

# The Poetics of Music Theory and the Writings of Rameau and Hauptmann

The history of music theory can be viewed as the history of transformations in the form of knowledge that, often in parallel to changing scientific and philosophical ideas, redefine parameters of focus, and develop alternative viewpoints through which to understand the meaning and workings of music. The theoretical writings of Jean-Philippe Rameau and Moritz Hauptmann offer a striking instance of such a transformation, offering a relatively unambiguous view of the shift in the nineteenth century from an epistemology rooted in empirical fact and conceived in terms of a poetics of representation, to one that grounds itself on a poetics of formation and the phenomenology of the subjective cognitive act. What is brought to focus in this article is the palpably different theoretical spaces fashioned by two systematic theorists, both concerned with unifying the rules of harmony under their natural principles.

The diversity of our opinions does not arise from the fact that some people are more reasonable than others, but solely from the fact that we lead our thoughts along different paths and do not take the same things into consideration.

Descartes, *Discourse on Method*

Moritz Hauptmann begins his introduction to the *Nature of Harmony and Meter* (1853)<sup>1</sup> with an extended critique of the custom of starting thoroughbass or composition textbooks with an acoustical chapter to explain the determination and harmonic relation of the intervals through their arrangement in a progressive series of ratios, either acoustical or of corresponding string length (*NHM*, xxxv). Hauptmann's objective is not to dispute mathematical certainties or acoustical facts, but to question an epistemology that attempts to locate a foundational explanation for musical practice in the ordered series of progressive identities and differences of a sounding object. The very representation of harmonic relations in terms of an uninterrupted ordered sequence, Hauptmann argues, carries in its train an extraneous logic that draws on the relative position of elements on a fixed, progressive scale, classifying harmonies as natural (major) and artificial (minor), intonation as 'savage' and 'civilized,' and conceiving consonance and dissonance not as qualitative distinctions but according to a scale of relative complexity or comprehensibility (*NHM*, xxxv–xxxviii). What is more, neither an unambiguous demarcation of the triad, nor the clear distinction between consonance and dissonance necessary for establishing the rules of harmonic practice, nor indeed, in the case of the acoustical series, true intonation can be gleaned from such data. As a result, Hauptmann observes, the acoustical and numerical ratio systems with which thoroughbass and compositional texts commonly begin, having no further ramification in the presentation of the harmonic doctrine that follows, remain separate and external to the main body of the text, which, in effect, must resume its discussion of harmony by way of a 'second' beginning – a position that is theoretically indefensible (*NHM*, xxxviii).

1 *Die Natur der Harmonik und der Metrik: Zur Theorie der Musik* [1853], Leipzig: Breitkopf & Härtel, 1873. Translated as *The Nature of Harmony and Meter*, ed. and transl. W.E. Heathcote, New York: Da Capo Press, 1989. Abbreviated hereafter *NHM*. Page references in text are to the Heathcote translation; quotations of the German text refer to the second, 1873 edition.

In his treatise, Hauptmann attempts to reorient music theory under the logical discipline of a genuine, or 'real' beginning that contains in itself the germ of every subsequent theoretical development, from its broadest to its narrowest applications (*NHM*, xxxviii) – a germ, he argues, that *precedes* the empirical reality of the sounding object, and underlies it as a logical principle determining both the interrelation of its parts and its possibilities of development.<sup>2</sup> Rather than to deduce the principles of harmony from a serialized arrangement of parts, Hauptmann's organicist viewpoint takes the self-determining autonomy and coherence of the life-form as its model, where the organizing principle of the whole not only precedes the formation of the parts, but is disclosed only in the emerging determination of these parts, in their interdependence, and in their reciprocal relations.

The present article takes Hauptmann's distinction between music-theoretical methodologies having as their starting point ontological first principles, and the reconfiguration of theoretical discourse from a dialectical beginning (as exemplified in the *NHM*) as its subject of investigation.<sup>3</sup> My focus, however, is not on practical points of theoretical contention as such, but rather, on the poetics of music-theoretical construction, its 'language-technologies' and modes of deducing (or producing) the tonal-harmonic sphere that speak to a prevailing world-view and a shared understanding of the form of what constitutes knowledge.<sup>4</sup> In this context, Rameau's theory of the fundamental bass, organized around the mathematical and acoustical properties of the *corps sonore* offers a rich field of comparison.<sup>5</sup>

Both Rameau and Hauptmann set themselves the task of bringing music theory under the governance of nature, not with the intention to innovate or modify musical practice,

- 2 This underlying grammar, Hauptmann argues, functions as a 'shaping principle' (*Gestaltungsprinzip*) or 'formative process' (*Gestaltungsprozess*) that constitutes the 'natural basis' for the laws of harmony and meter, both superseding musical elements and determining their shape, like a motive force lurking beneath manifestation (*NHM*, xliii).
- 3 For a detailed discussion of the ramifications of an ontological as opposed to a dialectical beginning, see Theodor W. Adorno, *Against Epistemology*, transl. Willis Domingo, Cambridge, Mass.: MIT Press, 1982, Introduction.
- 4 The prototypes of this kind of comparative study are Michel Foucault, *The Order of Things*, New York: Vintage Books, 1970, and Friedrich Kittler, *Discourse Networks 1800/1900*, transl. Michael Metteer and Chris Cullens, Stanford: Stanford University Press, 1990. See also Jairo Moreno, *Musical Representations, Subjects and Objects: The Construction of Musical Thought in Zarlino, Descartes, Rameau and Weber*, Bloomington: Indiana University Press, 2004.
- 5 Though the combination into a single treatise of the speculative tradition of *musica theorica* with the concerns with compositional application of *musica practica* dates from Zarlino's *Istitutioni harmoniche* (1558), the integration of the two branches of music theory remains difficult. Rameau's theoretical work, in its concerted effort to reflect the preeminence of the perfect triad in the composition of the *corps sonore* itself and to derive the principles of chord-succession directly from that structure, shows an effort to integrate the speculative and practical branches of music theory, and would seem to fall, in its intention at least, outside the purview of Hauptmann's critique. A focus on the logical form that underlies Rameau's and Hauptmann's configurations of tonal theory, however, will clarify the kind of separation between form and content that Hauptmann has in mind, and will help to situate Hauptmann's work in the context of the post-Kantian idealist critiques of empiricism. Besides its widespread general influence, among the most relevant aspects of Rameau's theory for Hauptmann (though appearing in reconfigured form and from within a different logic), are the preeminence of the structure of the triad as a source for harmonic logic, the symmetrical formation around the tonic of the subdominant and dominant triads and the derivation of the scale from this spatial ordering of the primary triads, the downward, directional derivation of the minor third, and the notion of the mixture of chords, as in Rameau's explanation of the dominant 7<sup>th</sup> chord incorporating in itself the root of the subdominant.

