Tonality 1900–1950

Concept and Practice

Musikwissenschaft

Franz Steiner Verlag

Edited by Felix Wörner,
Ullrich Scheideler and Philip Rupprecht

Tonality 1900–1950

Edited by Felix Wörner, Ullrich Scheideler and Philip Rupprecht

Tonality 1900–1950

Concept and Practice

Edited by Felix Wörner, Ullrich Scheideler
and Philip Rupprecht

Franz Steiner Verlag

Unterstützt von / Supported by

Alexander von Humboldt
Stiftung/Foundation

Bibliografische Information der Deutschen Nationalbibliothek:
Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

Dieses Werk einschließlich aller seiner Teile ist urheberrechtlich geschützt.
Jede Verwertung außerhalb der engen Grenzen des Urheberrechtsgesetzes ist unzulässig und strafbar.
© Franz Steiner Verlag, Stuttgart 2012
Druck: AZ Druck und Datentechnik, Kempten
Gedruckt auf säurefreiem, alterungsbeständigem Papier.
Printed in Germany.
ISBN 978-3-515-10160-8

CONTENTS

Contributors 7

Felix Wörner, Ullrich Scheideler, and Philip Rupprecht
Introduction 11

TONALITY AS CONCEPT AND CATEGORY

Joseph Auner
Weighing, Measuring, Embalming Tonality:
How we Became Phonometrographers 25

Richard Cohn
Peter, the Wolf, and the Hexatonic Uncanny 47

Wolfgang Rathert
The Legacy of German Rule: Some Reflections on Another Musical
Iceberg in the Transatlantic Relationships of Music History 63

Hans-Joachim Hinrichsen
Concepts of Tonality in Hindemith's *Unterweisung im Tonsatz*
and in His Late Writings 81

TONALITY IN AUSTRO-GERMAN THEORY

Markus Böggemann
Concepts of Tonality in Schoenberg's *Harmonielehre* 99

Stephen Hinton
Schoenberg's *Harmonielehre*: Psychology and Comprehensibility 113

Felix Wörner
Constructive and Destructive Forces: Ernst Kurth's Concept
of Tonality 125

PRACTICES OF TONALITY

Marianne Wheeldon
Defending Tonality: The Musical Thought of Milhaud and Koechlin 143

Mark Delaere
"Autant de compositeurs, autant de polytonalités différentes": Polytonality in French Music Theory and Composition of the 1920s 157

Volker Helbing
Nocturne in Blue, Black and Poppy Red: Tonal and Formal Dramaturgy in the Third Movement of Ravel's *Sonate pour violon et violoncelle* 173

Alain Frogley
Tonality on the Town: Orchestrating the Metropolis in Vaughan Williams's *A London Symphony* 187

Ullrich Scheideler
Between Archaism and Modernism: Tonality in Music for Amateurs in Germany around 1930 203

Philip Rupprecht
Among the Ruined Languages: Britten's Triadic Modernism, 1930–1940 . . . 223

Beth E. Levy
Roy Harris and the Crisis of Consonance 247

Daniel Harrison
Samuel Barber's *Nocturne*: An Experiment in Tonal Serialism 261

CONTRIBUTORS

Joseph Auner is Chair and Professor of Music at Tufts University. His scholarly work focuses on Schoenberg and the Second Viennese School, turn of the century Vienna, Weimar Berlin, and music and technology. He is the author of *Western Music in Context: A Norton History, Music of Twentieth and Twenty-First Centuries* (Norton, forthcoming), *A Schoenberg Reader* (Yale, 2003), *Postmodern Music/ Postmodern Thought* (with Judy Lochhead; Routledge, 2001), and the *Cambridge Companion to Schoenberg* (with Jennifer Shaw; Cambridge, 2010).

Markus Böggemann is Professor of Historical Musicology at the University of Kassel and was previously Lecturer at the University of Arts in Berlin and Assistant Professor of Musicology at Potsdam University. His publications include the monograph *Gesichte und Geschichte. Arnold Schönbergs musikalischer Expressionismus zwischen avantgardistischer Kunstprogrammatik und Historismusproblem* (Vienna, 2007), writings on the cultural context of the Viennese school, analytical studies, and essays on contemporary music.

Richard Cohn is Battell Professor of Music Theory at Yale University. His work on chromatic harmony has been the topic of a series of summer seminars convened by the late John Clough, and has been developed in about a dozen doctoral dissertations. He recently completed *Audacious Euphony: Chromatic Harmony and the Triad's Second Nature* (Oxford, 2012). In preparation is a general model of meter with applications for European, African, and African-diasporic music, and a co-edited collection on David Lewin's phenomenological writings. Cohn also edits *Oxford Studies in Music Theory*.

Mark Delaere is Professor of Musicology at the University of Leuven. His research covers music from the twentieth and twenty-first centuries, with a special focus on the interaction among the analysis, history, theory, and aesthetics of music. Book publications include *Funktionelle Atonalität* (1993), *New Music, Aesthetics and Ideology* (1995), and *Pierrot lunaire* (with J. Herman, 2004). He is currently preparing a book on early serial music to be published in the series *Analysis in Context: Leuven Studies in Musicology*.

Alain Frogley teaches music history at the University of Connecticut, Storrs, and in Spring 2008 was Visiting Professor at Yale University. In 2005–06 he was a Fellow of the American Council of Learned Societies. A contributor to the revised *New Grove*, Frogley has also edited *Vaughan Williams Studies* (Cambridge, 1996), and authored a monograph on Vaughan Williams's Ninth Symphony for the Oxford University Press series *Studies in Musical Genesis and Structure* (2001).

Daniel Harrison is the Allen Forte Professor of Music Theory at Yale University, where he is also Chair of the Department of Music. His book on late nineteenth-century chromaticism, *Harmonic Function in Chromatic Music* (Chicago, 1994), won the Young Scholar Award from the Society for Music Theory. He has published on tonal-music topics in *Journal of Music Theory*, *Music Theory Spectrum*, *Musical Quarterly*, *Theory and Practice*, and *Music Analysis*, among other venues. He has also published on the music of The Beach Boys in *Understanding Rock* (Oxford, 1997), a collection of essays on pop music.

Volker Helbing is Professor of Music Theory at Hanover University of Music, Drama, and Media, and was previously Visiting Professor at the Berlin University of the Arts and Trossingen University of Music. His publications include a monograph on Ravel entitled *Choreographie und Distanz. Studien zur Ravel-Analyse* (Hildesheim, 2008), a chapter in *Unmasking Ravel: New Perspectives on the Music* (Rochester, 2011), and several essays on late twentieth-century European composers.

Hans-Joachim Hinrichsen is Ordinarius in Musicology at the University of Zürich. He is co-editor of the *Archiv für Musikwissenschaft* and of *Schubert: Perspektiven*. He has published widely in music history, aesthetics, and the interpretation and reception history of the eighteenth to twentieth centuries. Most recently, he co-edited *Johann Sebastian Bach und die Gegenwart* (with Michael Heinemann; Cologne, 2007), *Werk-Welten: Perspektiven der Interpretationsgeschichte* (with Andreas Ballstaedt; Schliengen, 2008), and *Bruckner-Handbuch* (Stuttgart, 2010).

