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General introduction

§1 Music theory and music analysis

> . . . a *new theory*, established on the true interpretation of Nature, on meticulous analysis of good musical compositions . . .[1]

1803: Jérôme-Joseph de Momigny's ringing Preface to his *Complete Course in Harmony and Composition*. Like a fanfare for the newly dawning century and a repudiation of the old, it is a symbolic declaration.

Momigny, whose work is the earliest represented in the present volume and launches the series of extended analytical extracts given below, was admittedly a writer of minor significance to the advancement of music theory, but he remains nonetheless an intriguing and historically illuminating figure. This Introduction will take his declaration in its music-theoretical context, first as a charge against Rameau, which will in turn require a brief examination of Rameau's own theory, then as a statement of intent for its own age. To accomplish the latter will necessitate looking first at four models (other than Rameau's mathematical model) that the eighteenth century held out for musical structure: *rhetoric* (music as gesture and strategy) and *syntax* (music as language), which together furnish a quasi-scientific procedure for music analysis here called an 'agenda', which continues into the nineteenth century; physiological *anatomy* (music as a body with limbs) and *mechanism* (music as a system with functioning parts). Then it will trace a fifth model: that of *organism* (music as holistic and purposive structure). It will examine how this new model superseded previous ones, how it replaced the earlier aesthetic theory of unity and how the technical means were found for describing music as organism.

To return, now, to that ringing Preface quoted at the opening: Momigny qualifies his declaration by saying that his '*new theory*' is one that admits only two things:

> what is furnished by the resonance of the sonorous body, *correctly heard*, and what is at the same time sanctioned by the ear, and buttressed by the reason and authority of the greatest masters.

From these conditions, it is possible already to prognosticate the type of theory that is to come. 'Sonorous body' signals a theory founded on a natural acoustical phenomenon, the overtones of a single note – a theory that evidently derives from the work of that most influential of all French eighteenth-century music theorists,

1 *sur l'analyse réfléchie des bons ouvrages pratiques* (J. -J. de Momigny, *Cours complet d'harmonie et de composition, d'après une théorie nouvelle et générale de la musique*, vol. I (Paris: Momigny, 1803–05), p. iii).

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Jean-Philippe Rameau – and '*correctly heard*' indicates a belief that Rameau's observation of that acoustical phenomenon was faulty. 'Sanctioned by the ear' introduces the human cognitive system as arbiter, whilst 'buttressed by . . . the greatest masters' heralds verification of theory by the analysis of the work of publicly ratified composers.

The 'greatest masters' – that is to say, the greatest of the great composers – are invoked here, Momigny says, not in a spirit of sycophancy, but in emulation of the man of enlightenment who:

> while admiring what is substantial and delightful in their masterpieces, does not on that account close his eyes to the faults that have crept into them, whether through ill-considered haste or through an excessively cerebral approach.[2]

This is an affirmation not so much of good taste as of the primacy of unbiased observation, of reliance on seeing things as they really are. Momigny invokes, through the French philosopher Étienne Condillac (1715–80), the principle of empirical sensationism articulated by the English thinker John Locke (1632–1704). Since, Momigny says, we have no innate ideas, since all that we have we acquire through sensation and reflection – that is, through the impressions that external objects make upon us via our senses, and through our capacity to compare and correlate those objects reflectively – the best method for the instruction of others is that method which we unconsciously use for instruction of ourselves, namely *analysis*. In contrast to synthesis, which dictates laws:[3]

> analysis, a more modest pursuit, involves the pupil in the work of the teacher. It is a reasoned examination, jointly conducted, its apparent purpose being to satisfy mutual curiosity, hence more a recreation than a labour.