but with the goal of theoretical clarification and systematization. In either case, the nature in question is not an unmediated given, but rather a nature constructed under the tutelage of reason. In both instances, to invoke nature is to lay claim to an objectivity and an ideal authority that is synonymous with science, or nature as it is revealed by science. What is instructive, however, is the means of access to this objective space, its construction, indeed ‘the poetics of the natural’, in Rameau’s and Hauptmann’s theories. My discussion, limited to the methodological cast of the presentation of the major triad in Rameau’s *Traité de l’harmonie* and *Nouveau système de la musique théorique et pratique*,<sup>6</sup> and in Hauptmann’s *NHM*, will thus focus on two different approaches to the trope of nature, understood, respectively, as product and as process. The concern with methodological consistency in both Rameau’s and Hauptmann’s writings affords a relatively unambiguous view of the shift in the nineteenth century from an epistemology rooted in empirical fact and conceived in terms of a poetics of representation, to one that grounds itself on a poetics of formation and a phenomenology of the subjective, cognitive act. My objective is to show the very palpable difference in logical connection and sequence of ideas, between two distinct interpretations of how the figure of nature is used as a unifying paradigm and a category of thought.

References to nature abound in Rameau’s works, though the term gradually shifts in significance. In his first publication, the *Treatise on Harmony Reduced to its Natural Principles* (1722), nature is used synonymously with reason. Here, the natural principle of music is founded – following the Cartesian model – on the principle of mathematical ordering. It is by means of this principle of ordering that Rameau exhibits the conditions whereby the source, origin, and proper application of the rules of musical practice can be made intelligible to the understanding.<sup>7</sup> Following his discovery of Sauveur’s work on the acoustical properties of sound,<sup>8</sup> however, and the publication in 1726 of the *Nouveau système de l’harmonie*, the domain of nature shifts increasingly to the side of an unerring sensory awareness which it is reason’s task to confirm empirically and to systematize. This amounts to a seeming reversal of Rameau’s initial position, suggesting a priority of nature – as an immediate given – over reason. The natural ordering principle, in other words, is no longer understood as belonging exclusively to the domain of the mind; rather, reason *learns* from nature, and it is in nature itself that it discovers the coherence of order: a

- 6 *Traité de l’harmonie réduite à ses principes naturels*, Paris: Ballard, 1722, translated as *Treatise on Harmony*, transl. Philip Gossett, New York: Dover Publications, 1971; *Nouveau système de musique théorique et pratique*, Paris: Ballard, 1726, translated as *Rameau’s Nouveau système de musique théorique: An Annotated Translation with Commentary*, transl. Glenn B. Chandler, Ann Arbor, Michigan: UMI, 1977. References to the *Traité de l’harmonie* are to the Gossett translation.
- 7 Rameau writes in the Preface to the *Treatise*: ‘Music is a science which should have definite rules; these rules should be drawn from an evident principle; and this principle cannot really be known to us without the aid of mathematics. Notwithstanding all the experience I may have acquired in music from being associated with it for so long, I must confess that only with the aid of mathematics did my ideas become clear and did light replace a certain obscurity of which I was unaware before. Though I did not know how to distinguish the principle from the rules, the principle soon offered itself to me in a manner convincing in its simplicity. I then recognized that the consequences it revealed constituted so many rules following from this principle. The true sense of these rules, their proper application, their relationships, *their sequence (the simplest always introducing the less simple, and so on by degrees)*, and finally the choice of terms; all this, I say, of which I was ignorant before, developed in my mind with clarity and precision’ (*Treatise*, xxxv, emphasis mine).
- 8 Joseph Sauveur, *Collected Writings on Musical Acoustics (Paris 1700-1713)*, ed. Rudolf Rasch, Utrecht: Diapason Press, 1984.

coherence that it emulates, extends and elaborates in art and science.<sup>9</sup> However, far from invalidating the rationalist approach to which Rameau was committed at the time of writing of the *Treatise*, his subsequent awareness of the natural properties of the sonorous body served rather to confirm the theory he had developed using his earlier methodology. Nonetheless, the shift is significant insofar as it allows the art of music, in conformity with Enlightenment aesthetics, to be understood not as the mere product of artifice and convention, but as imitating the harmony and the forms of nature.<sup>10</sup>

In the preface to the *Traité de l'harmonie*, Rameau begins by making a distinction, in the study of music, between reason and experience. From experience, he states, from what the ear directly perceives, we can discern the properties of music and its effects. Experience can be kind to the artist, can seduce him, enabling him daily to discover the beauties of his art; yet, lacking the knowledge and the language with which to communicate it to others, this felicity will remain confined to him alone (*Treatise*, xxxiv). As a result, teaching the art of music will necessarily depend on an incomplete assortment of empirical rules at the limit of which the student is abandoned to what he can glean for himself, aided by experience alone. Accordingly, the certainty and clarity of knowledge and its power to awaken genius and taste is cut short, and the art and science of music is limited to mere talent.<sup>11</sup> What experience lacks, however, reason can discover. Hidden behind the empirical rules of music, incomplete and confused by long experience and prejudice, lies the 'evident principle' from which the 'true sense of these rules, their proper application, their relationships, their sequence (the simplest always introducing the less simple and so on by degrees) and finally the *choice of terms*' with which to describe them, becomes visible (*Treatise*, xxxv, emphasis mine). Like Hauptmann, Rameau seeks not to reformulate