Stephen Hinton is the Avalon Foundation Professor in the Humanities at Stanford University, where he has also served as Senior Associate Dean for Humanities and Arts and chair of the Music Department. His publications include *The Idea of Gebrauchsmusik*, *Kurt Weill: The Threepenny Opera* (Cambridge Opera Handbook), the critical edition of *Die Dreigroschenoper* for the Kurt Weill Edition (edited with Edward Harsh), *Kurt Weill: Gesammelte Schriften* (edited with Jürgen Schebera, expanded 2nd edition, 2000), a volume in the Hindemith Collected Works, and most recently *Kurt Weill's Musical Theater: Stages of Reform* (Berkeley, 2012).

Beth E. Levy is Associate Professor of Musicology at the University of California, Davis. She has recently finished a book titled *Frontier Figures: American Music and the Mythology of the American West*, and has published articles in *American Music*, *repercussions*, and the *Journal of Film Music*. Her contribution to *Copland and His World* (edited by Carol Oja and Judith Tick; Princeton) won the Irving Lowens Award for the best article on American music in 2005.

Wolfgang Rathert is Professor of Musicology at the Ludwig-Maximilians-Universität and his main research concerns music of the twentieth century to the present. He has published *Charles Ives* (Darmstadt, 1996) and *Musikgeschichte USA* (with Berndt Ostendorf; Mainz, 2012), and edited the Chamber Music of Kurt Weill for

the Critical Edition (with Jürgen Selk; Weill Foundation, 2004). He is a member of the advisory board of the journal *Musik-Konzepte*.

Philip Rupprecht is Associate Professor of Music at Duke University. His publications include *Britten's Musical Language* (Cambridge, 2001); "'Something slightly indecent': British composers, the European avant-garde, and national stereotypes in the 1950s" (*Musical Quarterly,* 2009); "Thematic drama," in *Peter Maxwell Davies Studies* (Cambridge, 2009); and "Agency effects in the instrumental drama of Musgrave and Birtwistle," in *Musical Narrative After 1900*, ed. Michael Klein and Nicholas Reyland (Indiana, in press). He is preparing *Avant-Garde Nation: British Musical Modernism, 1956–1979,* and *Rethinking Britten* (forthcoming, 2013).

Ullrich Scheideler is Head of Music Theory at Humboldt-University in Berlin and a former editor of the Arnold Schoenberg Critical Edition. His publications include *Komponieren im Angesicht der Musikgeschichte. Studien zur geistlichen a-capella-Musik in der ersten Hälfte des 19. Jahrhunderts im Umkreis der Sing-Akademie zu Berlin* (Berlin, 2010), the critical editions of Schoenberg's *Erwartung* and *Die glückliche Hand* (Mainz, 2005), and *Autorschaft als historische Konstruktion* (with Andreas Meyer; Stuttgart, 2001).

Marianne Wheeldon is Associate Professor of Music Theory at the University of Texas at Austin. Her research interests include the music of Claude Debussy and musical culture in Paris in the first decades of the twentieth century. She is the author of *Debussy's Late Style* (Indiana, 2009) and editor of *Rethinking Debussy* (with Elliott Antokoletz; Oxford, 2011). She is currently preparing a book on Debussy's posthumous reputation in the 1920s and 30s, an article from which appeared in *Journal of Musicology* (2010).

Felix Wörner is Assistant Professor of Music Theory at the University of North Carolina at Chapel Hill. His research focuses on the history of music theory and aesthetics in the nineteenth and twentieth centuries. His publications include a monograph on the early twelve-tone works of Anton Webern (Bern, 2004), and articles in *Musiktheorie*, *Zeitschrift der Gesellschaft für Musiktheorie*, and *Mitteilungen der Paul Sacher Stiftung*, among others. His most recent publications are "Otakar Hostinsky, the Musically Beautiful and the Gesamtkunstwerk," in *Eduard Hanslick: Aesthetic, Critical and Cultural Contexts*, ed. Nicole Grimes, Siobhán Donovan and Wolfgang Marx (Rochester, forthcoming) and "Transmitting Schoenberg's Legacy into a New World" in *Crosscurrents: American and European Music in Interaction, 1900–2000*, ed. Felix Meyer, Carol Oja, Wolfgang Rathert, and Anne C. Shreffer (Woodbridge, forthcoming 2012).

INTRODUCTION

Felix Wörner, Ullrich Scheideler, and Philip Rupprecht

Tonality, 1900–1950: our title aligns a very broad category of musical experience with a quite specific historical moment. The rhetorical strategy is deliberate, slightly polemical even. We begin by recognizing that tonality—or the awareness of key in music—achieved crisp theoretical definition in the early twentieth century, even as the musical avant-garde pronounced it obsolete. The notion of a general collapse or loss of tonality, *ca*. 1910, has remained influential within music historiography, and yet the textbook narrative sits uneasily with the continued flourishing of tonal music throughout the past century. Tonality, from an early twenty-first century perspective, never did fade from cultural attention, yet it remains a prismatic formation—defined as much by ideological and cultural valences as by more technical understandings of musical practice.

The history of twentieth-century art music has often been told as a story of innovations in technique, and it is in the early years of the period that the narrative appears most dramatic. Talk of expressive crisis and stylistic rupture, of revolution rather than smooth continuity, dominates many histories of musical style or musical technique.[1] The venturing into an atonal idiom by Arnold Schoenberg and his pupils around 1910, or the appearance of twelve-tone composition after 1923, invariably figure as pivotal developments in the history of Western music as a whole. In a 1933 lecture Webern examined tonality "in its last throes" in order to prove "that it's really dead."[2] The sense of an inevitable and possibly irrevocable abandonment of tonality governs Schoenberg's own references to "emancipation of the dissonance," or Boulez's later description of the Viennese composer's atonal counterpoint as "freed from its slavery to tonality."[3] Atonal music, for its first listeners, was

1 Among widely circulated historical surveys, see for example Marion Bauer, *Twentieth Century Music* (1933; New York: Putnam, 1947); Adolfo Salazar, *Music in Our Time* (New York: Norton, 1946); H. H. Stuckenschmidt, *Neue Musik* (Berlin: Suhrkamp, 1951); Paul Collaer, *A History of Modern Music,* trans. Sally Abeles (Cleveland: World, 1961); André Hodeir, *Since Debussy: A View of Contemporary Music*, trans. Noel Burch (New York: Grove, 1961); William W. Austin, *Music in the 20th Century* (New York: Norton, 1966); Hermann Danuser, *Die Musik des 20. Jahrhunderts* (Laaber: Laaber, 1984); Bryan R. Simms, *Music of the Twentieth Century* (New York: Schirmer, 1986); Robert P. Morgan, *Twentieth-Century Music* (New York: Norton, 1991); Arnold Whittall, *Musical Composition in the Twentieth Century* (Oxford: Oxford University Press, 1999); Richard Taruskin, *The Early Twentieth Century,* vol. 4, *The Oxford History of Western Music* (New York: Oxford University Press, 2005).