Momigny believed in the affinity of music and natural language, and so characterized analysis as the separating out of the structural components of music as if they were the components of prose and poetry, governed by the rules of grammar, syntax and versification. Drawing presumably on the German music-theoretical tradition established by Riepel, Koch and Kirnberger in the mid- and late eighteenth century, and based in rhetoric and poetics, he understood that the task of analysis was 'to distinguish period from period, verse from verse, hemistiche from hemistiche, all the way down to the level of the proposition and its various members' (hemistiche being a division of a line of verse, proposition a statement comprising subject and predicate).

Though understating the scope and richness of his own analyses, Momigny does not misrepresent his reliance on analytical method: again and again he resorts directly to it, adducing rules and principles only afterwards, on the basis of observation. Nor does he misrepresent Rameau in suggesting that the latter's method is the opposite, proceeding as it does from rational argument in the confident belief that all of reality has an inherently rational structure. However, Momigny seems to insinuate more than this: that Rameau discounted altogether the empirical data of finished, artistic compositions, never using them to exemplify his theoretical assertions.

2 . . . *soit par préc*[*ip*]*itation, soit par esprit de systême* (ibid, iii–iv). 3 ibid, 270–71.

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§2 Rameau and music analysis

Momigny's charge is factually incorrect. Rameau introduced a complete composition into even his first published theoretical work, the *Treatise on Harmony* of 1722, though it may have been written specially for the *Treatise* rather than having had an independent life in the performed repertory.[4] This, appearing at the end of Book III of the *Treatise*, was a five-part vocal fugue with instrumental accompaniment, *Laboravi clamans*, beneath the lowest part of which he placed a separate staff showing a series of conceptual bass notes from which he saw the harmonies deriving.

Four years later, in the *New System of Theoretical Music* of 1726, Rameau invoked two works that undoubtedly were independent: the Twelve Sonatas for Violin Solo Op. 5 (1700), of Corelli, and the monologue 'At last, he is in my power' from Act II Scene 5 of the opera *Armide* (1686) by Lully. To the former he devoted a whole chapter, quoting seventeen passages containing 'errors', signalling certain bass notes with letters of the alphabet, and then constructing chains of reasoning to expose internal inconsistencies.[5] The monologue by Lully was cited for the first time in the *New System*'s chapter 7, on modulation. Rameau then printed it entire in chapter 22, with voice and bass line in score and parallel staff beneath. This score, too, is marked with letters which refer to a page of commentary at the end delineating seven harmonic situations.[6]

Twenty-eight years later, in 1754, Rameau returned to Lully's monologue for a much more extended treatment in his *Observations on Our Instinct for Music*.[7] He discussed there another passage from Lully's *Armide*, and also took up again the monologue 'Sad Auguries' from his own opera *Castor and Pollux* (1737, revised 1754), which he had cited briefly in 1750 in his *Demonstration of the Principle of Harmony*.[8] Six years later he returned yet again to his own and Lully's monologues in his *Code of Musical Practice*.[9]

What was Rameau's purpose in engaging in these discussions, in particular those of his own fugue, and the operatic items by Lully and himself? To answer this will require a brief excursion to look at Rameau's extraordinarily significant theory, at the very heart of which lay the 'resonating body' (*corps sonore*), as

4 See Jean Duron, 'Le Grand Motet: Rameau face à ses contemporains', *Jean-Philippe Rameau: Colloque international organisé par la Société Rameau: Dijon 21–24 septembre 1983*, ed. J. de la Gorce (Paris and Geneva: Champion-Slatkine, 1987), pp. 331–2. J.-P. Rameau, *Traité d'harmonie* (Paris: Ballard, 1722), pp. 341–55; Eng. trans. P. Gossett (New York: Dover, 1971), pp. 357–66.

5 J.-P. Rameau, *Nouveau système de musique théorique* . . . (Paris: Ballard, 1726), pp. 94–106; Eng. trans. in Joel Lester, *Compositional Theory in The Eighteenth Century* (Cambridge, MA: Harvard University Press, 1992), pp. 305–19.

6 ibid, 41, 80–89, 89–90.