- 9 David Cohen has discussed the relation between reason and nature in Rameau's theory in his essay 'The "Gift of Nature": Musical "Instinct" and Musical Cognition in Rameau' in: Suzannah Clark and Alexander Rehding (eds), *Music Theory and Natural Order*, Cambridge: Cambridge University Press, 2001, 68-92. For a comprehensive discussion of Rameau's theoretical works in the context of his interaction with the complex intellectual world of the French Enlightenment see Thomas Christensen, *Rameau and Musical Thought in the Enlightenment*, Cambridge: Cambridge University Press, 1993. On Rameau's contribution in the context of eighteenth-century theory see Joel Lester, *Compositional Theory in the Eighteenth Century*, Cambridge, Mass.: Harvard University Press, 1992. On the descriptive function of the fundamental bass, see Allan Keiler, 'Music as Metalanguage: Rameau's Fundamental Bass', in: Richmond Browne (ed.), *Music Theory Special Topics*, New York: Academic Press, 1981, 83-100.
- 10 In contrast to Rameau, Jean-Jacques Rousseau (1712-1778) writes with regard to music: 'We still have no idea whether our system of music is not based on pure conventions; we have no idea whether its principles are not entirely arbitrary, and whether any other system substituted for ours would not end up, through familiarity, by pleasing us just as much.' Quoted in: Tzvetan Todorov, *Theories of the Symbol*, transl. Catherine Porter, Ithaca: Cornell University Press, 1982, 126n15. Rameau, on the other hand, in *Observations sur notre instinct pour la musique* (1754), sees a relation of reciprocity and mutual reinforcement between convention and pure unschooled instinct: 'If we ordinarily sing the third first in ascending the perfect chord, despite the fact that the sonorous body doesn't give it except at the double octave, which is the 17th, [and occurs] above the octave and fifth which is its 12th, it is that we naturally reduce all intervals to their smallest size, because the ear appreciates them more promptly, and because the voice can reach them with greater ease; but such would not be the case for a man without experience, who had neither heard nor listened to music – for there is a difference between hearing and listening. If this man [were to] intone a clear and distinct low tone, and he then [were to] allow his voice, quickly and without premeditation – not even of the interval he wants to traverse – [to continue] in a purely mechanical move, he [would] certainly intone the fifth first, in preference to any other interval' (emphasis mine). *Jean-Philippe Rameau: Complete Theoretical Writings* vol. III, ed. Erwin R. Jacobi, American Institute of Musicology, 1968, 268-269.
- 11 '[T]horough knowledge activates genius and taste which, without it, would often become useless talents' (*Treatise*, xxxvi).

the rules of music, but to exhibit the conditions through which their source, origin, and nature can be made available to the understanding.

The relationship between sounds, Rameau states, can be known by way of various forms of measuring and dividing, and by subsequently comparing the results of these operations: for example, by analyzing the numerical relations of string divisions; or alternatively, by measuring and comparing the lengths of string obtained by these divisions; or by comparing the number of vibrations released into the atmosphere when strings of different lengths are plucked; or measuring the gradations of thickness, weight, and tension of strings for the production of sound (*Treatise*, 4). But the essential insight that is necessary if any of these interchangeable operations are to lead to a clear understanding of the principles of music, is that of following the logical sequence of the numerical translation of these relationships in their 'natural progression.'<sup>12</sup>

The starting point for Rameau's investigation is to distinguish the generating source of harmony from among the combinations of consonances with which it was haphazardly combined in the figured bass theories of his time.<sup>13</sup> Following Descartes' observation in the *Compendium Musicae* (1619)<sup>14</sup> that the smaller intervals obtained from the division of a string are already contained in the whole, Rameau locates this source in the undivided string (represented by the number 1, unity) and its first six subdivisions, producing in sequence, the octave (division by 2); the perfect 12<sup>th</sup> (division by 3); the double octave (division by 4); the major 17<sup>th</sup> (division by 5); and the perfect 19<sup>th</sup> (division by 6). The seventh division, yielding the dissonant interval of the minor 7<sup>th</sup> (minor 21<sup>st</sup>), interrupts the series. Hence it is the consonant *quality* of the intervals generated by the progression of the first six subdivisions that determines the limits of the sequence, keeping it from continuing indefinitely. This series of consonances is framed by a final, limiting division of the string by 8, which yields the third and last replication of the fundamental note in the series. This final division makes it possible to compare each of the generated sounds both to its source below, and to its higher octave (*Treatise*, 9). The principle of inversion is thus generalized in tabular form in Example 1 (*Treatise*, 7).

The table in Example 1, generated from a linear sequence of progressive divisions in order of complexity, contains in itself an entire genealogy of relations and combinational possibilities. On the primary level are the fundamental sound and its directly generated intervals. On a secondary level are the comparisons of the directly generated intervals with the octaves of the fundamental (the inversions of the perfect fifth and the major third, yielding the perfect fourth and the minor sixth respectively). On a tertiary level are the intervals resulting from the difference of the directly generated tones among each other, namely the minor third and its inversion, the major 6<sup>th</sup> (arising between the 5<sup>th</sup> and 6<sup>th</sup> divisions respectively).

Of course the secondary and tertiary levels we have enumerated are fused in Rameau's table, but here we are merely interpreting in the spirit of the reasoning that Rameau has himself developed for us so far. We must leave aside, for our present purposes, Rameau's efforts to tamper, as it were, with the inescapable evidence of the hierarchy presented