2 Anton Webern, *The Path to the New Music,* ed. Willi Reich, trans. Leo Black (Bryn Mawr: Presser, 1963), 47.

3 Schoenberg, "My Evolution" (1949), in *Style and Idea: Selected Writings*, ed. Leonard Stein, trans. Leo Black (London: Faber, 1975), 84, 91; Pierre Boulez, "Arnold Schoenberg" (1961),

something radical; like Cubism in painting (a "harmony of asymmetrical lights"),[4] it was first understood as a genuinely new art, rather than as a reworking of earlier paradigms. Schoenberg himself in a January 1910 program note wrote of being "conscious of having broken through every restriction of a bygone aesthetic."[5] The image of limits breached has persisted for later historians. William Austin in the 1960s wrote of "a sort of spaceship, the twelve-tone technique," carrying its creator "out into the abyss." Paul Griffiths, 40 years later, in *A Concise History of Western Music*, puts the point more simply in the title of his chapter on atonality—"To Begin Again."[6] Most recently, the advent of atonality (born: 1909) has been marked as a historical event.[7]

But there is another story to be told about the 1900–1950 period. It begins by acknowledging the obvious continuity of tonal music throughout these years, in an established art-musical canon—encompassing Sibelius, Debussy, Copland, Prokofiev, Poulenc, Tippett, and any number of figures—whose music patently affirms tonal centers (not to mention the vernacular and theatrical works of Gershwin, Porter, Ellington, and countless others). Later movements operating under the banners of New Tonality, New Simplicity, or the post-modern have returned musicians' concern with asserting a home key to the center of cultural debate in American and European music. As composers as diverse as Terry Riley, Arvo Pärt, and Alfred Schnittke have achieved wide popularity since the 1960s, musicology has called into question the categorical tonal/atonal divide, especially when mapped onto an evolutionary view of music history. Charles Seeger, already in 1929, dismissed historically motivated views of music's pitch realm with a common-sense appeal to audience tastes: "Just as one can weary of too much tonality, so one can weary of too little."[8] Closer to the present, views surrounding the advent of atonality are changing; Schoenberg's renunciation of tonality, Charles Rosen noted, had to be thorough, for "no one was so deeply attached as he to certain aspects of it." Even in Schoenberg's own music, the idea of a sharp break with former tonal practice has been modified by recognition of his "ongoing extension and transformation" of prior techniques.[9]

in *Stocktakings From an Apprenticeship*, trans. Stephen Walsh (Oxford: Clarendon Press, 1991), 281.

4 Guillaume Apollinaire, *Les Peintres Cubistes* (1913), in *A Cubism Reader: Documents and Criticism, 1906–1914*, ed. Mark Antliff and Patricia Leighten, trans. Jane Marie Todd (Chicago: University of Chicago Press, 2008), 477–514, citing 481.

5 "Bin ich mir bewuβt, alle Schranken einer vergangenen Ästhetik durchbrochen zu haben…" Cited in Danuser, *Die Musik des 20. Jahrhunderts*, 35; trans. in *A Schoenberg Reader*, ed. Joseph Auner (New Haven: Yale University Press, 2003), 78.

6 Austin, *Music in the 20th Century*, 38; Paul Griffiths, *A Concise History of Western Music* (Cambridge: Cambridge University Press, 2006), 231.

7 See the symposium *100 Jahre Atonalität: Herausforderung für die Musiktheorie*, in *Jahrbuch des Staatlichen Instituts für Musikforschung Preuβischer Kulturbesitz*, ed. Simone Hohmaier (Mainz: Schott, 2009).

8 Charles Seeger, "Tradition and Experiment in (the New) Music," in *Studies in Musicology II, 1929–1979*, ed. Ann M. Pescatello (Berkeley: University of California Press, 1994), 125.

9 Charles Rosen, *Schoenberg* (Glasgow: Collins, 1976), 42; Ethan Haimo, *Schoenberg's Transformation of Musical Language* (Cambridge: Cambridge University Press, 2006), 7.

Much turns on the circulation of metaphor. Figures of tonality's exhaustion or death tug firmly against images of immutable nature; tonality is a proto-geometric space, or else a shared *lingua franca*; its loss spells crisis, its recovery a return to cultural vitality.[10] The role of tonality in music historiography, as Michael Beiche has shown, is a highly mutable one, and by the early twentieth century the term invariably encompasses the relation to a new conceptual opposite, atonality. The historical course of tonal music, as Bryan Hyer writes, has been understood largely in terms of a proto-cadential master narrative "directed toward its own end." The story unfolds in genetic accounts of growth or decay, and in the technological allegory in which tonality "collapses, breaks down or wears out from over-use."[11] Vivid metaphors, in their turn, are a salutary reminder that music theory—a discourse seeking ordered representations of what can be heard and understood—is constrained by verbal language.[12]

Striking, in the 1900–1950 period, is the extent to which the discovery of "new" musical resources by composers coincides with a spate of theoretical reflection on earlier tonal repertory, most notably from Austro-German writers. Schoenberg's own *Harmonielehre* was first published in 1911, on the heels of his least tonal sounding compositions, and in close proximity to a *Harmonielehre* (1906) and a *Kontrapunkt* (1910) by the Viennese theorist Heinrich Schenker. Schenker's theory of voice leading—the counterpoint of an *Urlinie* with supporting *Bassbrechung*, creating a deep structure, the *Ursatz*—was transplanted posthumously by his students to the USA, where it achieved widespread influence among English-speaking theorists and analysts. Ernst Kurth's treatises, with their emphasis on leading-tone motion and the energetic flow of chromatic tonal music, date from this same period. For German-speaking musicians, on the other hand, it was Hugo Riemann's prolific writings, offering an evolving theory of chordal *functions* within a key, that assumed by far the greater influence and pedagogical dissemination. Towards the end of his long career, Riemann reacted against the scientific methods of an emergent field of ethnomusicology, arguing in a 1916 study for tonality's historical development from folk-melodic repertories towards the diatonicism of modern European art music.[13] Such a study could be construed as an edifice against incomprehensibly atonal new music, or else as a teleological and Euro-centric view of world music.

10 The metaphoric lexicon is parsed in Lloyd M. Whitesell, "Twentieth-century Tonality, or, Breaking Up is Hard to Do," in *The Pleasure of Modernist Music*, ed. Arved Ashby (Rochester: University of Rochester Press, 2004), 103–20.