7 J.-P. Rameau, *Observations sur notre instinct pour la musique, et sur son principe* . . . (Paris: Prault, 1754), pp. 69–125 (Exx.B–G). The monologue had in the meantime become a *cause-célèbre* in the disputes over Italian and French opera: see C. Verba, 'The Development of Rameau's Thoughts on Modulation and Chromatics', *JAMS*, 26 (1973), 69–91.

8 ibid, 55–61 (Ex.A), 67; *Démonstration du principe de l'harmonie* . . . (Paris: Durand and Pissot, 1750), p. 97. The plates for both Lully extracts now lacked fundamental bass stave but had instead key-areas verbally designated beneath the score, giving them to the modern eye a more 'analytical' appearance.

9 J.-P. Rameau, *Code de musique pratique, ou Méthodes pour apprendre de la musique* . . . (Paris: Imprimerie Royale, 1760), pp. 168–9 (Ex.T).

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presented in his *Treatise* of 1722. A string, or column of air in a pipe, Rameau observed, once set in vibration, gives out not a single pitch but a set of pitches related proportionally to one another (now commonly known as overtones, or collectively as the harmonic spectrum, although Rameau understood them in these terms only later in his career). From this observed acoustical phenomenon, according to Rameau, followed all the other principles of harmony: chords (triads and seventh chords), chord inversion, cadence, chord progression, function (tonic, dominant, subdominant), consonance and dissonance, key, mode and modulation.

Following Descartes' use of the verb 'to generate', Rameau in his *Treatise* spoke of the octave as *generated by* division of a given source pitch, the fifth as *generated by* division of that octave, the third as *generated by* the division of that fifth, the tone as *generated by* the division of that major third; then by extension, of chord types as *generated by* fundamental chords. This, then, is what the five-part fugue *Laboravi clamans* was intended to demonstrate. The additional staff with the series of conceptual bass notes (not unlike that seen in Analysis 2 below, though split there into staves 5, 6 and 7) was a device that Rameau had already used in the earlier music examples of the *Treatise*. It displayed notes that were implicit, but not always sounded in the actual bass line, and these were the source pitches that generated the intervals, hence harmonies, hence chord types, above them. Together these source pitches made up the foundational bass line that Rameau called the 'fundamental bass' (*basse fondamentale*). In effect, then, by adding this staff, he was conducting a harmonic analysis of the piece, one which showed that the piece conformed to his theory, and at the same time gave practical validation to that theory.

Only later in his career did Rameau widen this concept by speaking of *génération harmonique*. By 'harmonic generation', Rameau denoted not merely the generation of the triad from an initial source pitch, or fundamental, but the generation of a succession of fundamentals from the first, then in turn a succession of chords upon those fundamentals, hence linear progressions connecting those chords. In short, all the materials of French Baroque harmonic practice could be *generated from* the single tone; or, to put it another way, the single tone contained within itself the seeds of all harmonic practice – and that included melody and counterpoint, and even metre and rhythm, as well as harmony in the narrow sense. Thus, in invoking the monologue by Lully, Rameau sought at first to demonstrate that its tonal areas were correctly distributed and its movement from key to key was perfectly executed, and also to show how the implied fundamentals of a piece could be adduced, and what 'beautiful simplicity' existed between the actual bass line and the fundamental bass. When he returned to the piece in 1754, he had the larger aim of showing that the tonal distance traversed by a musical modulation could be used to match with precision the distance in sentiment between two adjacent phrases of libretto. Lully, he believed, had possessed a mastery of this process, despite knowing nothing of the scientific basis of his art. He had been led solely by feeling, by good taste and by instinct.[10] His era had been totally ignorant of the underlying principle of music. Thus, when the clear light of reason was directed on to his music – that

10 *Nouveau systême*, p. 41; *Observations*, p. 76; *Code*, p. 168.

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is, when the fundamental bass was adduced, and was compared with the sentiments of the text – a perfect homology was disclosed between the two, and a complete conformity of the fundamental bass itself to Rameau's rules.

