventeenth century physician:

> *A moving body meeting another body which is at rest gives the body at rest all its motion and remains immobile itself.*
> *A hard body which strikes an immovable body will be reflected together with its motion.*(51)

[6.19] Rameau attempts to show that the first effect parallels that of the prepared dissonance, and the second, that of the unprepared dissonance. To do so, he analyzes two progressions, the first containing perfect cadences, the second with irregular ones. His analysis is presented in **Figure 5**. The slanted lines between pitches indicate the direction of the dissonances. The notes marked B are prepared dissonances, those marked F are unprepared. To see the similar effect of the collision between physical bodies and dissonances, Rameau asks us to notice that "dissonance B is at rest when consonance A strikes it (*la frapper*)." And he continues:

> Immediately after the collision [*choc*], the consonance becomes immobile and obliges the dissonance to pass to C. This is effectively the place to which the consonance itself could have passed but can no longer do so, since the dissonance has taken its place. The consonance seems to have given all its motion to the dissonance. Then, Consonance D, which seems to be unshakable [*inébranlable*], after having received a strike from dissonance F, obliges it to return to G, from where it started. The dissonance here seems to be reflected with all its motion, after having struck an immovable consonance.(52)

[6.20] Rameau's analysis clarifies in a far more tangible way than any theoretical statement his perception of music as a forceful activity. At the same time, the mechanistic-compulsive nature of the entire harmonic process attests to his view of music as having a defined structure of causality. Such a structure is an additional element of the force schema.

[6.21] Rameau's conceptualization of the dissonance also includes the element of vector or directionality of the same schema. Our experience of force involves directional motion of an object in space. For Rameau, I surmise, the mobile object is the chord, which "moves" to the following chord, repeating this process up to the final tonic. The whole process is activated by the dissonance, music's source of force. As a musical event that demands a defined and agreed upon resolution, the dissonance is responsible for the directionality of the harmonic progression.

[6.22] Rameau's view of musical motion as a whole is predicated upon the dissonance as a source of tension. The preparation and resolution of all types of dissonance, he argues, is identical to that of the seventh of the dominant seventh chord: "The

rules concerning dissonance should always be derived from the fundamental bass and from the fundamental seventh chord. We shall see, furthermore, that the seventh chord alone reigns in all the different dissonant chords we may use."[53] In his view, each seventh chord contains at least one of the following two types of dissonance: "minor dissonance," produced by the addition of a minor third above the fifth of the chord in root position (i.e. a minor seventh above the tonic) and "major dissonance," referring to the leading tone. (Rameau noted that the chord presently known as the dominant seventh chord contains a dissonant interval, a tritone, between its seventh and the leading tone.) Because both these tones demand a clearly marked resolution, the first downwards, and the second upwards, Rameau interprets both as dissonances.

[6.23] In order to explain how these rules apply to other types of dissonance, for instance, "suspensions," Rameau introduced a new concept in music theory: supposition. This term refers to a process in which a part is added either a third or a fifth below the fundamental bass of a dissonant chord, in order to explain various dissonances as "major dissonance" or as "minor dissonance" above the chord in the supposition.[54] Being based on the same harmonic formation, real or theoretical, all dissonances behave in an identical way. Ideally, music, in Rameau's view, is structured as a chain of seventh chords which resolve one into the other in a regular manner (**Figure 6**).[55] The ideal chain of seventh chords ends on the tonic. As the only chord that does not contain the kinetic element of dissonance, the tonic is the starting and ultimate ending point of every harmonic path. At the same time, it is also the conclusion of the mechanistic process activated by the dissonance.

[6.24] Finally, the qualitative difference between the tonic and all other chords implies the element of the degree of power or intensity essential for the prototypical force schema. From the distinction between "dynamic" chords that contain dissonances and a "static" tonic, it appears that Rameau's system admits at least two levels of intensity: the first, active tension produced within the phrase by progression between chords that are not the tonic, and, second, the total lack of tension intrinsic to the tonic. To these, one might add a third, intermediate level that results from the deceptive cadence which delays the musical flow by a temporary interruption, but does not bring it to a standstill: "If we change the progression of one of the sounds in the first chord of a perfect cadence, we shall undoubtedly interrupt the conclusion."[56] The deceptive cadence is apparently parallel to the case in which a temporary physical obstacle interferes with the advancement of a moving object, thereby invoking the removal of restraint schema (**Figure 7**). This schema, like the aforementioned force schemas, resonates with Rameau's contemporary scientific notion of mechanistic causation.