11 Michael Beiche, "Tonalität," in *Terminologie der Musik im 20. Jahrhundert*, ed. Hans Heinrich Eggebrecht (Stuttgart: Steiner, 1995), 412–33, esp. 425; Brian Hyer, "Tonality," *New Grove Dictionary of Music and Musicians*, 2nd ed., ed. Stanley Sadie and John Tyrrell (London: Macmillan, 2001), 25:591.

12 On epistemologies of the aural, see Jairo Moreno, *Musical Representations, Subjects, and Objects: the Construction of Musical Thought in Zarlino, Descartes, Rameau, and Weber* (Bloomington: Indiana University Press, 2004).

13 See Hugo Riemann, *Folkloristische Tonalitätsstudien* (Leipzig: Breitkopf & Härtel, 1916); also Matthew Gelbart and Alexander Rehding, "Riemann and Melodic Analysis: Studies in Folk-Musical Tonality," in *The Oxford Handbook of Neo-Riemannian Music Theories*, ed. Edward Gollin and Alexander Rehding (New York: Oxford, 2011), 140–64.

Either way, Riemann's theory (much like Schenker's, for that matter) was strongly implicated in discourses of cultural nationalism. A rounded concept of tonality, it seems important to affirm, can scarcely be thought apart from a complex of value judgments and claims toward cultural identity.

Between 1900 and 1950, concepts of tonality define themselves amid the wider trans-Atlantic transmission—and ensuing modifications—of a range of theoretical concepts and compositional practices. Schenker's well-known "Americanization" was by no means the first such transplant from the old world to the new; numerous other Austro-German theorists made the passage. Amid this historically continuous diaspora—stretching at least from Bernhard Ziehn's arrival in Chicago in 1868 to Schoenberg's college teaching in Los Angeles after 1936—the conceptual field encompassed by the basic term tonality, inevitably, covers a range of aesthetic and epistemic commitments. A perennial conceptual tension arises: that between acoustical definitions of relations between pitches (in a scale, for example), and a metaphysical concept of tonality grounded in the listener's consciousness. A separation between physical and anthropological views of tonality is clearly evident in Fétis's 1844 *Traité*, and one might claim that it is only with due attention to cultural context and the diverse premises of competing scholarly traditions that any concept of tonality comes into clear focus.[14]

The series of historically defined transformations identified in Fétis's influential account of *tonalité* bears affinities to the clearly historicist program that grounds much later tonality theorizing. Carl Dahlhaus's categories of *melodische* and *harmonische Tonalität*, for instance, expounded in publications of the 1960s, asserted considerable influence on Anglo-American scholars,[15] even if the commitment to an eclectic and historically mediated notion of tonality remains at odds with more structuralist conceptions.[16] But the tension between tonality as a kind of Saussurian *langue* (a set of underlying and broadly valid structural rules) and tonality as *parole* (a more historically contingent and localized way of speaking) is hard to escape, even within the oeuvre of a single scholar. The point is clear if we return

14 François-Joseph Fétis, *Traité complet de la théorie et de la pratique de l'harmonie* (Paris: Schlesinger, 1844; 11th ed., Paris: Brandus, 1875). On Fétis's engagement with German idealist thought, see Thomas Christensen, "Fétis and Emerging Tonal Consciousness," in *Music Theory in the Age of Romanticism*, ed. Ian Bent (Cambridge: Cambridge University Press, 1996), 37–56. Fétis's writings owe much to earlier French theorists' formulations, notably the 1810 discussion of *modalité* and *tonalité* by Alexandre Étienne Choron. See his "Sommaire de l'Histoire de la Musique," in *Dictionnaire historique des Musiciens*, ed. Choron and F. J. Fayolle (Paris: Valade, 1810; 2 vols., repr. Hildesheim: Georg Olms, 1971), 1:xxxvii–xxxix.

15 See Dahlhaus's dictionary articles "Tonalität," for *Die Musik in Geschichte und Gegenwart,* ed. Friedrich Blume (Kassel: Bärenreiter, 1966; also repr. in the 1998 2nd edition); and "Tonality," in *New Grove Dictionary of Music and Musicians*, ed. Stanley Sadie (London: Macmillan, 1980), 8:51–55; and his *Untersuchungen über die Entstehung der harmonischen Tonalität* (Kassel: Bärenreiter, 1967); translated by Robert O. Gjerdingen as *Studies on the Origins of Harmonic Tonality* (Princeton: Princeton University Press, 1990).

16 On the reception of Dahlhaus's tonality scholarship, see Alexander Rehding, "Dahlhaus zwischen Tonalität und *Tonality*," in *Carl Dahlhaus und die Musikwissenschaft: Werk, Wirkung, Aktualität*, ed. Hermann Danuser, Peter Gülke, Norbert Miller, and Tobias Plebuch (Schliengen: Edition Argus, 2011), 321–33.

once more to Riemann, acknowledging now the discrepancies between his unified theory of *Tonalität*—grounded in traditional fifth-based chord relations—and the inconvenient centrality of enharmonic third relations revealed in his own analyses of Beethoven piano sonatas. Riemann's central categories of tonal function, as Alexander Rehding has shown, prove inadequate to the harmonic exigencies of Beethoven's chordal maneuvering. Tonality remains caught between structural rule and historical repertory.[17]

If Riemann's theories of chordal function failed to take hold outside German-speaking countries in the early twentieth century, they have belatedly inspired one more phase of trans-Atlantic music theory—in this case, the remarkable efflorescence of so-called neo-Riemannian work, both formal and analytic, by American music theorists in the past two decades. Tonality, here, arises in sequences of transformations among triads within a *Tonnetz*, the grid-like network of tonal relations arranged according to common tones familiar from several nineteenth-century theoretical writings.[18] The "parsimony" of smoothly stepwise voice leading between *Tonnetz* positions well matches the chromatic situation in later Romantic music—Wagner's *Parsifal*, for example—a repertory obviously still triadic but "not altogether tonally unified" in ways familiar in earlier diatonic music.[19] A neo-Riemannian perspective increasingly promises new insights into a wealth of triadic music written *after* 1900, too. Analyses of works by Vaughan Williams, Ravel, Prokofiev, and Britten in the present volume attend particularly to a triadic language operating beyond traditional tonic-dominant schemes, one in which the security of the older consonance/dissonance binary is compromised at moments of functional ambiguity. Where familiar major and minor triads group themselves into symmetrical hexatonic progressions, a newly uncanny (*unheimlich*) discourse of "home" or tonal center emerges, and extant concepts of the distance between chords are up-ended.[20] This soundworld, enticing to many early twentieth-century composers, is amenable to heuristic analyses that broaden the explanatory reach of an evolving branch of tonal theory.

When attention turns away from tonality as rule to its living presence as repertory, the sheer breadth of the post–1900 tonal field is undeniable. The well-worn pedagogical notion of a diatonic common practice linking composers from Bach to Brahms appears unsatisfactory to listeners facing the chromatic fluency or modal

17 Alexander Rehding, "Tonality between Rule and Repertory: Or, Riemann's Functions—Beethoven's Function," *Music Theory Spectrum* 33 (2011): 109–23.

