

MELODIC FUNCTION AND MODAL PROCESS IN GREGORIAN CHANT

by

RICHARD PORTERFIELD

A dissertation submitted to the Graduate Faculty in Music
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

The City University of New York

2014

© 2014
RICHARD PORTERFIELD
All Rights Reserved

This manuscript has been read and accepted by the Graduate faculty in Music in satisfaction of
the dissertation requirement for the degree of Doctor of Philosophy
Codex hic lectus acceptusque est

William Rothstein

Date

Chair of Examining Committee

Norman Carey

Date

Acting Executive Officer

Ruth DeFord _____

Anne Stone _____

Joseph Straus _____

Abstract

MELODIC FUNCTION AND MODAL PROCESS IN GREGORIAN CHANT

by

RICHARD PORTERFIELD

Advisor: Professor William Rothstein

This study proposes a theory and method of analysis for voice leading in the melody of Gregorian chant. It draws on historical theories and practices, particularly those of the *cantus* tradition which 1) pre-dates the imposition on Western ecclesiastical chant of scale theories based in the Ancient Greek science of harmonics, 2) observes and predicts actual melodic behavior, and 3) remains basic to pedagogy through the centuries. Central to *cantus*-tradition doctrine is the investment of melodic tones with structural functions which articulate modes as melodic archetypes; idiomelic antiphons are analyzed according to five melodic functions derived from formulaic psalmody in a framework modally conditioned by the qualitative and intervallic relationship of final and tenor. Medieval sources put forward this functional dyad as essential to modal cognition—sometimes as the basis of modal construction—through a widespread mnemonic I call the “Re-la, re-fa” Rule; these dyads are also embedded in the ninth-century *Noanoeane* and eleventh-century *Primum quaerite* melodic prototypes. Evidence gathered from sources including the Metz tonary, *De octo tonis*, *Musica Enchiriadis*, *Commemoratio Brevis*, and treatises of Aurelian, Hucbald, Guido, Johannes, Amerus, Petrus de Cruce, Marchetto, Coclicus, Wollick, and Ornithoparchus is examined in light of the predicables

(genus, species, differentia, proprium, accidens) of Aristotelian dialectic, leading to critical re-evaluation of concepts such as *repercussio*.

The dissertation draws upon the Schenkerian tradition, demonstrating structural levels and prolongation in dyadic contrapuntal progression. Melodic-functional analysis employs modern staff notation to trace directed motion of a structural voice of tenor function from a state of consonance to one of unity with a second structural voice of final function; hexachordal *voces* (ut, re, mi, fa, sol, la) identify the qualities of structural tones as well as their order in the tenor-function *Urlinie* which passes through modal degrees toward the final-function *Urpunkt*; secondary modes projected by local, in-process dyads are noted in lower-case Roman numerals i–viii. Tenor and final remain inseparable in monadic structures logically preceding the dyadic (Claire’s “modes of a single element). Other key terms: concinnity, tenorization, finalization, transfer of function, *occursus*, Hollywood kiss.

MELODIC FUNCTION AND MODAL PROCESS IN GREGORIAN CHANT

PREFACE

How small a thought it takes to fill a whole life!—Ludwig Wittgenstein

In the late 1990s I was juggling three musical professions: as a member of the vocal ensemble Lionheart I was researching and performing medieval and Renaissance chant and polyphony; as music director and organist for a traditional-minded Roman Catholic parish I was conducting a choir in similar repertoire, and playing a lot of Baroque organ music besides; I was also teaching tonal harmony and counterpoint at the Mannes College of Music. In the Scherman Library at Mannes I discovered Murray C. Bradshaw's analysis of keyboard *Intonazioni* by Andrea and Giovanni Gabrieli as elaborations of psalm-tone harmonizations,¹ and a paper David Loeb read at a Mannes symposium inspired me to try applying modal theory to the analysis of J. S. Bach's *Orgelbüchlein* preludes.² Studying the chorale melodies on which Bach based these settings brought to my attention points of contact with the psalm tones. Sometime after Joel Lester sat down with me to discuss my Bach project, the thought struck me—how small a thought, and how dependent on a peculiar mix of interests and experiences!—that the psalm tone presents a structural summary of its mode, along with characteristic embellishments, that in a way the psalm tone virtually *is* the mode. I soon began to see that the psalm-tone tenor functions

¹ Bradshaw, *The Origin of the Toccata*. Musicological Studies and Documents 28 (American Institute of Musicology, 1972).

² Loeb, "Dual-Key Movements," in *Schenker Studies*, ed. Hedi Siegel (New York: Cambridge University Press, 1990), 76–83.

remarkably like Schenker's *Kopfton*—and that this was but one of several similarities between psalmodic practice and the upper voice of the Schenkerian middleground.

