

Von Entwicklung der Riemannschen Harmonielehre und ihrem Verhältnis zu Oettingen und Stumpf

Richard Münnich

Translated by Robert W. Wason, et al.

Preface

The first attempt to place Hugo Riemann's system of harmony in historical context was probably made by the author of the system himself.¹ However, it was bound to suffer from a certain lack of objectivity, to say the least, and thus one might argue that the present essay marks the beginning of the scholarly assessment of Riemann's achievement as a theorist. Published in a *Festschrift* for Riemann's

¹Hugo Riemann, *Geschichte der Musiktheorie im IX.-XIX. Jahrhundert* (Leipzig: Max Hesse, 1898); for a translation, see *Hugo Riemann's Theory of Harmony: A Study by William C. Mickelsen and History of Music Theory, Book III by Hugo Riemann*, trans. and ed. William C. Mickelsen (Lincoln and London: University of Nebraska Press, 1977); cited below as "Mickelsen." In much of Book Three (which deals exclusively with the history of harmonic theory), Riemann's system of harmony seems to offer the model against which Riemann, the historian of music theory, measures the achievements of earlier theorists; the self-aggrandizing nature of the book is most apparent in chapter nine, "Musical Logic." Also see Scott Burnham, "Method and Motivation in Hugo Riemann's History of Harmonic Theory," *Music Theory Spectrum* 14, no. 1 (Spring 1992): 1-14.

sixtieth birthday,² this study by the Berlin musicologist and music education specialist, Richard Münnich (1877-1970), is still of value as an introduction to the historical context of Riemann's theory. Münnich's rather different perspective places certain of the sources of Riemannian theory in unaccustomed relief. For example, his discussion of Oettingen helps us to develop some appreciation of the impact that this theorist's work must have had, as peculiar as it may appear to American theorists of the late twentieth century.³ And the climax of the essay presents a critique of Riemann's theory in light of Carl Stumpf's research—perhaps even less known to American theorists—that brings up questions of consonance and dissonance which are still apposite, if neglected. To be sure, many of Münnich's—and even some uncomfortably close paraphrases of his formulations—have become commonplaces in more recent secondary literature on Riemann; still, there is much to be said for a reading of the original, where the ideas appeared first, and with admirable clarity, organization, and concision.

That clarity has made for a relatively straightforward translation. With regard to the title, one could well render “Riemannische Harmonielehre” in improved English as “Riemann's Theory of Harmony.” However, I have come to believe that by writing “Riemannian harmonic theory” Münnich was placing Riemann first in line in a species whose further evolution was well underway at the time of the essay's writing.⁴ In most other respects the work requires little

²*Riemann-Festschrift: Gesammelte Studien: Hugo Riemann zum sechzigsten Geburtstage überreicht von Freunden und Schülern* (Leipzig: Max Hesse, 1909; reprint, Tutzing: Hans Schneider, 1965).

³Our lack of sympathy for Oettingen is certainly due in part to ignorance of his work; there is no published English translation of his *Harmoniesystem in dualer Entwicklung* (Dorpat und Leipzig: Gläser, 1866), and the first and only edition appears never to have been reprinted. One American theorist who has taken up the challenge of “dualism” is Daniel Harrison; see his *Harmonic Function in Chromatic Music* (Chicago and London: University of Chicago Press, 1994); see pp. 242-52, in particular, for his reading of Oettingen.

⁴For an excellent recent survey of the development of Riemann's own theory and its

further comment, though there are a couple of points at which I have felt it necessary to take issue with Münnich's analysis. I have done so either in text added to Münnich's footnotes, or in additional footnotes. All additions to the main text or footnotes are enclosed in square brackets; editorial interpolations end with "RW." All italicized passages in the body and footnotes of Münnich's essay appear in the original either as italics, or, more frequently, as "wide-spaced" type—the former for titles and foreign words, the latter for emphasis. Finally, I have retained the traditional octave nomenclature that Münnich used.

The first draft of this translation was the product of a class that I gave at the Eastman School of Music in the spring of 1992, the members of which were Hannu Apajalahti, Michael Buchler, Edward Jurkowski, Mary Linklater, David Palmer, Nancy Rogers, and Keith Waters. I thank all of them for their contributions, and hope that they may still be able to recognize some of their work in the present version. I have attempted "group translations" of important secondary articles with several classes in the history of theory, both to give students some sense of what this important—if prosaic—scholarly activity is like and to produce a library of translations for future generations of students. The advent of personal computing has greatly simplified the mechanics of combining and editing student efforts, and it is to be hoped that this recent boon to scholarship, and perhaps the appearance of this translation, may inspire others to attempt such group efforts. Finally, it is hoped that Münnich's essay in this new guise will be of continuing service to English-speaking students beginning their study of Riemann's work.

extension and modification by later Riemannian theorists, see Harrison, chapters six and seven.

On the Evolution of Riemannian Harmonic Theory and its Relation to Oettingen and Stumpf

Richard Münnich

Hugo Riemann laid the foundation for his system of harmony with his Göttingen doctoral dissertation¹ of 1873—twenty years after Moritz Hauptmann's *Die Natur der Harmonik und der Metrik*, ten years after Helmholtz's *Die Lehre von den Tonempfindungen*, and seven years after Oettingen's *Harmoniesystem in dualer Entwicklung*.² He received the idea of harmonic dualism from Moritz Hauptmann and the model of a system developed from this idea from Arthur v. Oettingen. However, it was Helmholtz's study of tonal perception, with its rich new scientific

¹“Über das musicalische Hören” [“On Musical Hearing”]. In published form, this appeared as *Musikalische Logik. Hauptzüge einer physiologischen und psychologischen Begründung unseres Musiksystems* [Musical Logic. The Main Elements of a Physiological and Psychological Basis of Our Musical System] (Leipzig: C. F. Kahnt [1874]). This brief text is still available.