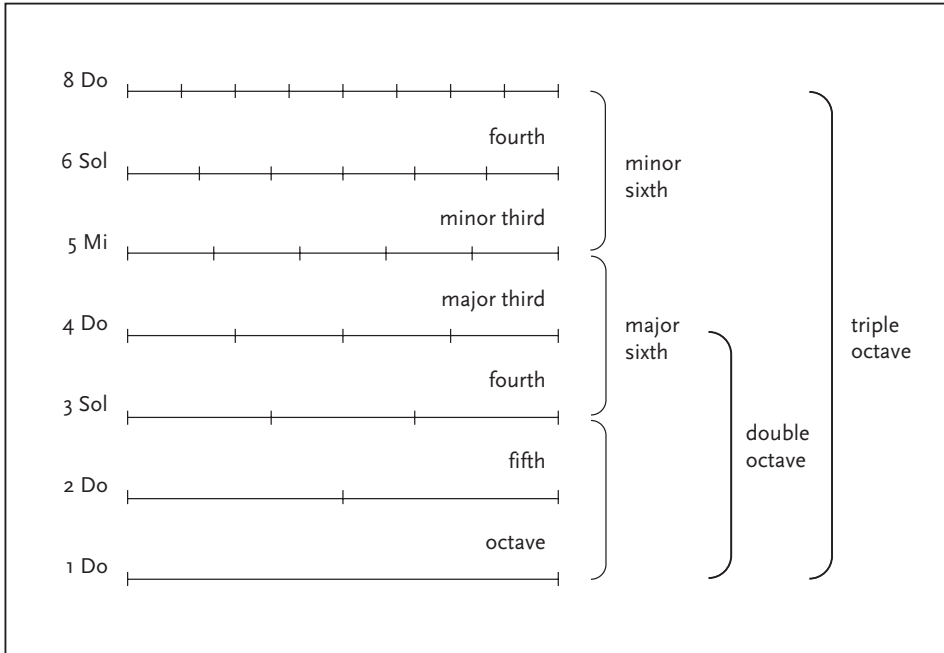
12 Rameau points out that the numerical progression obtained from measuring the lengths of the strings inverts the ascending progression obtainable by their division. Since the choice of operation ultimately has no effect on the resulting harmonic relations, however, he opts, in the interest of simplicity, for the latter. For the problems in representing his findings that Rameau encounters as a result of this choice, see Christensen, *Rameau and Musical Thought in the Enlightenment*, 92-93.

13 Harmonic structures in the notational practice of the figured bass were conceived according to the intervallic distance of individual voices from the given bass line. For a detailed discussion of the problems of figured-bass practice in the eighteenth century, see Joel Lester, *Compositional Theory in the Eighteenth Century*.

14 René Descartes, *Compendium Musicae*, translated as *Abrégé de musique*, ed. and transl. Frédéric de Buzon, Paris: Press Universitaire de France, 1987.

## Example 1

Rameau's diagram of the divisions of the fundamental in the *Traité de l'harmonie*.



in the order of generation as he sought for alternatives that would enable him – among other things – to represent the minor third, too, as a directly generated interval on an equal footing with the major third; where the instinct of the artist could not be deflected from its desire to manipulate the inexorable logic of method to match its own aesthetic certainties. Yet we cannot ignore Rameau's uneasiness at the way his scientific approach contradicted and resisted his musical instinct. We might remark in passing that similar to its Cartesian precedent, there lurks beneath the initial 'eidetic reduction' that is Rameau's starting point – beneath that first bracketing of all theoretical tradition, and the return to the uncluttered simplicity of the source of sound (the undivided string) – a conviction that this ordered, scientific, methodical view will confirm and restore without change the musical tastes and practices of his day.<sup>15</sup>

The most important aspect of the table for Rameau's purposes is that the possibility of integrating the intervals into a single unity that is capable of preserving its identity in any of its possible combinations is inextricably linked to the progressive generation of the intervals from a single fundamental source (*Treatise*, 40-41). Hence the possibility of an overarching synthesis of the object represented in the table presents itself in a way that was unavailable in the older method of direct derivation of the intervals through

<sup>15</sup> The expression 'eidetic reduction' is meant here not in the strict sense understood in Husserlian phenomenology but rather the impulse to return, unassisted by rules and conventions, to a starting point of 'evident principles', as Rameau states it, from which to reconstruct the edifice anew.



proportions.<sup>16</sup> The combination of the 2<sup>nd</sup>, 3<sup>rd</sup>, and 5<sup>th</sup> divisions yields the ‘perfect triad’ (or the five-three position of the major triad); that of the 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> division yields the six-four position of the *same* triad; and the 5<sup>th</sup>, 6<sup>th</sup>, and 8<sup>th</sup> divisions its six-three position, all issuing from the same fundamental note.<sup>17</sup> This change of perspective, that derives harmony from a fundamental source, and that associates the fundamental bass, or root, with the structure of the chord itself, was to bring about an almost irreversible change in the way harmonic materials came to be described and understood. The fundamental note possesses a new level of significance with respect to the other notes of the triad: it now functions as a sign. It stands for the combination of elements that it unites, at the same time representing the chord and represented within it,<sup>18</sup> and it is this structure of signification that stands as the basis of our present system of chord nomenclature.<sup>19</sup> To the extent that we name and identify chords by their roots, then, we are already committed, in part, to the field of vision set forth in Rameau’s theory.

Rameau’s quest for knowledge in the light of reason is a search for origins, and the progressive restitution of the full variety of possible harmonic combinations on the basis of calculation and ordering, where each successive element can be returned to the certainty of its source with ‘the simplest,’ in Rameau’s words cited above, ‘always introducing the less simple and so on by degrees.’ In his representation of harmonic generation,<sup>20</sup> it is

- 16 Rameau’s derivation of consonances through progressive divisions of the string differs crucially from Zarlino’s *senario* as illustrated in the *Istitutioni harmoniche* (1558) (translated by Marco and Palisca as *The Art of Counterpoint: Part III of the Istitutioni harmoniche*, New Haven: Yale University Press, 1968), which in its ordering of the superparticular ratios derives each interval directly through individual ratios:

6:5 minor third  
 5:4 major third  
 4:3 perfect fourth  
 3:2 perfect fifth  
 2:1 octave  
 1:1 unison

In this progression, the perfect fourth, for example, is derived directly as a fourth away from unity, and not the ‘shadow,’ as Descartes put it, of the 5th. In other words, the 4:3 proportion on a string tuned to *c* yields an *f* directly, whereas in Rameau’s system, sounding one-fourth of the same string produces another *c*, so that the fourth arises not as a directly generated pitch in its own right, but as a *difference*, between *g* (the one-third division) and that *c*. Zarlino’s direct derivation of the consonant intervals according to a distance model, arranged according to their ‘natural order of perfection,’ precludes the synthesis that Rameau achieves in his method of the successive divisions of the whole. The notational system of eighteenth-century figured-bass theory before Rameau had its basis in just this concept of direct derivation of the intervals as theorized by Zarlino. For Rameau’s critique of Zarlino’s use of mathematics, see *Treatise*, 22-25.