7. Conclusion

[7.1] This paper has focused on the metaphorical character of our musical understanding and investigated the influence of physical embodiment on Rameau's harmonic theory as this is expressed in the application of two image schemas: force and path. These provide a basis for metaphorical interpretations that bear on his conceptualization of harmonic processes. The path schema is expressed in Rameau's view of harmonic progression as a directional and continuous process that begins and ends at specified points; the force schema is indicated by his view of the chords as entities in interaction, of the dissonance as a source of force, and the complete harmonic process as a structure of causality. These two schemas are essential to Rameau's theory and to other systematic conceptualizations of music as well.

[7.2] But to what extent are Rameau's ideas the product of universal physical experience and to what extent are they based on individual choice and cultural influences? Or, to formulate the question in psychological terminology, what part is played by nature and what by nurture? According to the theory of embodied meaning, the choice of a specific verbal representation of reality is not arbitrary but based on an underlying image schema that best fits the event or experience to be represented.[57] As we saw, however, the range of application of each schema and the degree of its systematization may change from case to case in accordance with personal and cultural preferences. Moreover, the force and path schemas interact in Rameau's harmonic theory with additional sources for metaphorical projection. Most notable was Rameau's attempt to bring the scientific notions of his time to the theoretical discourse of music, which resulted in a certain perspective on musical space and tonal motion.

[7.3] This paper advocates a pluralistic approach to metaphor, one which acknowledges that metaphorical mapping can draw on a variety of sources simultaneously. For Rameau, the choice to conceptualize harmony in terms of the path and force schemas derives, apparently, from the temporal character of music that invites a discussion in terms of path on the one hand, and the mechanistic philosophy of the Enlightenment that encourages images of force and motion on the other. Yet, even if such a separation is feasible in theory, we have seen how, in reality, the various components of the two schemas, and concepts deriving from Rameau's intellectual models, combine with one another, rendering any separation between them artificial.

[7.4] As an attempt to explain an aspect of reality, Rameau's theory offers a good example of the fact that the borders between nature and culture, between subjective and objective meaning, and between literal and figurative description are not as clear as is commonly accepted. The new awareness of the metaphorical character of musical discourse and thought may not radically change the way music has been and continues to be discussed and analyzed, but it certainly raises profound questions about the relation between music and other fields of our experience.

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Footnotes

* I would like to thank the reviewers of MTO for their insightful comments and suggestions.
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1. Eduard Hanslick, *On the Musically Beautiful* (1854), trans. and ed. Geoffrey Payzant (Indianapolis: Hackett Publishing Company, 1986), 1.
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2. In an attempt to explain the attraction that systematic analysis holds for theorists, Joseph Kerman suggests that this derives from an affinity to the positivistic ideal of scientific knowledge. See: Joseph Kerman, *Contemplating Music* (Cambridge: Harvard University Press, 1985), 31–59.
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3. See: George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: The University of Chicago Press, 1980), and *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought* (New York: Basic Books, 1999); Mark Johnson, *The*