18 See especially Richard Cohn, "Introduction to Neo-Riemannian Theory: a Survey and a Historical Perspective," *Journal of Music Theory* 42 (1998): 167–80. In addition to the Gollin-Rehding *Oxford Handbook,* three recent publications suggest a consolidation of this theoretical paradigm: Steven Rings, *Tonality and Transformation* (New York: Oxford University Press, 2011); Dmitri Tymoczko, *A Geometry of Music: Harmony and Counterpoint in the Extended Common Practice* (New York: Oxford University Press, 2011), and Richard Cohn, *Audacious Euphony: Chromaticism and the Triad's Second Nature* (New York: Oxford University Press, 2012).

19 Cohn, "Introduction," 167.

20 On the numinous semantic trappings of hexatonic music in the nineteenth and twentieth centuries, see Cohn, *Audacious Euphony*, 20–24.

flexibility of Schubert, in whose music the centrality of a single tonic function appears less self-evident.[21] Whether it is possible to chart the territory beyond an era of seeming linguistic communality remains an open question. In the present context, we do not claim to present anything so grand as a paradigm shift in our historical view of something called tonality. Yet there are signs of an evolving ferment in theorists' understanding of the broader historical trajectory of music's pitch language—for example in the recognition of a nineteenth-century "second" practice favoring duality of key center, in the notion of separate diatonic and chromatic languages, or in the broader contention that tonal music presents an "extended" common practice, stretching from early polyphony through present-day vernacular styles.[22]

It is clear that recent commentators have moved a long way beyond the attimes bewildered reactions of early twentieth-century theorists to the stylistic transformations of the period. Schenker's unprecedented insights into the contrapuntal basis of earlier tonal music were accompanied by his famously hostile dismissal of Stravinsky's polyphony ("inartistic and unmusical").[23] Concurrently, Schoenberg's most chromatic scores were being explained with reference to traditional tertian harmony and conventional chord functions.[24] Casting a quizzical glance over a period of "unprecedented confusion," the English critic Edwin Evans in 1925 sensed that the advent of twelve-note chromatic music did not necessarily "imply either the abolition or even the desuetude of the tonalities as we know them," only the student's age-old need to "probe the mysteries of harmony as the aspiring painter probes those of colour."[25]

The various practices comprising the field of "Tonality 1900–1950" resist any simple taxonomy. And while reports of tonality's demise are, we maintain, exaggerated, it is easy to sense a genuine transformation of outlook among composers and listeners. Works such as Stravinsky's *Symphony in C* of 1940 or Hindemith's *Sinfonietta in E* (1949), by title alone, knowingly draw attention to the problem of key emphasis as a central value in musical language. The designation "in C," in a

21 "Schon in dieser so wohlklingenden und dem vordergründigen Ohr eindeutig tonal gesichert erscheinenden Musik Schuberts ereignet sich als sanfte Revolution ein erstes Infragestellen der Tonika als Funktionszentrum" ("In this music of Schubert, so gorgeous and so tonally secure to the foregrounded ear, the position of the tonic as functional center is placed into question for the first time, like a soft revolution"); Diether de la Motte, *Harmonielehre* (Kassel: Bärenreiter, 1976), 167; trans. from Cohn, *Audacious Euphony*, 205.

22 See, respectively, *The Second Practice of Nineteenth-Century Tonality*, ed. William Kinderman and Harold Krebs, (Lincoln: University of Nebraska Press, 1996); Cohn, *Audacious Euphony*, chapter 9; and Tymoczko, *A Geometry*, chapter 6.

23 "Meine Beweisführung gibt mir das Recht zu sagen, Strawinskys Satz sei … durchaus schlecht, unkünstlerisch und unmusikalisch." Heinrich Schenker, "Fortsetzung der Urlinie-Betrachtungen," in *Das Meisterwerk in der Musik* (Munich: Drei Masken Verlag, 1925–30; repr. Hildesheim: Georg Olms, 1974), 2:39. Schenker's assessment concludes his analysis of an excerpt from Stravinsky's Piano Concerto.

24 See, for example, the analysis of cadence and function in Schoenberg's *Klavierstück*, Op. 11, No. 1, in Edwin von der Nüll, *Moderne Harmonik* (Leipzig: Kistner & Siegel, 1932), 102–6.

25 Edwin Evans, "Atonality and Polytonality," in *Cobbett's Cyclopedic Survey of Chamber Music*, ed. Walter Willson Cobbett (London: Oxford University Press, 1929–30), 1:46, 47.

century perceived to be wary of tonality, carries seemingly unavoidable historical baggage, whether the composer is Stravinsky or Terry Riley. Even if one accepts claims for unbroken historical ties between nineteenth-century tonal music and what followed, tonality after 1900 ceases to represent a quasi-natural foundation of music. It becomes, instead, a musical technique: "not an end in itself, but a means to an end."[26] Echoing Adorno's conclusions about art in general, one might well argue that nothing concerning tonality is self-evident anymore, not its inner life, not its relation to the world, not even its right to exist.[27] To speak so conclusively, though, is to run the risk of ignoring a number of salient threads of compositional practice in the first half of the twentieth century—threads we will identify here only briefly and synoptically.

Tonality in the early twentieth century derives meaning and function frequently through a conscious artistic opposition to nineteenth-century aesthetic values. Stravinsky captured the sea-change memorably in 1924: "My Octuor is not an 'emotive' work but a musical composition based on objective elements which are sufficient in themselves."[28] His quotation marks do away with the emotional trappings of musical romanticism—a concern with subjective expression, or the sounding depiction of myth, society, religion, and philosophy.[29] Busoni's call for a "Young Classicism" of "strong and beautiful forms" found realization in a schematic opposition of diatonic and chromatic elements in his own music.[30] The rage for a kind of audacious simplicity in pitch choices, meanwhile, is as idiomatic to the explicitly white-note side of Stravinsky's middle period as to the eighteenth-century pastiche effects in early Poulenc, Milhaud, and others among Les Six. The self-conscious search for clarity and comprehensibility is bound up with a second facet of tonality in this period—its prominent role in works of functional (rather than absolute or programmatic) music. In the *Gebrauchsmusik* of Hindemith, Eisler, and Weill, modal or neo-triadic materials aim to address a wide public in an easy, pop-inflected vernacular. For Shostakovich and Prokofiev, in the 1930s and beyond, pitch choices were actively and publicly the object of Soviet-era ideological strictures.

A fuller survey of early-to-mid twentieth-century tonalities—plural—might go on to identify the revival of folkloric melodic tonality in composers as diverse as Bartók, Stravinsky, Vaughan Williams, or Copland. Further mapping of the territory, likewise, would require that we acknowledge the interplay of tonal and "post-tonal" or even serial languages in music that is essentially eclectic in its constructive means. Berg's appropriations of Bach amount to what Mark DeVoto calls

26 Schoenberg, "Opinion or Insight?" (1926), in *Style and Idea*, 259.

27 See the opening sentence in Theodor W. Adorno, *Ästhetische Theorie*, in his *Gesammelte Schriften*, ed. Rolf Tiedemann (Frankfurt am Main: Suhrkamp, 1970), 7:9; and Adorno, *Aesthetic Theory*, trans. Robert Hullot-Kentor (Minneapolis: University of Minnesota Press, 1997), 1.