If Momigny was factually wrong in insinuating that Rameau discounted artistic compositions as empirical data, he was surely right in spirit. Rameau's theory is a self-reliant edifice (or series of edifices, to be more correct): at no point does it depend on analysis of such data, as by contrast does that of Momigny. Analysis of extant compositions by known composers is one of the distinguishing features of Momigny's *Complete Course*, constituting a significant legacy for theorists and for historians of analysis today. The treatise contains many analyses of works (in part or whole) by C. P. E. Bach, J. S. Bach, Beethoven, Clementi, Handel, Haydn, Momigny himself and Mozart. Most notable among these are the extended analyses of the first movements of Mozart's String Quartet in D minor, K421/417*b*, and Haydn's 'Drumroll' Symphony, No. 103 in E♭.

§3 Rhetoric and syntax; analytical agendas

Music analysis, then, was by no means a nineteenth-century invention. Its ancestry is in fact easily traced back to the beginning of the seventeenth century, and analytical processes can be observed at work in music theory a whole millenium earlier. We have already glimpsed the harnessing of two non-musical models for music-analytical purposes: those of rhetoric and language. The application to music of both models extends back well into the Middle Ages. Thus, in what is widely regarded as the first surviving full-scale analysis of a piece of music, we can find traces of both: Joachim Burmeister's *Musica poetica* of 1606 contains a minutely detailed analysis of a five-part motet, *In me transierunt* by Orlando di Lasso, which diagnoses certain general technical characteristics, then breaks the piece into three rhetorical phases (*Exordium–Confirmatio–Epilogus*) and nine quasi-linguistic units (*periodos*), scanning each of these units for the presence of rhetorical devices, of which Burmeister has previously supplied a glossary of twenty-seven 'figures'. The purpose of the exercise is to exemplify the more general agenda with which Burmeister has equipped the analyst:[11]

> Analysis of a composition is the resolution of that composition into a particular mode and a particular species of counterpoint, and into its affections or periods . . . Analysis consists of five parts: determination of (1) mode, (2) species of tonality and (3) counterpoint, (4) consideration of quality and (5) resolution of the composition into affections, or periods.

Burmeister then enlarges on each of these categories in turn. It is interesting to juxtapose with the above a not dissimilar agenda provided nearly a century and a half later in 1737 by Johann Mattheson for the purpose of analysing purely instrumental pieces of music:[12]

11 Joachim Burmeister, *Musica poetica* (Rostock: Myliander, 1606; reprint edn Kassel and Basel: Bärenreiter, 1955), pp. 71–3, analysis 73–4. There are antecedents to this material in Burmeister's two earlier treatises of 1599 and 1601.

12 J. Mattheson, *Kern melodischer Wissenschaft* (Hamburg: Herold, 1737; reprint edn Hildesheim: Olms, 1976), §49, pp. 109–10; *Der vollkommene Capellmeister* (Hamburg: Herold, 1739; reprint edn Kassel: Bärenreiter, 1954), Eng. trans. E.C. Harriss (Ann Arbor, MI: UMI Research Press, 1954), §79, pp. 224–5.

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> one must identify (1) the affections intended to be expressed by the music alone, without words; (2) the [syntactic] subdivisions of the discourse, for which there are no words to show the way; (3) the accentuation, or emphasis; (4) the geometric proportion and (5) the arithmetic proportion. In even the shortest of pieces, all of this is to be found.