Body in the Mind (Chicago: The University of Chicago Press, 1987); George Lakoff, *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind?* (Chicago: The University of Chicago Press, 1987).
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4. This theory has proved itself fruitful for the works of Lawrence Zbikowski, Michael Spitzer, Janna Saslaw, Steve Larson, Candace Brower and other music theorists of a psychological bent who have adopted it as a basis for meta-theoretical accounts of musical discourse. See: Lawrence Zbikowski, "Conceptual Models and Cross-Domain Mapping: New Perspectives on Theories of Music and Hierarchy," *Journal of Music Theory* 41 (1997): 193–225, "Metaphor and Music Theory: Reflections from Cognitive Science," *Music Theory Online* 4.1 (1998), *Conceptualizing Music: Cognitive Structure, Theory, and Analysis* (Oxford: Oxford University Press, 2002), and "*Des Herzraums Aschied*: Mark Johnson's Theory of Embodied Knowledge and Music Theory," *Theory and Practice* 22/23 (1997/8): 1–16; Michael Spitzer, *Metaphor and Musical Thought* (Chicago: The University of Chicago Press, 2004); Janna Saslaw, "Forces, Containers, and Paths: The Role of Body-Derived Image Schemas in the Conceptualization of Music," *Journal of Music Theory* 40.2 (1996): 217–43, and "Life Forces: Conceptual Structures in Schenker's *Free Composition* and Schoenberg's *The Musical Idea*," *Theory and Practice* 22/23 (1997/8): 17–23; Candace Brower, "Pathway, Blockage, and Containment in Density 21.5," *Theory and Practice* 22/23 (1997/8): 35–54.
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5. Roger Scruton, "Understanding Music," in *The Aesthetic Understanding: Essays in the Philosophy of Art and Culture* (London: Methuen, 1983).
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6. For a comprehensive, though not uncontroversial, study of musical experience from a phenomenological point of view, see: Thomas Clifton, *Music as Heard: A Study in Applied Phenomenology* (New Haven: Yale University Press, 1983). For another phenomenological approach, see: David Lewin, "Music Theory, Phenomenology, and Modes of Perception," *Music Perception* 3.4 (1986): 327–92. For an expanded discussion of music and intentional understanding, see: Roger Scruton, *The Aesthetics of Music* (Oxford: Oxford University Press, 1997), 221–25.
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7. "Understanding Music," 90.
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8. Naomi Cumming claims that Scruton takes a positivistic position and criticizes him on two problematic points that are involved in this position: the first, the assumption that it is possible to distinguish clearly between metaphorical and literal language; the second, the complementary distinction between material object and intentional object. Her criticism focuses mainly on the implications of Scruton's position on fields other than music. See: Naomi Cumming, "Metaphor in Roger Scruton's Aesthetics of Music," *Theory, Analysis and Meaning in Music*, ed. Anthony Pople (Cambridge: Cambridge University Press, 1994). 3–28.
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9. "Understanding Music," 86.
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10. Scruton mentions Carroll C. Part's attempts to explain the experience of musical motion by reference to the strain on the larynx as it ascends the scale.
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11. "Understanding Music," 97.
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12. Ibid, 99.
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13. George Lakoff and Mark Johnson, *Metaphors We Live By*, 7–13.
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14. Ibid, 44–5.
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15. Ibid, 15.
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16. I use the pitch designation of the American Society of Acousticians.
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17. Lawrence M. Zbikowski, "Metaphor and Music Theory," 4.
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18. Mark Johnson, *The Body in the Mind*, 2.
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19. Ibid, 114.
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20. Ibid, 42.
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21. See: Janna Saslaw, "Life Forces," 18.
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22. Janna Saslaw, "Forces, Containers, and Paths," 217–43, and "Life Forces," 17–23.
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23. For the most part, I used Philip Gossett's reliable translation of Rameau's *Traité* (*Treatise on Harmony* [New York: Dover Publications Inc., 1971]) with only slight alterations. However, since Rameau's exact wording is of critical importance here, I have added the original French in the footnotes. The reader is encouraged to consult both sources.
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24. For further discussion of the cognitive aspects of Rameau's theory, see: Lawrence Zbikowski, *Conceptualizing Music*, 119–26, and Michael Spitzer, *Metaphor and Musical Thought*, 215–16.
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25. Thomas Christensen, *Rameau and Musical Thought in the Enlightenment* (Cambridge: Cambridge University Press, 1993), 106.
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26. Gossett, 152–3. "l'Harmonie est donc engendreé la premiere: Ainsi, c'est d'elle qu'il faut absolument tirer les Regles de la Melodie, comme nous le faisons aussi, en prenant à part ces Intervals harmoniques, dont nous venons de parler, pour en former une progression fondamentale, qui n'est point encore Melodie: Mais ces Intervals mis ensemble au-dessus de l'un des Sons qui les composent, suivant naturellement une route diatonique, qui leur est determiné par leur progression même." Jean-Philippe Rameau, *Traité de L'Harmonie* (Paris, 1722), 139.
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27. Ibid, 60.
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28. Rameau does not use the term "triad."
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29. Joel Lester, *Compositional Theory in the Eighteenth-Century* (Cambridge: Harvard University Press, 1992), 100.
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30. In recent years, Johnson's model of cognitive semantics has been subjected to criticism from various perspectives. See: James W. Fernandez (Ed.), *Beyond Metaphor: The Theory of Tropes in Anthropology* (California: Stanford University Press, 1991). Among music scholars, Michel Spitzer, noted an "alarming trend" among music theorists to apply Lakoff and Johnson's theory without sufficient "reflection on the philosophical undercarriage." See: Michael Spitzer, 62.
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31. Rameau believed he was the first to discover that certain sonorities are "inversions" of a chord consisting of thirds.