- 17 *Treatise*, 40-41. In the figured bass tradition as it was practiced in Rameau’s time, combinations of notes having a different order of intervals were considered different harmonic entities.
- 18 On the structure of the sign and its role in eighteenth-century epistemology see Foucault, *The Order of Things*, 64ff.
- 19 Rameau cites Zarlino, who, in the *Istitutioni harmoniche*, likens the bass to the earth, the ‘foundation for the other elements,’ that sustains, establishes, and strengthens the other parts. Were the bass to disappear, he writes, ‘the whole piece of music would be filled with dissonance and confusion’ (*Istitutioni* Part III, Chapter 58, 281-282). Rameau comments: ‘But if we contrast this clear and accurate definition of the fundamental part of harmony with the rules and examples given by this author, we find everywhere contradictions which leave us in doubt and uncertainty’ (*Treatise*, 59).
- 20 On the tabular form of representation and its importance in Enlightenment epistemology see Foucault’s analysis in *The Order of Things*; on spatial and figurative representations in science, see Ernst Cassirer, *The Philosophy of the Enlightenment*, transl. Fritz Koelln and James Pettegrove, New Jersey: Princeton University Press, 1979.

not just the triad and its permutations that are brought simultaneously to view: the table is the logical source for Rameau's elaboration of the concept of key-formation and the cadential paradigm, the derivation of the seventh chord, the notion of supposition and chord interpolation, the principles of chord succession,<sup>21</sup> the relation of the sub- or under-dominant developed in his later theory – in short, all the analytical and compositional resources of his theory are connected by a chain of deductions that ultimately are intended to lead to and derive from modified forms of this foundational matrix of the hierarchy of intervallic relations obtained from the ordered reconfiguration of the triad. One might say that Rameau's compositional theory is the systematic animation of the fixed data presented in the table.

Not just the insights, but also the shortcomings of Rameau's successive theoretical adjustments issue from his insistence on this deductive form, issuing from a fixed point of origin. Rameau's discovery of the acoustical properties of sound in the work of Sauveur, and his subsequent reconfiguration of the theory around the concept of the *corps sonore*, though opening a compelling new field of evidence for Rameau's argument, only subtly alters this epistemological space by shifting the source of self-evident truth from a mathematical beginning to a sensory one: the association of the triad with the fundamental bass now gains the authority of empirical evidence.<sup>22</sup> Acoustics enables Rameau to define the triad as an immediate sensory given, no longer needing to be conceived rationally by way of successive divisions. The method of inquiry and the principle of deduction of the rules of harmonic progression from the analysis of its properties and makeup, remain unchanged.

Rameau's appeal to nature and instinct notwithstanding, it must be remarked that the principle of order, in both the mathematical and the acoustical versions of his theory, is not the order of the genesis of any object, but the order necessitated by thought, as the condition of its certainty and clarity. For despite the easy alignment of Rameau's mathematical divisions with the properties of the *corps sonore*, the successive revisions of the theory chronicle his continuous attempts to derive the principles of early eighteenth-century compositional practice from a rigorous application of methodical deduction. And it is to this repeated effort of methodical consistency, this continuous intellectual confrontation with the contradiction between thought and thing, that Rameau's mature

21 In the first chapter of Book 2 of the *Traité* Rameau discusses principles of chord progression as follows: '[W]hen we give a progression to the part representing the undivided string [i.e. the bass], we can only make it proceed by those consonant intervals obtained by 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 ... The fifth is always preferred whenever the voice allows, but nothing is destroyed by substituting the fourth for it. Since the fifth is constructed of two thirds, the bass, in order to hold the listener in an agreeable state of suspense, may be made to proceed by one or several thirds, and consequently by the sixths which represent these thirds' (*Traité*, 60). From the *Nouveau système* (1828) onwards, these progressions by fifth and third are codified mathematically as the geometric triple and quintuple progressions – progressions having the same quotient, generating the series 1.3.9.27.81, etc., and 1.5.25.125.625, etc. – derived from the mathematical divisions associated with the perfect fifth and major third respectively.

22 'Nature is as bountiful as she is simple; she offers in her womb inexhaustible treasures; but it is up to us to discover the paths that must lead to them.' *Génération harmonique ou traité de musique théorique et pratique*, Paris: Prault fils, 1737, 11.



theory owes its shape.<sup>23</sup> In both the mathematical and the acoustical versions of Rameau's theory, access to the scientific language of representation is by way of identifying the origin, and through a series of deductive links, of reconstituting the principles of harmony in the order in which they can be known, with certainty and without omissions. This is the light of reason, the universal mathesis that, in Rameau's words, 'dispels the doubt in which experience can at any moment plunge us' (*Treatise*, xxxiv).

Rameau's theory originates in a reflexive act that analytically reconfigures an object that already exists in the world, and it is to this empirical reality outside itself that the theory ultimately refers. Hauptmann, by contrast, withdraws from the empirical existence of the natural object, and seeks instead to understand the principle of *self-formation*, the essence or nature itself of harmony and meter, as the title of his treatise (*Die Natur der Harmonik und der Metrik*, or *NHM*) suggests. Hauptmann's organicist model takes the self-determining autonomy and coherence of the life-form as its principal analogy, where the immanent organizing principle of the whole is materialized and disclosed in the movement of the reciprocal determination of its parts.<sup>24</sup> Musical understanding, for Hauptmann, is not to be gleaned from the empirical or mathematical properties of external objects; rather, musical consciousness is made to emerge as the result of its own constructive power, discoverable not through calculation, but through theoretical contemplation. It is this constructive or formative power, 'the principle whereby the most diverse outward manifestations proceed in all directions as [they are] defined from the inside outwards' (*NHM*, xxxix, translation slightly modified), that determines both the interrelation of the parts, and the direction and limits of their possible development. Here, the reference to the formulations of nineteenth-century German *Naturphilosophie* and romantic aesthetics is clear. The theory imitates not the products of nature (analytically) but the processes by which nature produces them (synthetically). No longer satisfied with the scientific analysis of the empirical object as a source for understanding, it seeks now to grasp the object of knowledge 'in its organic working and weaving in living growth' (*NHM*, xlv). The conditions of knowledge here described fall outside the purview of empiricist and rationalist methodologies as such. It is not mathematical knowledge or the mechanical structure of sound that is the source of the theory's content, but the dynamic formative process, the logical principle underlying the emergence and transformation of its elements, in which process, form, and content emerge as inextricably united in the concept of the whole. Knowledge in this view rests on an interiority of consciousness both surrendered, as it were, to the life of the object,