Mattheson's analysis, following Baroque affective doctrine, identifies an emotional state that characterizes the piece as a whole (e.g. 'moderate gaiety' for a typical minuet, 'jubilant delight' for a gavotte). His syntactic analysis successively breaks a piece down into paragraphs, sentences, clauses, subclauses and phrases, marking them off by paragraph signs, periods, colons, semicolons and commas, respectively. By accentuation is meant the piece's climactic stress points; by geometric proportion, its underlying, regular phrase structure (e.g. four-by-four bars) and by arithmetic proportion, the recurrence of specific rhythmic patterns (expressed as poetic feet, e.g. spondee, dactyl). Mattheson then restated this procedure as an eight-stage process whereby the total structure is segmented at four hierarchical levels, and periodicity and recurrent rhythmic configurations are observed. A basis for all of this in grammatical, rhetorical and poetic analysis had been given in an earlier chapter (as a pioneering venture: 'you won't find these terms in even the very latest music dictionaries'), under the general name *Diastolica*.[13]

At another point in his treatise, Mattheson provided a second analytical procedure, based entirely on the principles of rhetoric. In this, he set forth a six-phase schema for the structure of a piece of vocal music, then exemplified it with an analysis of an aria (otherwise unknown) by Benedetto Marcello.[14] These prescriptions have an optimism about them that perhaps makes them a product of their age, an optimism reflecting the positive spirit of an era of rapid scientific progress. They are like laboratory experiments conducted according to standardized procedures, the very prescriptive nature of which guarantees success. Their naïveté is exposed even in Mattheson's own implementation, for the Marcello analysis seems to lose its way hopelessly. It is hard to tell whether the six-phase schema applies once through the whole aria, or whether the aria passes several times through it, section by section. Mattheson's account is confident in tone, but vague in substance.

This kind of analytical prescription is to be found also in the nineteenth century. There are two overt examples in the present volume. Abbé Georg Joseph Vogler analyses his own Prelude No. 8 (1806: Analysis 7 below) against a three-stage agenda: 1) *rhetoric*, 2) *harmonic logic*, 3) *aesthetics*. Under rhetoric, he traces recurrences of the opening thematic material in almost semiotic detail; under harmonic logic, he charts the roots of all the vertical sonorities and performs a phrase segmentation that tracks tonal movement; and under aesthetics he answers seven questions designed to test whether the inner content of the piece matches its formal structure. Gottfried Weber analyses the opening of Mozart's 'Dissonance'

13 *Kern*, Part V, pp. 71–92, 'The Subdivisions of Musical Discourse', expanded as *Capellmeister*, Part II, chapter 9, pp. 180–95, 'The Sections and Subdivisions of Musical Discourse', the term *diastolica* only in *Capellmeister*. The eight-stage process is merely stated in *Kern*, §52, p. 110, but is itemized in *Capellmeister*, §84, p. 225.

14 *Kern*, Part VII, pp. 127–43, 'Disposition, Elaboration and Embellishment in Musical Composition', expanded as *Capellmeister*, Part II, chap. 14, pp. 235–44, 'The Disposition, Elaboration and Embellishment of a Piece of Music'.

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Quartet (1831–2: Analysis 10 below) against a six-stage agenda of even greater technical detail: 1) *tonal scheme*, 2) *passing notes*, 3) *cross-relations*, 4) *parallel progressions*, 5) *grammatical construction*, 6) *rhetorical import*.[15] Under tonal scheme, Weber measures ambiguity as a property of the chords in this passage; under grammatical construction, he draws together the data of stages 1–4, reanimating the dynamics of the passage; under rhetorical import, he investigates the composer's intentions, and extracts from the passage its 'governing idea'. (We shall encounter a third user of prescription in volume II of the present work: rather surprisingly, Robert Schumann, who analyses Berlioz's *Symphonie fantastique* (1835: vol. II, Analysis 10) against a four-stage agenda: 1) *form*, 2) *techniques of composition*, 3) *idea*, 4) *governing spirit*.)

§4 Biological models for music analysis

Rhetoric and syntax were not the only non-musical models for music analysis in the eighteenth century. If we return for a moment to Mattheson's analytical method for instrumental pieces, from 1737, we find this statement immediately following the five-point agenda:

> Just as in the whole of nature and in all of Creation there is not a single bodily form that can be properly apprehended without dissection, so let me be the first ever to take apart a melody, and systematically to investigate its parts. For our experiment, a short Minuet will serve first, so that everyone may see how so small a thing is bodily constructed, unless it is a monstrosity, and so that one may learn from tiny objects how to pronounce sound judgment on more weighty ones.