However, it is well known today that the idea of inversion was already familiar to seventeenth century German theorists. His real innovation was the application of it to the seventh chord, and turning it into an effective instrument for the explanation of harmonic progressions through its elaboration to the idea of the fundamental bass. See: Lester, 96–100.
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32. Allan Keiler, "Music as Metalanguage: Rameau's Fundamental Bass," *Music Theory: Special Topics*, ed. Richmond Browne (New York: Academic Press, 1981); and Lester, 105–6.
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33. Gossett, 59. "On appelle basse, la partie où regne ce Son fundamental, parce qu'il est toûjours le plus grave, et plus bas." *Traité*, 49.
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34. Gossett, 59. "[D]e même que la terre sert de fondement aux autres-élemens, de même aussi la basse a la proprieté de foûtenir, d'établir et de fortifier les autres parties; de sorte qu'elle est prise pour la base et pour le fondement de l'Harmonie, d'où elle est appellée Basse, comme qui diroit le base et la soûtient ... pareillement si la basse venoit à manquer, toute le piece de musique seroit remplie de dissonances et de confusion." *Traité*, 49.
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35. Arnold Schoenberg, "Composition with Twelve Tones," *Style and Idea*, ed. Leonard Stein, trans. Leo Black (Los Angeles: University of California Press, 1975), 220.
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36. Gossett, 60. "[D]e sorte que si nous pouvons donner une progression à la partie que nous represente cette corde entiere, ce ne peut être qu'en la faisant proceder par ces intervals consonans que nous rendent les premieres divisions de cette corde, ainsi chaque Son s'accordera toûjours avec celuy qui l'aura precede, et chacun pouvant porter à son tour un accord pareil à celuy que nous avons recû de ces premieres divisions, nous representera sans difficulté la corde entiere qui est le principe & le fondement de cet accord." *Traité*, 50. For discussion of the relation between chord structure and progression of the fundamental bass, see: David Lewin, "Two Interesting Passages in Rameau's *Traité de l'Harmonie*," in *Theory Only* 4.3 (1978): 3–11.
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37. Gossett, 249. *Traité*, 227.
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38. I would like to thank one of the anonymous readers of this article for encouraging me to delve more deeply into this issue.
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39. Manfred F. Bukofzer, *Music in the Baroque Era* (New York: W. W. Norton & Company, 1947), 12.
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40. George Lakoff, *Women, Fire, and Dangerous Things* (Chicago: University of Chicago Press, 1987), 278.
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41. For expansive research on Rameau's appropriation of the scientific theories of his time and especially Cartesian views of nature and space, see: Thomas Christensen, *Rameau and Musical Thought in the Enlightenment*. And also: Nicholas Cook, "Epistemologies of Music Theory," in *The Cambridge History of Western Music Theory* (Cambridge: Cambridge University Press, 2002).
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42. For a particularly pertinent discussion, see: Fred Lerdahl, "Cognitive Constraints on Compositional Systems," in *Generative Processes in Music*, edited by John A. Sloboda (Oxford: Clarendon Press, 1988), 231–259, and William Thomson, *Schoenberg's Error* (Philadelphia: University of Pennsylvania Press, 1991).
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43. In addition to the "deceptive" cadence to be discussed below.