²[See Moritz Hauptmann's *The Nature of Harmony and Metre*, trans. W. E. Heathcote (London: Sonnenschein, 1888, 1893; reprint, New York: Da Capo Press, 1991); Hermann von Helmholtz's *On the Sensations of Tone*, trans. A. Ellis, 2d ed. (London: Longman, Green & Co., 1885; reprint, New York: Dover Publications, 1954). As mentioned earlier, there is no published English translation of Oettingen.]

findings and bold foray into the physiological realm, that gave him courage for an all-out attack upon, and scientific assessment of, the collected problems of harmony. The construction of a harmonic system would only be safe on a precise physiological foundation; this had become his firm conviction through the strengths and weaknesses of Helmholtz's work. And only a consistent application of scientific knowledge to the experiential facts of musical practice—as Oettingen had tried to do—could lead to a system that could pass the test in the analysis of masterpieces, and in a viable musical pedagogy.

However, the productivity of the young theorist caught fire not only on the positive thoughts, research and constructions of his predecessors, but also very much on the criticism to which they forced him.

Riemann received the idea of harmonic dualism from Hauptmann, as has been said. The proud line of dualist theorists that he shows in his latest essay dedicated specifically to this question³ was as unknown to Riemann then as it had been to Hauptmann, for Riemann's later researches were the first to reintroduce us to the views of these earlier musical writers. Only one theorist of earlier centuries is mentioned in the dissertation as a representative of the dualistic notion of harmony: Rameau, with regard to his *Démonstration principe de l'harmonie* (1750), while Riemann expressly refuses to claim Tartini as witness for the venerable old age of the theory. Hauptmann, however, who had rediscovered it entirely independently in the nineteenth century, remained as far removed from a consistent development of the dualistic idea as Rameau had been one hundred years earlier. It had been a mere episode in his musical thought, and thus, strictly speaking, Hauptmann can be counted among the forbearers of dualistic theory to just as limited an extent as Rameau and others. As objective evidence seems to show, the dualistic idea in Hauptmann's formulation had not yet made a decisive impression on Hugo Riemann. This objective evidence consists of essays on harmonic and metric logic, and on tonality, which

³*Das Problem des harmonischen Dualismus* [The Problem of Harmonic Dualism] (Leipzig: Kahnt Nachfolger, 1905).

the student, barely twenty-three years old,⁴ published—essays which show, in every respect that had further consequences, complete independence from Hauptmann.⁵

The influence which Oettingen's system of harmony had on Riemann's development must be assessed at an incomparably higher [level].⁶ Oettingen offered, in fact, something so novel, so idiosyncratic and relentlessly single-minded, that *if* the dualistic theory had been accepted as scientifically justified by later theorists, he indisputably would have received the place of honor in the history of musicology that Riemann's dissertation assigns him, next to Rameau and

⁴In the *Neue Zeitschrift für Musik*, 1872. One of these essays already bears the title "Musikalische Logik" (Musical Logic); one should not confuse it in references with the dissertation of the same name. Cf. Riemann's *Präludien und Studien*, vol. 3 (Leipzig: Hermann Seeman, 1901), 1ff. and 23ff., where it is reprinted. [For "Musikalische Logik," see *NZfM* 68/28-29, 36-38: 279-82, 287-88, 353-55, 363-64, 373-74; for "Über Tonalität," see *NZfM* 68/45-46: 443-44, 453-54; both appeared under the pseudonym "Hugibert Ries." Also see Mark P. McCune, "Hugo Riemann's 'Über Tonalität': A Translation," *Theoria* 1 (1985): 132-50.]

⁵The as yet unclear conception of minor betrays a trace of Helmholtz's influence! One hears: "Our minor scale is based essentially on the same principles as the major scale. Only the fifth overtone of the fundamental is incorrect, namely the major third. Instead of this, a foreign tone appears, to which the fifth is a third: a c e." I cannot repress the remark that an attentive reading of this early essay (which shows the urge to clarity, free from emotions, and mature independence) remains inspiring for today's educated reader. [Münnich's final claim that the "essays . . . show, in every respect that had further consequences, complete independence from Hauptmann," is in fact much too broad and certainly a rhetorical excess. Münnich's opinion is tenable, if controversial, as long as the discussion *is confined to the understanding of minor*. Riemann presents a dialectical reading of the cadence in "Musikalische Logik" (throughout Part I, "Harmonische Logik") that is clearly an attempt to translate Hauptmann's abstract ontology of the cadence into a "real-time" musical analysis. Münnich seems to be reacting against what he perceives to be an inflation of Hauptmann's contribution and influence upon Riemann; see n. 7, below. RW]

⁶Arthur v. Oettingen, *Harmoniesystem in dualer Entwicklung* (Dorpat und Leipzig: W. Glässer, 1866). The absolutely amazing consistency of Oettingen's book makes it a downright gripping read, despite blatant and, not infrequently, equally amazing mistakes.

Helmholtz.⁷ Oettingen was the first who worked out with profound seriousness what for Hauptmann had been a mere idea. He gained a starting point in the double principle of tonicity and phonicity—a starting point that made possible a strictly consistent development of the dualistic idea. *Tonicity* is what he called the quality of a simultaneity, by virtue of which it may be interpreted as a component of a fundamental, its *tonic fundamental* (for example, $c^1 e^1 g^1$ as component of the generating sound C, whose fourth, fifth, and sixth partial-tones are these tones); tonicity yielded the principle of the major consonance. *Phonicity* is what he called the quality of a simultaneity, by virtue of which any or all of its tones possess partial-tones in common, the lowest of which was called the phonic overtone (for example, g^3 is the lowest common overtone of $c^1 e^1 g^1$); phonicity gave him the principle of minor consonance. One sees that Oettingen's tonic fundamental of a *major* chord lies just as far under its *lowest* tone as the phonic overtone of a *minor* chord lies above its *highest* tone; conversely, the tonic fundamental of a minor chord lies just as far below its highest tone as the phonic overtone of a major chord lies above its lowest tone.⁸ And it is obvious that the same symmetrical arrangement may be shown between the chords on each [scale] degree and their correspondents [in the opposite mode], and thus, that each mode can be represented as a mirror image of the other. In consistent obedience to his principles, Oettingen then also sets the triad of the phonic (phonic with the upper-third and under-fifth [$g^1 e^1 b^1 c^1$]) against the triad of the tonic (that is, the tonic with the upper-third and upper-fifth [$c^1 e^1 g^1$]), and correspondingly, the triad of the (under-)regnant ($c^1 a^1 b^1$) against the triad of the (upper-)dominant ($g^1 b^1 d^2$), the triad of the upper-

⁷Besides those just mentioned, Riemann's dissertation names Oettingen, and Moritz Hauptmann as the fourth; I think, however, that one should be more restrained in judging Hauptmann today.