In using words such as 'dissection' (*Zergliederung*) and 'take apart' (*zerlegen*), Mattheson was transferring the language of the natural sciences to the world of music theory. Strongly influenced himself by the ideas of Locke, and believing in the paramount importance of the senses, he was suggesting that the empirical methods of the scientific investigator (*Probe*: 'experiment') might be applied to the living forms of music.

The history of science in the sixteenth and seventeenth centuries had seen enormous advances with the growth of anatomy as a field, and of dissection as its primary technique, aided latterly by the microscope. Beginning with the revolutionary work of Vesalius (1514–64) and his followers in Padua, and continuing with that of others such as William Harvey (1578–1657), Regnier de Graaf (1641–73), Jan Swammerdam (1637–80) and Giovanni Borelli (1608–79), it had brought about a significant understanding of how the body worked as both a physical system comprising muscles, bones and the heart, and a chemical system involving blood, gland secretions and digestive processes. On the other hand, it presented the early eighteenth century with a dilemma that was to last for 150 years: whether the body could be explained purely as a physico-chemical system, as seventeenth-century

15 Cf. J. B. Logier, *A System of the Science of Music and Practical Composition* (London: Green, 1827), p. 295: '[1] The Key, whether major or minor. [2] The Time. [3] Fundamental Basses. [4] Modulation and Fundamental 7ths. [5] Dissonances. [6] Passing Notes, Auxiliary Notes, and Secondary Harmony. [7] Periods. [8] Sections and Imitation.'

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thinkers had in the main sought to show, or whether it possessed some property exclusive to living organisms – a special vital principle.

In one sense, what follows the passage by Mattheson quoted above is purest musical anatomy. The parts into which the melody is dissected are its *Glieder*, 'limbs', or 'members', and their subordinate parts; to analyse is *zergliedern*, 'to dismember' (about which there will be more to say in the Introduction to Part I, below). But most striking is the aside 'unless it is a monstrosity'. The noun here is *Misgeburt*: literally, 'misbegotten', but really meaning 'born with a deformity', a 'monstrosity', a 'hideosity'. For eighteenth-century natural historians, children or animals born with parts of the body missing or superabundant, such as were commonly displayed at fairs and carnivals, were no mere objects of curiosity (any more than were children found to have been brought up by animals in the wild, or even the blind, the deaf and the dumb): they were valuable clues in the search for an understanding of how species reproduced and were regenerated – for what was to become the theory of heredity in the new nineteenth-century science of biology.[16] The principal discussions of *monstres* were those by Pierre de Maupertuis (1698–1759) in the 1740s and Charles Bonnet (1720–93) in the 1760s, especially concerning celebrated cases of albino Negros, and of families with a recurrence of six fingers and six toes; but the phenomenon of gross abnormality had already troubled seventeenth-century thinkers who believed that God had created all species as fixities, and also those who maintained that each new life-form was 'preformed' in the image of one or other of its parents.[17]

§5 Nature versus mind as organizing principle

The views of Rameau and Mattheson as to the origin of music were sharply at odds. According to Rameau, music's organizing principle lay in nature, the resonating body providing all the material of harmony; harmony preceded melody, and from it composition was generated via the succession of fundamentals. Mattheson, in a work provocatively entitled *Essence of the Science of Melody* (1737), disputed every one of these points:[18]

> Melody is fundamentally none other than the original, true and simple harmony itself, in which all intervals follow one *after* another, in *order*, and in *succession*. With music in parts, these selfsame intervals, and no others, sound one *with* another, *together*, and *simultaneously*.
>
> This central proposition puts an end to dispute on the matter. For everyone must concede that the prime elements from which part-writing is generated are [first] the very scale-degrees themselves, and second the innate natural learning [*Natur-Lehre*]