28 Stravinsky, "Some Ideas About my Octuor" (1924), in Eric Walter White, *Stravinsky: the Composer and his Works*, 2nd ed. (London: Faber, 1979), 575.

29 On this paradigm, see Hermann Danuser, *Weltanschauungsmusik* (Schliengen: Edition Argus, 2009).

30 Busoni, letter to Paul Bekker, cited in Jim Samson, *Music in Transition: a Study of Tonal Expansion and Atonality, 1900–1920* (London: Dent, 1977), 28.

"nostalgic tonality," operating both as audible gesture and as a structuring framework that holds even amid densely chromatic textures.[31] Britten's compositional allusions to Purcell or Dowland, similarly, control the larger progress of luminous triads. By mid-century, Britten—like Frank Martin, Samuel Barber, Alberto Ginastera and others—is apt to arrange major and minor triads according to idiosyncratic twelve-tone schemes, thereby staging a delicate reconciliation of compositional approaches once deemed mutually exclusive.

Some obvious features of earlier tonal practice continue to flourish throughout the twentieth century in radically different stylistic settings—the assertion of a home tonic or key-note; a favoring of plain triads as a central chordal resource; the prominence of scales as an audible basis for melodic invention. But if one seeks a fuller syntactic model of tonality—the rigorous hierarchy of structural and embellishing events in Schenker's *Schichten*, for example—one is bound to admit that tonality after 1900 lacks the kind of linguistic familiarity and security observable in music of earlier periods. Fétis's historical narrative, with its orderly progression of epochs—from a *tonalité ancienne* of plainchant through the *tonalité moderne* of Monteverdi and, later, of Mozart and Rossini—whatever its resonances for early nineteenth-century music, hardly speaks to the musical landscape after 1900. Tonality, to recall our starting point, isn't exhausted or dead; a canon of artworks confirms it was never really abandoned. What seems most clear, surveying the first half of the twentieth century, is that the storms of progress define no coherent historical succession in the field of musical tonality. It seems more accurate to speak of a cosmopolitan simultaneity of musical languages—an old notion in music-historical circles, though one more frequently applied to the art of the later twentieth century.[32] The time has come to attend more closely to continuities among a spectrum of musical styles—all "tonal," to varying degrees—spanning the years 1900–1950. It may be that only from the longer perspective of the early twenty-first century are we ready to recognize tonality in the period of its much-reported demise.

*

Concept and Practice: in arranging the fifteen essays of this volume, we have—as the subtitle suggests—sought to balance broader conceptual reflections with the particularity of individual case studies. Confronting the contingent and diversified practice of a rich half-century of tonal music, we (like Melville's narrator) felt that this was the kind of enterprise for which "a careful disorderliness" furnished the only true method.[33]

A first cluster of chapters, "Tonality as Concept and Category," attempts to delineate and explore the basic field of inquiry. Four writers address the big questions grounding all tonality-talk—the influence of new musical technologies; the

31 Mark DeVoto, "Harmony," in *New Harvard Dictionary of Music*, ed. Don Michael Randel (Cambridge: Harvard University Press, 1986), 368.

32 See Leonard B. Meyer, *Music, The Arts and Ideas* (Chicago: University of Chicago Press, 1967), chapter 9.

33 See Herman Melville, *Moby-Dick*, chapter 82.

listener's role in identifying tonality effects; and the geographical and historical transmission of several concepts of tonality, most especially between Austro-Germanic culture and the US. Joseph Auner's essay, "Weighing, Measuring, Embalming Tonality: How we Became Phonometrographers," explores inventions in sound technology and science of the late-nineteenth and early-twentieth century as direct influences on the imagination of composers, performers, and theorists. Drawing on an eclectic array of writings, Auner proposes a set of hypotheses for how tonality has been and continues to be thought—his categories of "weighing," "measuring," and "embalming" (inspired by remarks of Satie) provide suggestive ways for understanding mechanical mediations of the sonic. Technology, in this reading, has served as a catalyst for "new conceptions of individual harmonies, their relationship to each other, and the radically expanded sphere of sound in which music came to be understood."

Tonality has invariably been defined either as an effect of the listener's cognition or as an intrinsic property of music. Richard Cohn, in "Peter, the Wolf, and the Hexatonic Uncanny," starts from a definition of tonality as something invested in listeners ("this for me sounds tonal") rather than in any listened-to musical object. The ontological query is pursued, however, through close analytic parsing of a single work. Revealing the musicalized folk-tale *Peter and the Wolf* to be rife with triads moving by smooth chromatic ("parsimonious") voice leading—rather than by more standard diatonic progressions—Cohn gets at the uncanny and disturbing harmonic forces that roam Prokofiev's 1936 score. Within a hexatonic framework, the *Tarnhelm* progression between triads and its major-mode form (the Taruskin) provoke doubts as to the security of the categorical boundaries, consonance and dissonance. Tonality, Cohn concludes, "frames … but does not saturate" the dangerously liminal world of *Peter and the Wolf*.

The transmission of concepts of tonality, both across history and by geographic displacement, is explored in Wolfgang Rathert's chapter, "The Legacy of the German Rule." Rathert's concern is with "Trans-Atlantic" relationships in music history as they developed in the US under the extensive influence of ideas originating in the Austro-German cultural sphere. The compositional and theoretic Ultra-Modernism of Charles Seeger and Henry Cowell in the 1920s provides the first of three case studies of cultural encounters with Germanic thought that bore new fruit when transplanted abroad. In the second, Rathert traces Schenker's impact on American musicians in the 1930s, through the specific lens of Roger Sessions's reviews of the Viennese theorist's writings and of Hindemith's *Unterweisung im Tonsatz*. Schoenberg's reversion to tonal composition around this time, lastly—a relaxing of "the antithesis between suppressed tradition and lawless innovation"—situates one phase of his compositional activity within its biographic and geographic context. Inscribed on the history of tonality, Rathert shows, are personalized histories of students, emigrants, and exiles.

Modifications of the category of nature in Hindemith's concept of tonality over two decades again betray a precisely localized history, considering his emigration to the US in 1942 and his later return to Europe. Hans-Joachim Hinrichsen's account traces how a concept of tonality might change significantly within the theo-

retical work of a single author. With close attention to the texts of the *Unterweisung* treatise, both in its original German form and in English translation, Hinrichsen investigates the reception of Hindemith's tonality concept. That reception, he shows, was itself governed by the complexities of the composer's own career at home and abroad.