⁸[Harrison, 244, Ex. 5.3, shows the symmetrical relationship between the tonic fundamental of the major triad and the phonic overtone of the minor triad. But as might be expected, Oettingen investigates the reverse of the norm as well: namely, the *dissonant* common phonic overtone in a major triad and the symmetrically placed *dissonant* tonic fundamental of the minor triad; see Harrison's Ex. 5.4, 245. RW]

regnant ($d^2 b b^1 g^1$) against the triad of the under-dominant ($f a c^1$), the phonic regnant-seventh-chord ($c^1 a b f d$) against the tonic dominant-seventh-chord ($g^1 b^1 d^2 f^2$), and so forth.

As brilliantly as Oettingen had developed Hauptmann's idea, Riemann nevertheless could not adopt the new system without further work.⁹ Oettingen's point of departure, phonicity, was already an insufficient foundation for the minor consonance for Riemann, even though he would allow it as a sort of "hint."¹⁰ Furthermore, Oettingen overshot the objective in more than one sense. At the very least, the concept of the regnant as a mirror image of the dominant was dispensable.¹¹ But such consequences as the permissibility of the doubled minor prime as bass tone ($e a c^1 e^1$), which Oettingen discusses in all earnestness, were completely impossible for Riemann:

If in four-voice composition . . . , in the phonic system, e-a-c-e appears not to denote a satisfactory close to any progression, I do not want to conclude from this that this chordal position would be absolutely useless. Here it is perhaps a matter of being "chained to the fundamental bass," while we possess no such [limitations] for the soprano of tonic-system cadences—indeed, not even for the soprano of the phonic-system cadence.¹²

⁹To my knowledge, there are no known critical remarks concerning Oettingen's work by Riemann, except for a few locations in the dissertation (to be mentioned shortly) and *Das Problem des harmonischen Dualismus*, 11. On the other hand, compare C. Stumpf, *Beiträge zur Akustik und Musikwissenschaft*, vol. 1 (Leipzig: J. A. Barth, 1898), 90ff.

¹⁰Compare Riemann's lecture "Die Natur der Harmonik" in the Waldersees Collection (Leipzig: Breitkopf & Härtel) 6:159-90, especially pp. 176-77. [See Riemann, "The Nature of Harmony," trans. John Comfort Fillmore as *New Lessons in Harmony* (Philadelphia: Presser, [1886 or 1887]), 22-23.]

¹¹Compare *Das Problem des harmonischen Dualismus*, 35-36. Riemann does not bring up Oettingen there, but everything said there about the notion of the dominant is *mutatis mutandis* simultaneously a justification for Riemann's distancing himself from Oettingen's terminology.

¹²*Harmoniesystem in dualer Entwicklung*, 78; also cf. 73.

The chains clank loudly and clearly as the consistent lover of symmetry proposes a phonic “figured-soprano” notation as the counterpart to a tonic “figured-bass” notation.¹³ For the doctoral candidate from Göttingen, this could only be a new warning signal:

The overtones exist in reality [he wrote in the dissertation] and crowd into our conscious mental image often with unpleasant force; they allow the lowest tone of the harmony to be understood all too easily as the fundamental, and continually entice us toward the interpretation of a minor passage in the sense of major. In order to *understand* the minor chord, we must ignore the existence of the overtones; however, in order to *write* a sensible harmonic passage in minor, we must *take account* of them.¹⁴

Closely related to this undeniable deviation by Riemann from Oettingen’s standpoint is another, which likewise shows Riemann as the representative of practical matters, as opposed to Oettingen, the consistent advocate of assumed theoretical principles. Specifically, Oettingen stands energetically for the *universal* restoration of pure minor in practical harmonization.

If one works for a long time in the phonic system (for example, A minor), employing no non-diatonic tones, one remarks that the final cadence with G# throughout is sensed as not proper to the system, even though it may sound good on its own. Indeed, I maintain that the strangeness of G# dwindles the more one becomes accustomed to these progressions, so that finally the use of the G# will be perceived as an inconsistency, and even as weak.¹⁵

¹³Ibid., 74.

¹⁴Ibid., 50.

¹⁵*Harmoniesystem in dualer Entwicklung*, 77-78.

This barely perceptible move from thoroughly correct observation to concluding hyperbole (which here makes of the major third in the minor-mode dominant an object of derision) is characteristic of Oettingen's conception of minor. An even less appetizing illustration of Oettingen's distortion of a basically sound tendency occurs in his book with his critical corrections of Beethoven's Scottish folk-tune harmonizations.¹⁶ That Riemann, the musician, was not entirely enthusiastic about these arrangements by a physicist may be concluded from the fact that he later made an attempt to harmonize them himself in pure minor.¹⁷ Also, in the dissertation he protests strongly against "advocating the rehabilitation of pure minor in the extreme manner of A. v. Oettingen." Riemann was definitely not interested in influencing the compositional act by theoretical assumptions, but rather in an "explanation which granted equal rights to the polar-opposed modes in principle, *not practice*."¹⁸ He also demands recognition for himself in the concluding chapter of the dissertation for "bringing Oettingen's conception of minor down to size."¹⁹

Oettingen was as consistent in his definition of *dissonance* as he had been in his construction of chords. His explanation that "dissonance is the simultaneous existence of two or more tonal complexes"²⁰ was exactly the word for which Riemann was waiting, and I would not hesitate to maintain that the basic idea behind this—in whatever transformations the definition itself and its justification have been

¹⁶Ibid., 100-110.

¹⁷These harmonizations—for mixed choir—have not been printed. Information on this is given by Riemann in *Musikalische Syntax*, 54 [Musical Syntax: Outline of a Theory of Musical Structure] (Leipzig: Breitkopf & Härtel, 1877).