- 23 For critiques of Rameau's logic and methods of reasoning see Matthew Shirlaw, *Theory of Harmony*, DeKalb: Coar, 1955; Thomas Christensen, *Rameau and Musical Thought in the Enlightenment*; Joel Lester, 'Rameau and Eighteenth-Century Harmonic Theory,' in: Christensen (ed.), *Cambridge History of Western Music Theory*, Cambridge: Cambridge University Press, 2002, 753-777; Philip Gosset, translator's introduction to the *Treatise on Harmony* (op. cit.); Deborah Hayes, *Rameau's Theory of Harmonic Generation*, PhD dissertation, Stanford University, 1968; Glenn Chandler, *Rameau's Nouveau système de musique théorique: An Annotated Translation with Commentary*, Ann Arbor: Michigan: UMI, 1977; David Lewin, 'Two Interesting Passages in Rameau's *Traité*,' *In Theory Only* 4/3 (1978), 3-11. For d'Alembert's critique of Rameau's use (and abuse) of geometry see the 'Discours Préliminaire' in the 1762 re-edition of the *Elémens de musique théorique et pratique suivant les principes de M. Rameau* (1752), New York: Broude Brothers, 1966, and Thomas Christensen, *Science and Music Theory in the Enlightenment: d'Alembert's Critique of Rameau*, PhD dissertation, Yale University, 1985.
- 24 For studies on dialectical form and organicism in Hauptmann's work see esp. Peter Rummenhöller, *Moritz Hauptmann als Theoretiker*, Wiesbaden: Breitkopf & Härtel, 1963; Wilhelm Seidel, 'Moritz Hauptmanns organische Lehre,' *International Review of the Aesthetics and Sociology of Music* 2/2 (1971), 423-466; Lotte Thaler, *Organische Form in der Musiktheorie des 19. und beginnenden 20. Jahrhunderts*, Berliner Musikwissenschaftliche Arbeiten 25, München: E. Katzbichler, 1984; and Lothar Schmidt, *Organische Form in der Musik: Stationen eines Begriffs 1795-1850*, Kassel: Bärenreiter, 1990 (Marburger Beiträge zur Musikwissenschaft; 6).

and itself constitutive of everything that can be objectively known about it.<sup>25</sup> Hence, Hauptmann's theory constitutes itself in the space of immanent identity between the structure of thought and the apperception of the object as it is constituted in thought.<sup>26</sup>

Unlike Rameau's schematic representation of the triadic source of harmony, Hauptmann's harmonic and metrical theory describes a hierarchical chain of continuous becoming. In order to accomplish this, he has recourse to a special vocabulary modeled on that of the nineteenth-century German idealists, but having its closest kinship with Hegel's modes of description. What this specialized descriptive terminology makes available to him is a theoretical language of evolving and transforming harmonic structures, and their merging with temporal processes totally excluded from Rameau's rational account. In short, if the dimension of Rameau's theory was essentially spatial, Hauptmann's description takes shape in the dimension of time.

Like that of Rameau, Hauptmann's stated objective is to bring the existing laws of music under a single unifying principle.<sup>27</sup> Yet where Rameau's investigation was determined by the source of sound, the undivided string and its directly *generated* intervals, Hauptmann, in what could be construed as a reference to, or transposition of, Rameau's central claim, describes the triad in terms of its three directly *intelligible* intervals. The shift of focus from object to subject is immediately apparent. Hauptmann's formulation, so often repeated in late nineteenth-century treatises – most notably by Riemann, and also Helmholtz and von Oettingen – is as follows: 'There are three directly intelligible intervals: I) the octave; II) the fifth; III) the (major) third. They are unchangeable' (*NHM*, 5). Hauptmann's meaning, it must be remarked, is not that the octave, fifth and third are directly intelligible to the senses, as is sometimes assumed. The condition of their intelligibility lies not in the 'sensible expression' of intervals themselves; it is rather that from among all possible intervals, these intervals and only these, express in their *relation* to one another, a more general and universal underlying notion that 'something which at first subsists for intuition [*Anschauung*] in immediate totality, parts from itself [*auseinandertrete*] into its own opposite [*Gegensatz*], and that this opposite is in turn abolished [*wiederaufhebe*] to let the whole be produced again as one with its opposite, as a whole correlated in itself' (*NHM*, xliii). The manifestation of this in itself intangible inner structure in the mode of intervals (among other possible modes, for example key or meter), yields the mutual interrelation of octave, fifth, and major third, and it is in this sense that they are directly intelligible and unchangeable.

The correlated whole, the major triad, is described as embodying within itself the inner tension of the opposition between the static self-identity of the octave (unity), and its self-contradiction in the fifth that is latently contained in it – an opposition that is redirected back into itself in the unifying element of the third: an element inseparable

25 As Schelling explains in his *System of Transcendental Idealism* (1800), objective knowledge comes into focus only indirectly: '[W]hereas in common knowledge, knowledge itself (the act of knowing) disappears in the face of the object, in transcendental knowledge, the object disappears qua object, and only the act by which knowledge proceeds remains.' *Sämtliche Werke III*, 345, quoted in: Jean Hyppolite, *Genesis and Structure of Hegel's 'Phenomenology of Spirit'*, transl. Samuel Cherniak and John Heckman, Evanston: Northwestern University Press, 1974, 19.

26 Hauptmann writes à propos of his theory: 'We must distinguish this manner of theoretical contemplation from the theory which bears immediately upon practice: the theory of harmonic and metrical shape in itself from the theory of the art of composition' (*NHM*, xlvii). 'Wir müssen aber diese theoretische Betrachtungsweise unterscheiden von der Theorie, die unmittelbar in die Praxis eingreift: die Theorie der harmonischen und metrischen Gestaltung an sich, von der Theorie der Tonsetzkunst' (*NHM*, 1873 German edition, 12).