16 I am grateful to Keith Falconer for first suggesting this interpretation of Mattheson's *Misgeburt* to me.

17 It is tempting, but idle, to speculate that when using the geometer's term 'generation' later in his life, Rameau was aware of the natural historians' use of the term, over which fierce controversy raged. (Diderot's *Encyclopédie*, vol. VII (1757), under 'Génération', devoted three inches to geometry and thirty columns to natural history (physiology), with no reference to music at any point.) The notion that the source pitch had an interior moulding force which could shape entire pieces is an appealing one.

18 *Kern*, Foreword, p.b *verso*, §§6–7; 'in parts' for *vollstimmig* and 'part-writing' for *Vollstimmigkeit* are too contrapuntal in implication. This Foreword is not repeated in *Capellmeister*.

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> that any qualified musician must possess. The saying remains irrefutable: *The simple goes before the complex, hence is its origin and root.*

Here, *Natur-Lehre* is a play on words between natural (i.e. acoustical) theory and the innate wisdom of *human* nature. In 1735, Mattheson had listed seven 'erroneous, insupportable and mutually contradictory principles' that he had found in Rameau's *Treatise*.[19]

Rameau, then, was a controversial figure in his own century; and the dispute, far from petering out after 1800, continued unabated – if anything, sharpened – during the nineteenth century. The essentials of his theory were preserved by Momigny in 1803–05 and by Reicha in 1816–18; and some vestiges of it were retained by Vogler. The fundamental bass was revived in a limited form by Sechter in 1853, who directly influenced both Anton Bruckner's teaching methods and also the harmonic theory of Karl Mayrberger in 1878. Influenced by more recent acoustical work of Helmholtz and others, Arthur von Oettingen's *System of Harmony in Dual Development* (1866) built a new theory of chord structure, progression and modulation, based on the overtone series together with its inverse, the undertone series (itself proposed by Rameau in 1737), and Riemann was influenced by this, though developing a theory of harmonic function that derived in part from Hauptmann. Though Heinrich Schenker rejected Rameau's theory as neglecting voice-leading in its obsession with vertical sonority, he accepted the acoustical origin of the major triad – the 'chord of nature' – and projected the latter through time to form the *Ursatz* (for which the accepted translation, 'fundamental structure', is doubly anachronistic: 'primal counterpoint' might be more faithful, 'contrapuntal archetype' more immediate) as the basis of all musical form.[20]

In 1802, the Paris Conservatory adopted as its official harmony textbook a compact treatise that swept away the complexities of Rameau's theory and proclaimed with utmost simplicity: 'There exists in harmony but one solitary chord, which contains all the others', namely the ninth-chord, G–B–D–F–(♭)A. Independently opposing Rameau in 1817, Gottfried Weber cited the out-of-tuneness of many of the overtones of a fundamental, and the fact that the constituent notes of any one chord have mutually conflicting sets of overtones, robustly declaring:[21]

> Take all of this into account and you will easily become convinced that the resonance of the overtones of a string, far from being intrinsic to the essential nature and beauty of the sound, is an impurity, the harmful effect of which is averted only by the inaudibility of these resonating sounds.

19 Johann Mattheson, *Kleine General-Bass-Schule* (Hamburg: Kissner, 1735), Dedication, also p. 221, where he speaks of the augmented unison, augmented third, and the diminished sixth 'and other monstrosities [*Misgeburten*] that have been brought into the world [by Rameau, in whose works] one finds a generous 1,000 hundredweight of unrelieved tedium and obscure minutiae, 500 stone of wearisome caprice and eccentric absurdity, some 3lbs of genuine knowledge, not counting hearsay, 20zs of sound judgment, and scarcely a peck of good taste'.