¹⁸"Musikalische Logik," 47.

¹⁹Ibid., 66.

²⁰*Harmoniesystem in dualer Entwicklung*, 228. [See the discussion of problems in the translation of *Klang* in Robert Wason and Elizabeth W. Marvin, "Riemann's 'Ideen zu einer Lehre von den Tonvorstellungen': An Annotated Translation," *Journal of Music Theory* 36, no.1 (Spring 1992): 70-71.]

subjected to—may be recognized in all modern systems of harmony, including Riemann’s final system.

However, as excellent as Oettingen’s explanation of dissonance was (including as it did first-rate formulations of the basic principles of resolution), much was still lacking for an assessment of the tonal-logical relationship of the various “levels” of triads—for a system, that is, as Riemann imagined it.²¹ No one, with the exception of Riemann, knew this better than the creator of the first dualist system, who was free from any overestimation of his own abilities. “It will be a primary task of any future musical science,” he admitted, “to sift through the chaos of possibilities,” and left the completion of this task to the practically educated music theorist. It was Hugo Riemann who was granted this to accomplish. He is the founder of *tonal logic* in the science of harmony,²² and only Rameau before him took a small though essential step in this direction. With the establishment of tonal logic, however, begins a new chapter in the history of the scientific (and even practical) theory of harmony.

When Riemann, as opposed to Oettingen, felt the obligation to build, upon an altered but similar basis, a system directed more towards practical music, precisely the principal requirements of the theory of harmony that would inspire his fantasy were contained in Helmholtz’s

²¹Riemann demanded such an assessment even as a student in the early essays mentioned above! “Abstract notions like the key-system may be defined through the complex conception of primary chords of the key as a single ‘master chord,’ but with this idea *Hauptmann is not yet in a position to place three chords in a rational progression*. He has certainly understood the unity of chords in a key, but *clearly not the varying meaning of these chords to one another*—their logical meaning in a musical structure.” Cf. “Musikalische Logik” (*Präludien und Studien*, 3:1). [Cf. my remarks on Münnich’s “rhetorical excess” in n. 5, above; Münnich certainly recognizes Hauptmann’s influence upon Riemann in this area. RW.]

²²The expression “musical logic” does not make a fine enough distinction; the astute Riemann distinguished correctly between “harmonic logic” (tonal logic) and “metrical logic.” See *Präludien und Studien*, vol. 3, pp. 2 and 11 respectively. Incidentally, Hauptmann already had applied the notion of “logic” to the domain of music, though only *en passant* to be sure, and with no attempt to develop it; he was unable to appreciate its consequences (*Die Natur der Harmonik und der Metrik*, 7).

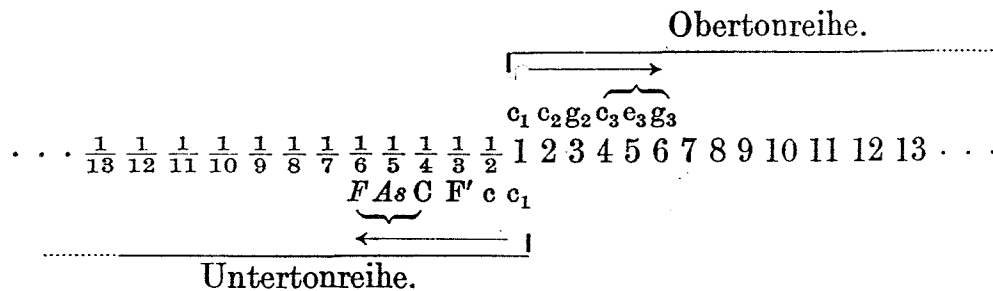
theory of tonal perception. In his “Geschichte der Ästhetik in Deutschland” (1868), the famous philosopher Hermann Lotze had complained that Helmholtz’s explanation of consonance reduced the specific difference of major and minor to a “mere ‘more or less,’ corresponding only to differences of degree.”²³ Riemann, influenced by Lotze, begins his critique as well as his new theoretical justification of minor, since it was evident that the major consonance was connected in one manner or another with the first five tones of the overtone series (second to sixth partial). Now, since Oettingen’s explanation of minor had the defect that one, justifiably, could not connect a mental conception with a corresponding physiological mechanism of hearing²⁴—and precisely the return to the physiological process of hearing had given Helmholtz’s ideas their authority—it seemed impossible not to search for the justification of the minor consonance (which was on an equal level with its polar opposite, major) in the physiological realm. But here the goal could only be achieved if there corresponded to the natural overtone series and *undertone* series—just as natural, and obviously just as ordered. Thus, as an extension of Helmholtz’s theory of hearing, Riemann proposed the additional hypotheses: “*The fibers of the basilar membrane which correspond to the undertones of a given tone vibrate partially; this provides, implicitly, the tonal conception of undertones.*”²⁵ Naturally, the ratios of vibration of these undertones had to be the exact reciprocals of the corresponding overtones, yielding the double series:

²³Lotze’s student Stumpf provided a penetrating and influential criticism of Helmholtz’s theory of consonance in “Konsonanz und Dissonanz,” *Beiträge*, vol. 1. [This is the same Stumpf work to which Münnich refers in n. 9 above. RW]

²⁴Riemann’s *Geschichte der Musiktheorie* (Leipzig: Hesse, 1898), 499, [Mickelsen, 214-15] speaks, to be sure, of the phonic relationship of the minor triad tones as a “physiological basis” for the undertone series. But certainly the expression is used there only in the subjective sense, from Oettingen’s point of view.

²⁵“Musikalische Logik,” 12. Doubtlessly, Riemann was put onto this way out of the problem through Rameau’s *Démonstration du principe de l’harmonie*. Cf. *Geschichte der Musiktheorie*, 458-59 [Mickelsen, 190-91].