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44. *Traité*, 54–55, 63.
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45. Ibid, 240–45. Rameau posits that the first chord of the irregular cadence is often accompanied by an added-sixth. For Rameau, the fundamental bass of the F-A-C-D chord in Fig. 3b is not D but F, which accounts for the fifth relationship between it and the following chord, C.
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46. In this respect Rameau's view of harmony retains an affinity to contrapuntal theory of the late Middle Ages. See: Carl Dahlhaus, *Studies on the Origin of Harmonic Tonality*, trans. Robert O. Gjerdingen (New Jersey: Princeton University Press, 1990), 29; and David E. Cohen, "'The Imperfect Seeks its Perfection': Harmonic Progression, Directed Motion, and Aristotelian Physics," *Music Theory Spectrum* 23.2 (2001): 139–69.
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47. Gossett, 217. "Bien loin que la Dissonance doive embarrasser dans la Composition, elle en facilite au contraire les voyes." *Traité*, 197.
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48. Gossett, 62. "Il semble que la dissonance soit necessaire icy, pour faire souhaiter avec plus d'ardeur par sa dureté, le repos qui la suit" *Traité*, 53.
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49. Rameau developed this idea mainly in his later writings. See: Lester, 135–40.
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50. This part was added by Rameau apparently after he had already submitted the text for printing. See: Christensen, 108–9.
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51. Gossett, 79. "Un Corps mobile rencontrant un autre corps en repos, lui donne tout son mouvement, et demeure lui-même immobile. Un coprs dur venant à frapper sur un autre corps inébranlable, se refléchit avec tout son mouvement." *Traité*, "Supplement," 6.
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52. In this quotation, the original French supports my reading better than Gosset's translation. Gossett, 79–80. "Pour bien juger de l'effet dont il s'agit; il n'y a qu'à remarquer dans cet example, que la Dissonance B, est en repos, pendant que la Consonance A, vient la frapper, et qu'incontinent après le choc, cette Consonance demeurant immobile, oblige cette Disonance de passer à C, qui est effectivement le lieu où la Consonance auroit pù passer; mais elle ne le peut plus dès que la Dissonance prend sa place; de sorte qu'il semble que pour lors la Consonance lui donne tout son mouvement. Ensuite la Consonance D, qui paroît inébranlable, après avoir reçu le choc de la Dissonance F, l'oblige de retourner à G, d'où elle étoit partie: de sorte qu'il semble encore ici que la Dissonance se réflechisse avec tout son mouvement, après avoir frappé sur la Consonance inébranlable." *Traité*, "Supplement," 7.
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53. Gossett, 255. "C'est toûjours de nôtre Basse-fondamentale et de nôtre Accord fondamental de la Septiéme, que nous devons tirer les Regles qui regardent les Dissonances; aussi nous allons voir que le seul Accord de Septiéme regne dans tous les differens Accords dissonans que l'on peut employer." *Traité*, 235.
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54. See: Lester, 108–14.
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55. Christensen, 129.
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56. Gossett, 71. "Si nous changeons la progression de l'un des Sons compris dans le premier accord d'un cadence parfait; il est certain que nous en interromprons la conclusion." *Traité*, 61.

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57. See also: Hoyt Alverson, "Metaphor and Experience: Looking Over the Notion of Image Schema," in *Beyond Metaphor: The Theory of Tropes in Anthropology*, ed. James W. Fernandez (California: Stanford University Press, 1991), 104.
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58. About Rameau and the philosophy of the Enlightenment, see: Thomas Christensen, *Rameau and Musical Thought in the Enlightenment*. And also: Nicholas Cook, "Epistemologies of Music Theory," in *The Cambridge History of Western Music Theory* (Cambridge: Cambridge University Press, 2002), 84–8.
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