20 Heinrich Schenker, 'Rameau oder Beethoven? Erstarrung oder geistiges Leben in der Musik?', *Das Meisterwerk in der Musik: ein Jahrbuch*, vol. III (1930), pp. 9–24. A complete English translation of *Das Meisterwerk* (1925–30) is forthcoming in the series Cambridge Studies in Music Theory and Analysis.

21 Gottfried Weber, *Versuch einer geordneten Theorie der Tonsezkunst*, vol. I (Mainz: Schott, 1817), §IV, Anmerkung.

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The parading of arithmetical and algebraic formulas was in his view sheerest pedantry; the entire mathematical treatment of musical composition was an illusion.[22] This view was echoed in 1837 by the first volume of Marx's *Manual of Musical Composition in Theory and Practice*, a landmark in the history of music theory and pedagogy. Marx purged the whole apparatus of acoustics, believing that the calculated perception of relationships between overtones had nothing to do with the mental and spiritual activity of music creation and perception.[23]

Fétis, while conceding in 1840 that parallels might be found between harmonic practice and acoustical phenomena, denied that the latter were the origin of the former:[24]

> But, someone will ask, what is the origin of these scales; what is it that controls the order of their tones [i.e. provides the laws of tonality], if it is not acoustical phenomena, and the laws of calculus? I reply that their origin is purely metaphysical: we conceive this order, and the melodic and harmonic phenomena that ensue from it, as a consequence of our mental make-up and of our education. For us it exists as a fact in its own right, independent of all cause extraneous to us. [. . .] Mark my words: these acoustical phenomena, so badly analysed at first, do not possess the significance that they have so rashly been accorded.

Fétis derived this approach from the philosophy of Kant and also of Schelling. Sounds come from external sources, and the composer's organization of them takes place as mental process. The human cognitive system delivers impressions of sounds to the conscious mind; but it is the mind, prompted by the will, that correlates and organizes those impressions.[25] In place of the organizing principle of the fundamental bass, Fétis provided the innovatory and enduring paradigm of tonality, an indubitably human, mental creation.

For Moritz Hauptmann, in 1853, the false intonation of many overtones in the harmonic spectrum constituted an obstacle even more insurmountable than it had been for Weber. Whereas (if we take the fundamental to be C) the notes of the dominant chord, G, B and D (overtones 3, 9 and 15), were true in pitch, the F and A (11 and 13) of the subdominant chord were completely unusable. For Hauptmann, dominant and subdominant were mirror-images of one another a fifth above and below the tonic respectively, their symmetry central to his theory; hence the absence of one side of this symmetry in the natural tone-system was unacceptable, and he rejected acoustics as a basis in its entirety:[26]

> While these basic things remain undetermined, we surely cannot expect [to infer] from the data of such acoustical ratios alone a theoretical foundation for harmony in the wider sense – a foundation for the laws governing chord-to-chord connection, [let alone] for chord progression.

22 ibid, §X, Anmerkung.
23 A. B. Marx, *Die Lehre von der musikalischen Komposition, praktisch-theoretisch* (Leipzig: B&H, 1837), pp. 41–2. Marx disputed the evidence of acoustics in *Allgemeine Musiklehre* (Leipzig: B&H, 1839, 10/1884), pp. 49–51, and *Die alte Musiklehre im Streit mit unserer Zeit* (Leipzig: B&H, 1841), pp. 49, 77–84.
24 François-Joseph Fétis, *Esquisse de l'histoire de l'harmonie considérée comme art et comme science systématique* (Paris: 1840), pp. 169–70; restated in *Traité complet de la théorie et de la pratique de l'harmonie* . . . (Paris: Schlesinger, 1844, 3/1875), pp. 249–50.
25 This is summarized from Rosalie Schellhous, 'Fétis's "Tonality" as a Metaphysical Principle: Hypothesis for a New Science', *Music Theory Spectrum*, 13 (1991), pp. 225–30.
26 Moritz Hauptmann, *Die Natur der Harmonik und Metrik* (Leipzig: B&H, 1853, 2/1873), p. 4.

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