Example 1. Vibrations of undertones and overtones



To be sure there existed a distinction between overtones and undertones: that the former could be analyzed, the latter not. However, as a consequence of the sympathetic vibration of the fibers in the ear, the undertones should be capable of having a definite effect upon the *sensation* of the primary tone, in a manner analogous to the way overtones affect the sensation of tone color of a tone, even when the listener is not able to assess this interesting, natural effect due to the deficiency of experience or hearing. Consonance was now obtained by Riemann, in that the partial tones of the overtone- or undertone-series, respectively, represented by prime numbers (1, 2, 3, 5, 7, 11, 13, etc.) were assembled, and with the exclusion of tones not realized within our tonal system (7, 11, 13, etc.), were classified as “prime sounds.” From this emerged the definition: “Consonance is the simultaneous sounding of tones (actually, composite tones, because they generally carry overtones and always undertones) belonging to one and the same prime.”²⁶ That is to say, simultaneities are consonant which move within the series of proportions: 1:2:3:5 and 1:1/2:1/3:1/5, or—with the omission of the octave—within 4:5:6 and 1/1:1/5:1/6. In other words, the major triad, the minor triad, and the tones and intervals

²⁶This and the following in “Musikalische Logik,” 17, 21ff, 55.

representing them are consonant. Dissonant, therefore, are: (1) all tones in relationship to the primary tone (“tonus” = tonic) not corresponding with its primary overtones or undertones; (2) all harmonies (intervals and chords) within the key which are based upon the previous type of dissonance, or which result from simultaneity of components of the over- and undertones. Examples of (1) are: D against C, B \flat against C; examples of (2) are: C-B, E-F, A \flat -E, E \flat -C \sharp , C-E-G \sharp , A \flat -D-C, A \flat -C-F \sharp , G \flat -C-E. After setting up the concepts of tonic, dominant, and subdominant as the only pure components of the cadence, the formula emerges: dissonance arises first through the simultaneity of tonic and under- or overdominant; second, through the simultaneity of under- and overdominant harmony; and third, through simultaneous sounding of all three kinds of cadential components.²⁷ These are Oettingen’s results, which Riemann arrived at in his own way. But at the same time Riemann takes an apparently small and yet extremely important step beyond his predecessor. This step, which Oettingen certainly came close to, but never really found, is the setting up of the notion of *apparent consonance*.²⁸

Even if the chapter “Musical Logic” in the dissertation is underdeveloped, and the explanation of musical logic in cadential formations is impaired by Hegel’s influence,²⁹ the notion of apparent

²⁷Riemann’s explanation is somewhat more elaborate.

²⁸Oettingen designates the “secondary chords” [*Nebenakkorde*] (his *leading-* and *third-*chords) expressly as consonant chords, naturally as phonically consonant in major, for example, and *eo ipso* tonically dissonant. Never does he say that the phonic consonance of this chord is only of *apparent* value. Rameau already possessed the basic idea; Momigny elaborated it clearly, while with Koch, it is questionable whether he accepted apparent consonance or apparent *dissonance*. Cf. Riemann, *Geschichte der Musiktheorie*, 503 (note) [Mickelsen, 237-38, n. 59], 495-96 [Mickelsen, 212-13], as well as *Musik-Lexikon*, 7th ed., s.v. “Dissonanz.”

²⁹The notions of thesis, antithesis, thetic norms, etc. have certainly not vanished completely from Riemann’s terminology, but they have influenced neither the development nor the content of his system. [Again, this should be read in light of Münnich’s disinclination to admit any influence of Hauptmann—and hence perhaps this aspect of his theorizing—upon Riemann. Oettingen, Helmholtz, and others had criticized Hauptmann for burying what they regarded as sound musical thinking in obscure

consonance leads deeply into the territory of *tonal logic*. Of course, Riemann's discussion is motivated initially only through the more complicated vibration ratio which confronts the major chord first from the point of view of the minor mode, and the minor chord from the point of view of the major mode. But beyond that, it is clearly stated that the apparent minor chord in major and the apparent major chord in minor must have the effect of dissonance, because their individual intervals are to be interpreted as representatives of consonant sound complexes of the operative mode—that is, they are to be interpreted as a tonal “majority decision.” That is certainly one of the most important laws in tonal logic: that a chord consonant in itself may suffer such a fundamental alteration of its aesthetic character that it may be interpreted as a dissonance.³⁰

The tasks remaining to Riemann after the dissertation appeared to him to emerge directly from the fact that his work was essentially a sketch of a physiologically grounded system of harmony: he was concerned with developing the system and firming up its foundation. But herein lay an error. Actually, the system had not been physiologically based, but rather psychologically, at best. Everything that he had found with regard to chords was based solely on self-observation and purely logical operations, having not the slightest connection to physiological matters.

Therefore, he would have been able to go on confidently with the extension of the system without worrying about the physiological domain; even the assessment of [empirical] musical facts and their mutual functional relationships could have been reached in that manner. Unfortunately, Riemann did not limit himself to this goal. It is certain that the mistaken assumption of the objective existence of undertones, its necessary retraction, and the attempted explanation of consonance in minor which resulted thereupon hindered perceptibly the recognition of Riemann's most important thoughts. Of course, this is a reproach

dialectics. RW]

³⁰Context again leads us to this remarkable situation. Here we can only say that the complex intellectual process upon which the notion of “apparent consonance” rests is hardly more than hinted at—let alone exhausted—by the term.

appropriate not to Riemann, but to his one-sided critics, since no man is free from error. Justice and reason always demand examination of the complete theory—not just detachable parts.

The construction of the system continues with a comprehensive description and characterization of the various harmonic progressions, first of all essentially within the confines of basic cadence forms. Still based upon clumsy correspondants to Oettingen's terminology, the system of "musical syntax"³¹ develops chains of consonant chords into tonal unities, always concerned to test and clarify the effects of the emergent chords and chord progressions. Occasionally, a tendency to simplify comes through with regard to the terminology of *progressions*: for example, the much simpler "dominant progression" replaces the horrible "retrograde homologue-homonome fifth-progression." Most importantly, Riemann takes a significant step forward in the theory of dissonance by singling out the dominant seventh before any of the remaining dissonances. While the remaining dissonances were understood as "double sound-complexes" [*Doppelklänge*], the seventh appears to us also to be understandable in a *direct* relationship to the fundamental. This rests on the resemblance of the seventh relationship to the ratio 4:7. Naturally, the corresponding situation holds in minor for the lower-seventh of the subdominant.