"Tonality in Austro-German Theory" forms the subject of part two, which is dominated by the imposing figure of Schoenberg, viewed here as the author of a treatise that was a milestone in theoretical discourse about tonality. Markus Böggemann's chapter, "Concepts of Tonality in Schoenberg's *Harmonielehre*," emphasizes the flexibility of Schoenberg's rhetorical strategies with regard to the core concept of tonality. The book's argument, Böggemann notes, is structured around two competing concepts—historical and natural—of tonal organization. That Schoenberg in the *Harmonielehre* found it impossible to ground tonality in any single normative concept confirms music theory as another site of post-1900 modernity—a period of inescapable relativism of categories, norms and premises. Stephen Hinton's chapter on "Psychology and Comprehensibility" in the *Harmonielehre* compares the 1911 first edition with the third revised edition (1922). Hinton scrutinizes both texts in order to trace the development of two central ideas—the so-called "emancipation of dissonance" and the notion of *Fasslichkeit* ("comprehensibility")—each closely bound up with Schoenberg's evolving compositional aesthetic.

Felix Wörner, in "Constructive and Destructive Forces: Ernst Kurth's Concept of Tonality," reconstructs the discursive foundations of Kurthian energetics. Kurth's premise that sound (*Klang*) in music is only an inadequate representation of inner forces leads him to conclude that tonality is not given through the musical material itself. Kurth's theoretic formulations, as Wörner notes, are indebted to such diverse philosophical concepts as Dilthey's psychological hermeneutics, Bergsonism, and Gestalt theory. *Tonalität*, for Kurth, enacts the "crisis" of *romantische Harmonik*, presenting a highly flexible and ever-changing constellation of constructive and destructive forces which must themselves be reenacted through musical listening.

If there is a plurality of the discourses surrounding tonality after 1900, even within the restricted orbit of Austro-German theory, the plot only thickens when attention turns from conceptual matters to individual composers and their works. "Practices of Tonality"—the third and final section of *Tonality 1900–1950*—presents eight case studies, grouped loosely according to cultural-geographical milieu: one essay treats German composers, three writers focus on French music, two on British composers, two more the scene in the US.

French music, especially after 1918, witnessed broad discussion of aesthetics, invariably inflected by cultural and political forces. Marianne Wheeldon, in her essay "Defending Tonality: The Musical Thought of Milhaud and Koechlin," views *tonalité* as one salient element in a larger cultural field, along with atonality, and polytonality. The meanings of such terms, Wheeldon observes, in the French musical world of the 1920s and 30s derived "not only from how they were defined with regard to one another, but also in how they were deployed in the various 'position-takings' of composers, for whom the establishment of a distinct French musical identity was key." Her discussion frames tonality as a term in public, journalistic

circulation in particular institutional and professional settings, as well as a term of proto-philosophical significance. Mark Delaere's chapter, "Autant de compositeurs, autant de polytonalités différentes," complements Wheeldon's by tracing polytonality as a system of composition in the writings and compositions of Milhaud and Koechlin, and also in the work of less familiar figures such as Georges Monier, Marcel Dupré, and Armand Machabey. Volker Helbing's study of the third movement of Ravel's *Sonate pour violon et violoncelle* (1921) revealingly links analysis of the composer's modally inflected harmonic language to his articulation of a dramatic form. In an aesthetic of nuance and transformation, as Helbing's account makes clear, Ravel traces a forceful narrative of peripeteia and catastrophe.

Alain Frogley's study, "Tonality on the Town: Orchestrating the Metropolis in Vaughan Williams's *A London Symphony*"—one of two chapters with a British focus—offers a hermeneutic reading of a score whose finely balanced dialectic between diatonic tonality and various anti-tonal elements engages the anxieties surrounding urbanized life in the early twentieth century. The score's brash hexatonic modernity serves as a foil to more pastoralist idylls, visions evoked by pentatonic means. This twilit harmonic idiom, as Frogley argues, can be understood in the context of an array of responses by social commentators, novelists, poets, and painters—from Baudelaire to Kraus, Renoir to Sickert—to the experience of modern daily life.

In "Between Archaism and Modernism: Tonality in Music for Amateurs in Germany around 1930," Ullrich Scheideler examines a brief moment in music history when a self-consciously tonal language was cultivated amid the shifting aesthetic currents of *Neue Sachlichkeit*. In both Weill's *Der Jasager* (1930) and Bruno Stürmer's *Feierliche Musik* (1931), an archaic tone is achieved by a modal reworking of Baroque dance forms. Clear tonal goals, in Hindemith's *Plöner Musiktag* (1932), are affirmed even within a resolutely polyphonic idiom of non-traditional chord structures. While a 1931 essay of Adorno's had criticized purveyors of "neue Tonalität" for historical naiveté, Weill, Stürmer, and Hindemith, in distinctive ways, were creating tonal music as an agent for building community among amateur players and listeners.

In "Among the Ruined Languages: Britten's Triadic Modernism, 1930–1940," Philip Rupprecht begins by noting that the teenage Benjamin Britten's familiarity with Schoenbergian atonality bore compositional fruit in a little-known 1930 *Sextet for Wind*. Sketching British critical awareness of atonality and polytonality in the 1910s and 20s (including the pre-1914 fascination with Scriabin), Rupprecht reconsiders the aesthetic context for Britten's later, emphatically triadic scores. In *Les illuminations* (1939) and the *Michelangelo Sonnets* (1940), key sense emerges through hexatonic symmetries rather than conventional chord functions. Tonality never seems "lost" in Britten, and by mid-century, his continued embrace of triadic euphony set him apart from what Hans Keller dubbed "the anti-diatonicism of the present."

Two final contributions to this volume offer a suggestive sampling of the rich tonal compositional practices of the US. Beth E. Levy, in "Roy Harris and the Crisis of Consonance," explores Harris's development of his own theory of tonality,

and his response to serialism in the 1930s. Harris, as Levy notes of the 1936 Piano Quintet, conceived of a twelve-tone music that could "strengthen the gravitational pull of the tonic rather than breathing the air of other planets." As the composer's own testimony makes clear, his ideas of tonality were inextricably bound up with personal experiences of the physical world. Another tonally oriented flirtation with serial techniques is documented, finally, in Daniel Harrison's chapter, "Samuel Barber's *Nocturne*: An Experiment in Tonal Serialism." Barber, for all his well-known ambivalence to serial techniques, undertook in the *Nocturne* an uncharacteristically rigorous experiment in using multiple rows of cyclical intervallic content. The likely model, as Harrison suggests in a detailed analysis, was not Schoenberg, but Berg, a composer who had also sought to reconcile all-chromatic structures with conventional overtone-rich harmonies.

The chronological sweep of the eight case studies spans Vaughan Williams's *London Symphony* (1913) and Barber's *Nocturne* (1959). Clearly, it would take a much larger group of contributors to document the fully international extent of tonal music in the first half of the twentieth century, with due attention to many other figures—Bartók, Stravinsky, Messiaen, among others—whose music was created, heard, and understood (to varying degrees) as "tonal" after 1900. The mutual interference of compositional imagination and the rule of theory suggest the possibility of a recuperative history of tonal music, and of alternate canon formations. For now, though, we must rely on synecdoche, and the prospect of future scholarly investigation of tonality—as conceived and as practiced.