27 'In the broadest relations of the expanded musical work to its narrowest particular,' Hauptmann writes, 'in all elements of its harmonic-melodic, and also of its metrical-rhythmical existence, there will always be only *one* law to be traced for its right and intelligible construction' (*NHM*, xxxix, translation slightly modified).

from the opposition from which it derives its meaning. Hauptmann supports his reading of the triad by invoking the equal and unequal divisions of the string that produce the octave (division by one-half, giving rise to the notions of ‘unity,’ (*Einheit*) ‘identity,’ or ‘equality with self’), and the fifth (the two-thirds division of the same string, representing the notion of inequality, ‘duality’ (*Zweiheit, Trennung*) or ‘inner opposition’ – understood here in the sense of something that opposes itself, and not in the sense of the opposition of one thing to something else), and the relation of these divisions to those of the major third (division by four-fifths) in which the union (*Verbindung*) of the opposites is conceivable.<sup>28</sup> The triad, then, is conceived as the locus of a confluence of contradictory forces, at once sundered and reflected back into itself.

In contrast to Rameau, whose triad has the abstract referentiality of the sign which points beyond itself to an external materiality, Hauptmann’s triad constitutes itself in the autonomous concreteness of its own space. Not the materiality of the intervals, but the dialectical rhythm of the tension of self-opposition conserved in unity casts the theory in both its synchronic and its diachronic aspects, operating simultaneously on the level not just of the triad but also of key, scale, meter and rhythm as well as in the details of voice-leading, dissonance treatment, harmonic and rhythmic progression, and modulation. It is through the relational and functional constants (symbolized by Hauptmann’s generic use of the terms octave-, fifth-, and third-meaning), that the otherwise disparate elements of music are integrated with one another in an architectonic, vertical projection within which the horizontal axis, or succession, is embedded.

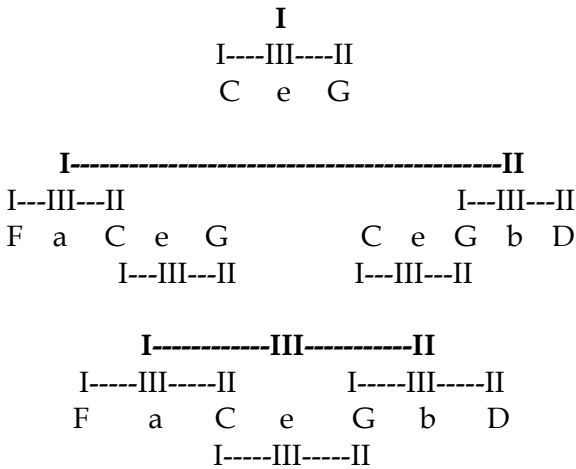
It is not a poetics of representation that characterizes Hauptmann’s theory, but a poetics of formation. In its insistence on process as the condition of understanding, it not only undermines the stability of the fixed, exterior surface – the spatialized catalogue of stable positive entities – it also destabilizes the exterior position of the observer. Like language, the theory of music is seen not as an exterior thing available at leisure to empirical observation, but instead, as abiding in the undifferentiated space of emerging tonal and metrical processes that have no independent prior being (as given entities or objects) apart from the individual action, the intention that shapes and motivates them in time. Nonetheless, Hauptmann does make use of charts and symbols in his treatise; yet these are invariably animations, as for example the diagram in Example 2, showing the formation of the key from the inherent self-oppositions of the triad.

The top level shows the triad as simple unity or ‘octave meaning.’ The middle level shows the self-opposition of the triad, through the tension of the double meaning of root or fifth exerted on the tonic by the dominants on each side. The bottom level shows the new unity of the key, with the correlative function of the tonic engendered in and through the sundering movement of the extremities. (The symbols I----II represent not first and second, but simply the relation of opposition; the symbol III represents the integration of the opposition into a higher unity.)

28 Hauptmann’s somewhat strained justification of the four-fifths division as the mediator between one-half and two-thirds is that the division of four-fifths is related to the octave by its numerator (twice two corresponds to the *equal* division of the octave) and to the fifth by its denominator (five is the number that cannot be divided into equal whole numbers, and therefore represents *unequal* division) (*NHM*, 6). As Rummenhöller points out, Hauptmann’s illustration of the relation of the intervals in the triad by invoking numbers and string divisions should not be interpreted as an empiricist move, but rather as an illustration, in the language of numbers, of the moments of the triadic formation (*Moritz Hauptmann als Theoretiker*, p. 28). It must be added, however, that Hauptmann’s theory in no way positions itself in opposition to empirical evidence, but rather contends only that the analytical methodology of empiricist and also rationalist approaches cannot provide an adequate framework for the conceptual apparatus necessary for the processes of musical thinking – namely, access to a direct logic of progression and succession.

## Example 2

Hauptmann's diagram of key formation.



The diagram shows a three-stage process, very much like diagrams of the successive stages of cell-division. The intention is not to show a static formal configuration, but the formation of the key as action. Yet the analogy of animation, the idea of the moving, as opposed to the still picture, despite the fact that it conjures the dimension of time, is misleading and not entirely accurate. For the moving picture is still a view; it still implies an external observer position, which, if we take Hauptmann's metaphysical stance seriously, would be a misunderstanding of his intentions. The diagram is intended not as a slack image of the stages of development of an exterior object, but as the inner dynamics of the formation of a self-contained entity apprehended through the functional categories, not of the linearity of the subdominant – tonic – dominant *sequence*, but the movement from octave- to fifth-meaning, from repose to self-sundering, and the reflection of this opposition back into itself, which is the actualization, the concrete embodiment of the uneasy harmonic network of the unified key. In this reading of the diagram as formative in *act*, the gaze of the observer is no longer detached from the object – no longer looks from the outside onto an exterior surface, but is immersed and constitutive of the formative movement itself. For not only should the diagram be read *in* time, but the triad itself must here be understood as *generating* time, or valid only in a temporal framework in which the movement of consciousness *produces* the object in the dialectical passage from simultaneity (the triad) to succession (key).