In the *Skizze einer neuen Methode der Harmonielehre* [Sketch of a New Method of Harmony],³² this preferred method of derivation with respect to the relationship 4:9 is also transferred to the V⁹ chord (in minor, the subdominant ninth chord). The derivation of dissonant chords from the simultaneity of two harmonies is by no means given up, however, for even the Rameauian *accord de la sixte ajoutée* is explained as a mixed form of major and minor. However, the predominance of *one* harmony, even in a dissonant chord, is expressed very clearly in the schematic representation of chords. With the designation of leading-tone-change chords and parallel-chords as

³¹*Musikalische Syntax: Grundriß einer harmonischen Satzbildungslehre* [Musical Syntax: Outline of a Theory of Musical Structure] (Leipzig: Breitkopf & Härtel, 1877).

³²Leipzig: Breitkopf & Härtel, 1880.

apparent consonances³³ and the introduction of the generalized notation of function³⁴ in *Harmony Simplified*, Riemann's system of harmony received its final form, which is nothing else than an exhaustive and profound development and extension of Oettingen's dual system of harmony by means of the theory of tonal functions ("tonal logic") that Riemann created.

While the inner construction of Riemann's system does not show the influence of other theorists, the theoretical formulations of the notion of consonance in Riemann's latest writings are influenced not insignificantly by the emergence of an excellent research scientist in a related field. In his magnum opus, Carl Stumpf, the founder of modern tone-psychology, created the concept of tonal fusion—a concept that has since become indispensable.³⁵ This is not a process—something coming into being—but rather a property: a characteristic, sensory trait of simultaneities, which consists in their greater or lesser approach to a sensation of *unity*. This [property of] fusion (always spoken of with regard to isolated intervals) is the strongest with the octave, weaker in the case of the fifth and fourth, and decreases with increasing complexity according to interval vibration ratios such that, according to Stumpf's experiments with unmusical people, the following gradations of fusion emerge: octave, fifth, fourth, thirds and sixths, the "group of sevens" (4:7, 5:7) that are only approximated in our tonal system, and finally, the remaining intervals.³⁶ Stumpf found the

³³*Handbuch der Harmonielehre* (Leipzig: Breitkopf & Härtel, 1893).

³⁴These were invented at approximately the same time by F. Marschner in Vienna. [Presumably Münnich refers to Franz Marschner (1855-1932), who taught in Vienna from 1883 to 1910; unfortunately, *Die Musik in Geschichte und Gegenwart* (8:1681) lists no published work by Marschner on harmony. RW]

³⁵Stumpf was the first researcher of note who exhaustively examined and studied Riemann's writings. Even those who choose not to follow his critique in their work cannot deny its service to the field. See Stumpf, *Beiträge*, 1:84-107.

³⁶Stumpf's *Tonpsychologie* [Psychology of Tonal Perception], vol. 2 (Leipzig: Hirzel, [1883-90]), 127-218. That the concept was already well known to the ancients is often emphasized by Stumpf himself; cf. also his "Geschichte des Konsonanzbegriffs"

defining characteristic of consonance in tonal fusion:³⁷ the stronger the fusion of simultaneously sounding tones is, the more consonant the simultaneity; the weaker the fusion of tones, the more dissonant the simultaneity. Our distinction between consonance and dissonance, which is not only gradual but specific, is grounded in the habit of understanding the relationship of tones at higher degrees of fusion (up to the thirds and sixths) *directly* and those at lower grades *indirectly*—that is, through the mediation of a tone more closely related to both. Further, there occurs a gap in the gradations of fusion (because the “group of seven” is left out of our musical system), and a series of sensations such as the sensory discomfort of the fusion-gradations designated by us simply as “dissonant,” of which the need for resolution is a practical consequence. According to this theory, consonant chords are all of those which consist of consonant intervals; dissonant intervals of a chord furnish the chord with dissonance, even when they occur together with consonant intervals.

It was not to be expected that Riemann would go over immediately with great enthusiasm to this new camp. Chords made of combinations of intervals were an impossible idea for him. A general definition of consonance based upon gradual degrees of consonance and fusion

[History of the Notion of Consonance] in the *Abhandlungen der Bayrischen Akademie der Wissenschaft*, I. Cl., vol. 21, pt. 1. Riemann also speaks repeatedly of the “fusion” of tones into a single sound as early as the treatise on “the objective existence of undertones” and in “Musikalische Syntaxis.” However, there it had only to do with the fusion of partials into a composite sound [*Klang*] (“Only the primary [partials] corresponding to prime numbers fuse with C as a unity,” *Musikalische Syntaxis*, 7, footnote). Even *Heinrich Bellerman* used the expression “fusion” along with the related “mixture”—both obviously influenced by the Greek—in *Kontrapunkt* [Counterpoint] (3d ed., 138-39) exactly in the sense in which Stumpf uses it. Of course, Stumpf was the first to make the term useful through empirical testing, discussion of its possible causes, and following up on its consequences.

³⁷The formulation of Stumpf’s theory of consonance based on the concept of fusion is found in *Beiträge*, vol. 1 (1898), 66-83. In any critique of the theory of fusion, the important article “Neures über Tonverschmelzung” (Stumpf, *Beiträge*, vol. 2) cannot be ignored.

contradicted the obvious assumptions of his tonal thinking.³⁸ However, Riemann recognized the phenomenon of fusion and, above all, accepted it as deliverance from ideas that had long been misleading—namely, that Stumpf had shifted the crux of the problem of consonance away from the physical and physiological realms.³⁹ *The formulation and solution of the problem of consonance had to be dealt with, independent of all relation to real or assumed secondary tones*—this realization was due to Stumpf. If, nevertheless, the hope expressed jokingly by Stumpf “that, even among music theorists, the dualism of the parties may lead little by little to a unified fusion”⁴⁰ has remained unfulfilled up to now, and even disappeared in most quarters, this is due, in my opinion, to the fact that the two great founders of the new scientific disciplines have understood the problem of consonance far too narrowly and have viewed it according to completely opposed points of view.