*

The editors gratefully acknowledge generous financial support for the conference *Tonality 1900–1950: Concept and Practice*, held October 1–2, 2010 at UNC Chapel Hill and Duke University, from a number of donors: the National Endowment for the Humanities; the Ernst von Siemens Musikstiftung; the University of North Carolina at Chapel Hill, College of Arts and Sciences; and Duke University's Department of Music. The conference brought together a distinguished roster of scholars, including all contributors to the present volume. Preparation of the book has been made possible by a two-year research and publication grant from the TransCoop Program of the Alexander von Humboldt Foundation; and by a grant from the Senior Associate Dean of the College of Arts and Science at UNC Chapel Hill. We are particularly grateful to the following colleagues for their support at various stages: William Andrews, Tim Carter, Hermann Danuser, Edward Gollin, Jane Hawkins, Hans-Joachim Hinrichsen, Brian Hyer, Stephen Jaffe, Severine Neff, Carol Oja, Terry Rhodes, Christian Martin Schmidt, Gayle Sherwood Magee, and Anne C. Shreffler. Susan S. Williams facilitated many administrative issues over the entire period of this collaborative project. Ben Haas was indispensable at all stages in preparing the manuscript for publication. At Franz Steiner, we are most grateful to Thomas Schaber and Harald Schmitt.

TONALITY AS CONCEPT AND CATEGORY

WEIGHING, MEASURING, EMBALMING TONALITY: HOW WE BECAME PHONOMETROGRAPHERS

Joseph Auner

In his peculiar little essay from 1912, "What I am," Satie denies being a musician, describing himself instead as a "phonometrographer," inspired by science and dedicated to weighing and measuring sounds. He writes:

> … I enjoy measuring a sound much more than hearing it. With my phonometer in my hand, I work happily and with confidence.
>
> What haven't I weighed or measured? I've done all Beethoven, all Verdi, etc. It's fascinating.
>
> The first time I used a phonoscope, I examined a B-flat of medium size. I can assure you that I have never seen anything so revolting. I called in my man to show it to him.
>
> On my phono-scales a common or garden F-sharp registered 93 kilos. It came out of a fat tenor whom I also weighed.
>
> Do you know how to clean sounds? It's a filthy business. Stretching them out is cleaner; indexing them is a meticulous task and needs good eyesight. Here, we are in the realm of phonotechnique.[1]

With what at first seems like a series of one-liners, Satie in fact opens up a wide range of questions concerning the impact of science and technology on the new ways of hearing and thinking about sound, the materials of music, and the nature of tonality that emerged in the early decades of the twentieth century. It is as if through the use of his phonoscope a musical sound is forcibly extracted from the sacred sphere of art and turned into an object to be manipulated and probed, with rather unsettling results. And not only is the musical sound transformed by the process, but so is the person on the other end of the phonoscope. Satie's disavowal of his identity as a musician—no doubt alluding to his many teachers and critics who derided his competence—was more than a one-off joke; during this period he repeatedly asked to be introduced at concerts as a "phonometrographer."[2] Moreover, it is clear that he did not believe the eye- and ear-opening experience of the phonoscope should be

1 Erik Satie, "What I Am," in *A Mammal's Notebook: Collected Writings of Erik Satie*, ed. Ornella Volta, trans. Antony Melville (London: Atlas Press, 1996), 101. The essay has also been discussed in Douglas Kahn, *Noise, Water, Meat: A History of Sound in the Arts* (Cambridge, MA: MIT Press, 2001), 193–94; and Daniel Albright, *Untwisting the Serpent: Modernism in Music, Literature, and Other Arts* (Chicago: University of Chicago Press, 2000), 192–94.

2 Robert Orledge, *Satie the Composer* (Cambridge, MA: Cambridge University Press, 1990), 118. Peter Dayan points out that in the original publication of "What I am" in the *Revue musicale S.I.M.* 8, no. 4 (15 April 1912), Satie added a footnote referring to a description of himself the previous year by the critic Gérard Poueigh as a "clumsy technician, but a subtle one, a seeker after new sonorities, sometimes exquisite, sometimes bizarre." Peter Dayan, *Art as Mu-*

limited to artists or to the elite; as soon as he sees the revolting B♭, he at once calls his servant in to take a look.

In this essay I will argue that many of the composers who defined musical modernism in the first half of the twentieth century might also be thought of as phonometrographers, with ears and minds remade by recording, phonography, player pianos, and the burgeoning sciences of sound. The last two decades have seen an explosion of scholarship on the impact of these and other technologies on many aspects of musical composition, performance, reception, and the history of hearing in classical and popular music around the world.[3] Scholars in other disciplines have also been exploring the impact of sound technology, film, and radio on literature, art, phonetics, and the history of the senses. As Jonathan Sterne has written, "The history of sound reproduction is the history of the transformation of the human body as an object of knowledge and practice."[4] While earlier technological revolutions had focused on extending limbs and muscles in the search for "physical speed and power," Friedrich Kittler and Steven Connor have written of the period between the invention of the telephone and the beginning of World War II as a second phase dedicated to extending the reach of the central nervous system, one carried out by the development of technologies designed to enhance the senses, including such inventions and writings as listed in Fig. 1.[5]

1857	Phonautograph, Édouard-Léon Scott de Martinville
1862	Helmholtz, *On the Sensation of Tones* (Eng. trans. 1877)
1867	Tyndall, *On Sound*
1876	Telephone, Bell (three million in use by 1904)
1877	Phonograph, Edison (large commercial market by 1890)
1885	Electric Siren
1889	Universal Exposition, Paris, *Galerie des machines*
1897	Telharmonium, Cahill, (Telharmonium Hall, NYC, 1906)
1897	Oscilloscope (improved version 1911)
1899	Wireless Telegraph
1904	Welte-Mignon Reproducing Piano
1906	Radio
1913	Oscillator
1917	Condenser Microphone

sic, Music as Poetry, Poetry as Art from Whistler to Stravinsky and Beyond (Burlington, VT: Ashgate, 2011), 40.

3 I have developed ideas related to the discussion of tonality here in connection with our relationship to the recorded voice in, "Losing Your Voice: Sampled Speech and Song from the Uncanny to the Unremarkable," in *Throughout: Art and Culture Emerging with Ubiquitous Computing,* ed. Ulrik Ekman (Cambridge, MA: MIT Press, forthcoming).

4 Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke University Press, 2003), 50.

5 Steven Connor, "The Modern Auditory I," in *Rewriting the Self: Histories from the Renaissance to the Present*, ed. Roy Porter (London: Routledge, 1997), 204–5; Friedrich Kittler, *Gramophone, Film, Typewriter* (Stanford: Stanford University Press, 1999).