As Hauptmann writes about his use of symbols, 'the organic property of a membered whole can never be represented exhaustively, either by symbols, numbers, or words – it can only be indicated to reason, which has the power of *reproducing alive, the living thought* conjured into symbols and words' (*NHM*, 11, emphasis mine).<sup>29</sup> It is in a similar vein that Humboldt, in his essay *On Language* (1836–40) writes:

The comprehension of words involves much more than the mere evocation of the *sound* of the object indicated. Conversing together is never comparable with a *transfer of material*. In the understander, as in the speaker, the *same thing* must be evolved *from the inner power of*

29 'Die organische Beschaffenheit eines gegliederten Ganzen ist überhaupt so wenig durch Zeichen und Zahlen als durch Worte erschöpfend darzustellen; sie ist nur einem verständig fühlenden, d. h. vernünftigen Entgegenkommen, das den in Zeichen, Zahlen und Worte gebannten lebendigen Gedanken lebendig zu produciren vermag, geistig anzudeuten' (*NHM*, 1873 German edition, 25).

each; and what the former receives [from the speaker] is merely the harmoniously attuning structure.<sup>30</sup> (emphasis mine)

Seen from this perspective, then, we must interpret Hauptmann's diagram not at all as an image corresponding to an independent entity outside, but rather as speculative act of both author and reader – an event that belongs not to the transcendent plane of theoretical abstraction, but to an immanent space, saturated with the dynamic cross-purposes that are preserved in the unified key. We might cite in this context a well-known passage from the preface of Hegel's *Phenomenology of Spirit*, out of the many such descriptions in Hegel's philosophical writings, that expresses the dynamics in question:

The bud disappears in the bursting-forth of the blossom, and one might say that the former is refuted by the latter; similarly, when the fruit appears, the blossom is shown up in its turn as a false manifestation of the plant, and the fruit now emerges as the truth instead. These forms are not just distinguished from one another, they also supplant one another as mutually incompatible. Yet at the same time their fluid nature makes them moments of an organic unity in which they not only do not conflict, but in which each is as necessary as the other; and this mutual necessity alone constitutes the life of the whole.<sup>31</sup>

Rameau's deduction of the rules of harmony follows from a fixed 'simple nature,' an evident certainty: the association of the intervals of the perfect triad with their generating source – to which all subsequent rules are traceable and in which they find their justification. Hauptmann's treatise, by contrast, is the description of a network of relations everywhere present and operative – an invisible shaping principle that operates in the formation of intelligible harmonic and metrical shape; a network in which understanding and intelligibility are predicated on the process of formation itself, in the context of the functional constants that ground the relations it brings to view. Where Rameau's methodology led immediately to a theoretical *representation* of harmonic structures reliant on a system of signification, an analytical language based on the association of the fundamental bass with the chord, from Hauptmann's perspective it is not the root relation in and of itself that reveals how musical elements are connected to one another: indeed, throughout the *NHM* emphasis is less on the separation of chords into distinct entities, than on the greater network of relations of which they are part, and which constitute the conditions of their emergence. As a result, the next level of theoretical development from the triad is not a reproduction, on various scale degrees, of similar triads, each issuing from a separate root (as is the case in Rameau's *Treatise*), and to be unified only subsequently within a key structure defined and imposed by a cadential syntax, but the form-generating tension of inner self-opposition, that leads necessarily from the triad to a 'triad of triads,' which is the complex relational network of the key.<sup>32</sup> The concept of key, in other words, is not a level of organization that is *added* to the primary material, but rather – and this is the crux of the ontological distance that separates Hauptmann's theory from Rameau's deductive procedures in the *Treatise* – it is a level of organization that emerges and concretizes itself from the same principle of dialectical self-movement which formed the logical framework of the triad.

30 Wilhelm von Humboldt, *On Language: The Diversity of Human Language-Structure and its Influence on the Mental Development of Mankind*, transl. Peter Heath, Cambridge: Cambridge University Press, 1988, 57.

31 Georg W.F. Hegel, *Phenomenology of Spirit*, transl. A.V. Miller, Oxford: Oxford University Press, 1977, 2.

32 With the introduction of the concept of the *sous-dominante* or 'under-dominant' in the *Nouveau système* in place of the chord of the 'fourth degree' (*quatrième degré*) in the *Treatise*, the topography of the key in Rameau's theory shifts to the symmetrical formation of subdominant/tonic/dominant that is reflected in Hauptmann's theory.

Observing Rameau from this perspective, we see an inherent conceptual duality, a separation between the quasi-independent harmonic entities and the rules of their correct musical manipulation that reverberates throughout his theoretical oeuvre, and is observable in his successive attempts to integrate the principles of harmonic progression, the derivation of scales, dissonance treatment and key formation with the fixed primary material of the triad. Indeed, one might view the developmental trajectory of Rameau's theoretical work as a response to the problem of the unification of theory and praxis under a common principle, through the integration of the structure of the given 'chord of nature' with the conventions of the harmonic language of his day: a problem to which Rameau never found a wholly adequate solution. What remains difficult of access in Rameau's theory is the possibility of elaborating a direct logic of harmonic invention, independent of normative paradigms and stylistic practices. What is at stake in Hauptmann's doctrine on the other hand, with his emphasis on process and the stages of emergence of an autonomous theory, is first overcoming the duality that separates the act of knowing from the object of knowledge, and second, establishing a logical autonomy for music theory, and thus presenting an alternative to methodologies based on a normative, but ultimately ephemeral common practice. We might observe a shift in the criteria of understanding from an original and fixed empirical given in Rameau to a mental activity and a way of cognizing in Hauptmann; from a beginning from the standpoint of inertia, to one that takes motion and growth as its starting point. Where Rameau's theory presents itself on a single plane, outside temporal processes, Hauptmann's theory takes shape in the constant flux of interlocking stages of development in time. And where Rameau's theoretical construction is ultimately transitive, seeking its materialization and justification in a reality beyond itself, Hauptmann's theory is distinguished by its self-standing autonomy, by its internal density, and ultimately, by its *intransitivity*.<sup>33</sup> Neither theory belongs to the same field of vision; each ultimately expresses a different approach to knowledge – proposes a different *type* of science, each with its own methods of reasoning and manners of proof.

33 Hegel writes '[T]he purpose does not pass over, but *preserves* itself, in its operation; i.e., it brings only itself about and is at the *end* what it was in the *beginning*, or in its originality: what is truly original comes to be only through this self-preservation.' *The Encyclopedia Logic*, transl. A. Suhtig and H.S. Harris, Indianapolis: Hackett Publishing Company, 1991, 280, § 204Z.