In order to substantiate this, I must allow myself a certain verbosity, with respect at least to the dimensions of this small sketch.

Stumpf’s research in tone-psychology in “*Beiträge zur Akustik und Musikwissenschaft*” (Ebbinghaus-König Zeitschrift) deals with tones and chords as simple sensorial perceptions, as isolated elements of sensation. Riemann, for whom the important question is not of the psychology of sensorial perceptions, but rather of the musical problems in the narrower sense, makes the point in contrast to Stumpf that, for *musical* hearing, isolated tones and chords are certainly not authoritative; only the relationship to a definite musical center, and thus only musical *context* can give them sense. But, of course, Stumpf never denied that. In contrast to Riemann, he is of the opinion that the results

³⁸Riemann is mistaken, however, when he maintains that Stumpf struggled against the acceptance of chord representation [*Klangvertretung*] for contemporary hearing. Cf., Stumpf, *Beiträge*, 1:102: “Further, it is an important fact, correctly emphasized by the above-mentioned researchers [Oettingen and Riemann] . . . that the contemporary musician thinks in triads. . . .”

³⁹*Elemente der musikalischen Ästhetik* (Berlin and Stuttgart: Spemann, 1900), 93ff. *Das Problem des harmonischen Dualismus*, 29.

⁴⁰*Beiträge*, 1:107.

of musical hearing separated from musical context are not unrelated to those of extra-musical, isolated hearing; rather, he regards extra-musical hearing as the indispensable prerequisite for musical hearing. He would certainly admit that a triad—for instance, c-e-g—can take on an essentially different aesthetic character according to the governing tonality and the larger context, and that, for example, in C major, it has a completely different effect than in A minor. But he denies resolutely that any quality which an isolated c-e-g sensation shows can simply be suspended through a given musical context—for example, through a governing tonality of A minor. I must concur strongly with Stumpf's opinion. In the second chord of the succession,

Example 2. Chord succession



the prevailing, consonant relation between the tones c-e-g is certainly not suspended. My ear clearly hears a unified sound: g fuses with c-e, and C with e-g so wonderfully into a unity that I do not know how I am to come to the point of designating one of these tones as dissonant

against another.⁴¹ And I must also say that considerations of a more general sort only strengthen me in this view, although I would not like to call upon them directly as evidence. As I see it, the relation between single components in any conceivable domain is not lost when the components are placed together in a larger, even remote context. The relationship between a particular green and yellow, for example, in a landscape, will not be changed through a blue or red that contrasts with both of them, although the aesthetic character of that relationship is changed considerably thereby. The same can be said of logical or even social relations. A father named C, and his sons, who might be named E and G, are always combined to become the social group “family,” no matter whether one views this family from the point of view of tax purposes or in terms of fitness for military service, or with regard to tobacco consumption; the father will always stay the father of his sons, and the sons will always remain the sons of their father.

The foregoing also implies a definite position with regard to Riemann’s second objection to Stumpf’s fundamental method: Riemann regarded the departure from *intervals* in the treatment of the problem of consonance as senseless. I believe that that also may not be conceded. Stumpf is certainly justified in pointing to the well-known *octave-consonance*, the problematic nature of which Riemann

⁴¹One need only imagine the above-notated chord progression with extension of the strong beats:

Example 3. Extension of strong beats

$$\frac{3}{2} \quad | \circ | \circ \quad | \circ | \circ .$$

The unity of sound and the major character of the dominant-parallel chord of the minor tonality is even clearer: g-b-d in A minor. I regret that I cannot go into the problem in greater depth here.

recognized as well.⁴² Naturally, this cannot be explained through hearing in triads, as the interpretation of consonance through the third and fifth may be; Riemann satisfies himself therefore with establishing the impossibility of its explanation. Even Stumpf, by his own admission, cannot offer an exhaustive explanation of the special and musically important position of the octave. But nevertheless, through the evidence of its superior position in the series of gradations of fusion, he has provided a reason to distinguish it *absolutely* from the other intervals! And even if one ignores this, as soon as there is a problem with the octave-consonance, there must also be a problem with the fifth-, the fourth-, and the third-consonances. I do not see how one can get past that.

However, perhaps Riemann does not want to dispute the existence of these problems, but rather only their importance for music-theoretical problems of *tonal* consonance in a more narrow sense. But I also believe that one may not ignore the question of interval consonance on this account.⁴³ For if only the third and fifth above and below the same prime can be fused to chordal unity, then one must also ask how precisely these acquire this ability, which all other intervals lack. They must already have a unity of a lesser degree within themselves in order to be able to become a chordal unity under favorable conditions.

According to what has been said, I can maintain that Stumpf's procedure of considering first of all the fundamental qualities of isolated intervals is not a mistake, but rather thoroughly correct and indispensable. I also believe that the varying degrees in each group have importance for harmonic theory without regard to the specific

⁴²Stumpf did not overlook the excursus dedicated to this problem in *Musikalische Syntaxis* (10ff), but he also did not find it satisfying.

⁴³We must always differentiate *tonal* (interpretation) consonance from *interval* (sensation) consonance, for which another more auspicious name may be used. The secondary triads have interval-consonance and tonal dissonance; they are *perceived* as consonant and *interpreted* as dissonant. However, the interpretation—which one may not understand as a capricious, subjective act—is decisive for the aesthetic character.

separation of consonance and dissonance,⁴⁴ and that the theory of fusion, although it leaves the last and highest questions of harmonic science unanswered, belongs to the “prolegomena to every future harmonic theory that may be presented as a science.”⁴⁵

But, as mentioned above, the theory of fusion certainly does not gain *entrée* for us to the highest questions—neither to their answer nor even to their formulation. Stumpf considers the chords *merely* as isolated sensory perceptions. Naturally, he also knows well that the “so-called musical hearing includes much more memory and thought than one usually assumes”;⁴⁶ but for the formation of the concept of consonance, the consideration of these processes appears to be superfluous to him. Riemann assumes precisely the opposite standpoint. To him, the only worthy object of research is the effects inherent in simultaneities as a result of the complicated psychological process of perpetual comparison and relating. The most exhaustive and, in any case, systematic arrangement possible of these relationships between chords is Riemann’s theme, and the theme of every future harmonic theory.

As is only natural after what we have said, Riemann adopts Stumpf’s concept of fusion, but only in a much freer interpretation.⁴⁷

⁴⁴Incidentally, Stumpf believed that the dissonances “had, since ancient times, been thrown together in a class according to their very nature as dissonances” (*Beiträge* 1:77). That is an error; degrees of dissonance were distinguished by [Johannes de] Garlandia, by Tunstede, and in the *Ars cantus mensurabilis*. Cf. Riemann’s discussion of these sources in *Geschichte der Musiktheorie*.

⁴⁵[An obvious allusion to Kant, the original text parallels precisely his *Prolegomena zu einer jeden kunstigen Metaphysik die als Wissenschaft wird auftreten können* [1783], and thus I have slightly modified a published translation of Kant’s title, “Prolegomena to Every Future Metaphysics that may be Presented as a Science” (*The Philosophy of Kant*, ed. Carl Friedrich [New York: Random House, 1949], 40). RW]

⁴⁶*Beiträge* 1:91.

⁴⁷His formulations in the last publications are variable. Here I confine myself to the latest edition (7th) of the *Musik-Lexikon* that has just appeared, in particular to the articles “Klang” and “Konsonanz.” Incidentally, in the interests of a unified music-theoretical terminology, we welcome Riemann’s decision to replace “gradations of

He distinguishes four degrees of fusion: first, the fusion of the octave; second, that of the major third or [perfect] fifth; third, that of the major or minor triad; [and] fourth, that of the musically comprehensible dissonant chord. Beyond the series of degrees of fusion stand—to some extent as an addendum—the musically uninterpretable chords, the so-called discordances.⁴⁸

“Consonance is the fusion of a number of sounds into the unity of chordal meaning.” Clearly this statement is formulated from the standpoint of the theory of harmony as the theory of *tonal logic*, since the chordal meaning intended here is nothing other than the meaning of a chord of the tonic, dominant, or subdominant. Thus, *Riemann formulates the notion of consonance, in its final and definitive musical sense, in the most extreme antithesis to Stumpf*: instead of sensation, the *interpretive* act characteristic of the hearing of a musical context is made its basis. And according to musical interpretation, that is, from the standpoint of comparison based upon tonal logic, the idea of consonance is to be understood more narrowly than is usually the case. Indeed, this raises the question of whether, [proceeding] from this standpoint, one could go even further than Riemann did.⁴⁹

In Riemann’s gradations of fusion, he clearly emphasizes the specific separation, on the one hand, of consonance from dissonance, and, on the other, of musically clear dissonance from musically unclear dissonance (discordance). This specific separation, which harmonic

fusion” [*Verschmelzungsstufen*] with “gradations of unity” [*Einheitsstufen*] or similar locutions.

⁴⁸The second and third levels of this hierarchy are to be understood, of course, within the limitations of Riemann’s theory. Whether the second, according to Riemannian assumptions, may be viewed as allowable in any sense appears questionable to me. In any case, when limited to the major third and fifth, it has no meaning vis á vis the third level. Even when extended (through minor third, fourth, and the sixths), it does not fit with the following definition of consonance.

⁴⁹Thus it is questionable, whether dominants and subdominants should not be classified as a special group of apparent consonances; the fact—among others—that the added seventh or sixth mark their tonal character more sharply certainly supports such a view.

science can under no circumstances do without, is, strictly speaking, absent from Stumpf's theory. To be sure, Stumpf never speaks of an objectively existing distinction, but merely of a subjective "impression" of such a distinction, at least regarding consonance and musically useable dissonance. But this subjective impression has such powerful consequences in the actual practice of art that one has the right to demand the establishment of a clear psychological foundation for it. I do not see that Stumpf would have succeeded in finding a definitive solution to this problem and I believe that his admirable logical acuity did not support him fully in the attempt. The first component—the direct relationship, which we have called "consonant," and the indirect, which we have called "dissonant"—is itself already too much of a problem to be of use in solving other problems, particularly if the understanding of both relationships is, as Stumpf assumes, based on mere habit. On the other hand, the exclusion, from among the components Stumpf deals with, of the "group of seven" from our tonal system will seem quite reasonable to all, even though he did give reasons *not* to view them as acceptable. Finally, only the subjective elements of the need for resolution and the sensual unacceptability of dissonance remain for Stumpf [to explain]. Yet these are precisely the issues which the musician wishes to see explained. At this point he will no longer ask where and why is there a boundary between consonance and dissonance, but rather where and why is there a boundary between sensual acceptability and unacceptability—between the sense of cadence and the need for resolution? And this is precisely the eternal question which he had hope to have clarified!

True, Riemann too has certainly not provided a *foundation* for his idea of consonance. In fact, he has even expressly renounced the search and only sought support for the character-distinction between major and minor in the increase of frequency of vibration or size of sound wave, respectively ([an explanation] which is not understandable to me).⁵⁰ Yet it is certain to me that his understanding of consonance itself—though one might rightly demand many corrections of definition as well as the elimination of the dualistic explanation of minor—is, in essence,

⁵⁰*Das Problem des harmonischen Dualismus*, 21.

correct. It is certain that, at least in the main points, it corresponds to the [empirical] facts of *musical hearing*, and that a harmonic theory as tonal logic can never grow in any other soil.

Thus, I believe that Stumpf as well as Riemann have undoubtedly contributed essential and important things to the understanding of the nature of consonance. Stumpf has shown us *one* way, with scientific exactitude and exemplary logical rigor, and Riemann the *other*, with distinguished, assured musical intuition. But there is still something lacking in the *middle*, which explains scientifically and beyond doubt the empirical compatibility of both sides. Of course, these are extremely weighty problems, whose common solution would benefit us all. But regardless of how difficult and far away their solution may be, it is certain that the bridge from Stumpf to Riemann must be built first before we may regard the problem of consonance as essentially solved and the theory of harmony as grounded scientifically.