This *Anschauung* soon led to further realizations: first that the Bach project would have to wait for the theoretical ground to be prepared with treatment of monophonic melody; second, that someone must have heard and described this virtual identity of recitation tone and mode before me. When I finally read the article by Harold S. Powers that Joel Lester had recommended, I found the following: “by the end of the 11th century, in a passage at the beginning of chapter 11 of the *De musica* of Johannes Afflighemensis, the practical distinction of mode and psalm tone is obliterated with respect to the tenor.”³

I offer this autobiographical vignette in order to emphasize that although the *De musica* of Johannes and other historical treatises have confirmed my idea and guided its further development, what I present here ultimately stands or falls depending on how well it accords with the repertoire. With or without the intervention of theorists, the melodies of Gregorian chant speak to those who have ears to hear.

I owe a debt of gratitude to others who have aided, encouraged, or challenged me in this project: to Carl Schachter, George Fisher, and Robert Cuckson; to Ian Bent, Susan Boynton, Matthew Cheung-Salisbury, David Cohen, Andrew Hughes, Cristle Collins Judd, Patrick McCreless, Stefano Mengozzi, Robert P. Morgan, Luca Ricossa, William Renwick, and Daniel Zimmerman; to Kyle Adams, Jason Hooper, Ève Poudrier, and Alan Richtmyer; to my gracious advisor William Rothstein and to the other members of my dissertation committee Joseph Straus, Ruth DeFord, and Anne Stone; also to Mark Anson-Cartwright, Allan Atlas, Stephen Blum, Poundie Burstein, David Gagné, and Chadwick Jenkins; to Margot Fassler, who alerted Yale

³ Powers, “Mode,” in *The New Grove's Dictionary of Music and Musicians* (New York: Macmillan, 1980), 386.

undergraduates they could hear Gregorian chant performed live at the church down the street; to the choir of that church and its directors Nicholas Renouf and Britt Wheeler; also to Harold Chaney; to my colleagues in Lionheart; to Tom Beckett, David Hyder, Vincent Renzi, and Maggie Robbins. I am grateful to directors and staff of the Scherman, Mina Rees, and Bobst libraries; to those of online databases including the Indiana University School of Music THESAURUS MUSICARUM LATINARUM and Bayerische Akademie der Wissenschaften online Lexicon musicum Latinum; to the folks at Google; to my mother and to my father, to my sister, and to my wife and son, who for the sake of this project have endured many sacrifices. Finally, I wish to thank my high school Latin teacher, Pamela Raschio Brown.

TABLE OF CONTENTS

Abstract	iv
Preface and Acknowledgements	vi
Epigraphs	xiv
Abbreviations	xv
Examples and Tables	xvi
 General Introduction	 1
Chapter One: A Simple Office Antiphon	
§1.1 Grammar, rhetoric, levels of structure	6
§1.2 Origins, transmission, aesthetics	14
§1.3 Tonal trajectory, liturgical usage, mode	27
Chapter Two: Modal Theory in the <i>Cantus</i> Tradition	
§2.1 The scale-based concept of mode in the Latin West	43
§2.2 Rival theoretical traditions	46
§2.3 Melodic prototypes and modal qualities of the <i>oktōēchos</i>	49
§2.4 Introduction to Aristotelian division	69
§2.5 Epistemology of the <i>cantus</i> tradition	73
§2.6 Johannes and the theory of melodic functions	82
Chapter Three: Introduction to Melodic-Functional Analysis	
§3.1 Formal, rhetorical, and melodic functions in the psalm tone	97
§3.2 Melodic-functional analysis of the antiphon	110
§3.3 The proposed theory and method in relation to those of Schenker	122

§3.4	Mid-twentieth-century precedents	134
§3.5	Precedents incorporating the pentatonic concept	144
§3.6	Schenkerian and Schenker-influenced proposals	169
§3.7	Harmonic-contrapuntal government of the modal process	179
Chapter Four: The Modal Dyad and the “Re-la, re-fa” Rule in Historical Sources		
§4.1	A song for the eight modes	185
§4.2	Rhetoric and distribution of the “Re-la, re-fa” Rule	190
§4.3	The <i>repercussio</i> : more than “characteristic”	196
§4.4	<i>Proprium</i> : the unique property	199
	<i>CRITICAL EXCURSUS I: LOGIC AND FACT</i>	208
§4.5	Logical conclusions	209
	<i>CRITICAL EXCURSUS II: ‘REPERCUSSIO’ BEFORE 1517</i>	214
§4.6	‘Repercutere’ and ‘repercussa’ in the <i>Dialogus de musica</i>	218
§4.7	Marchetto’s <i>repercussa</i> and species doctrine	220
	<i>CRITICAL EXCURSUS III: LOGIC AND ANALYSIS</i>	226
§4.8	Theoretical weakness of the term ‘repercussio’	229
§4.9	The “Re-la, re-fa” Rule in the thirteenth century	231
	<i>CRITICAL EXCURSUS IV: AMERUS AND THE DIFFERENTIA</i>	235
§4.10	Weaker interpretations of the Rule; the role of notation	237
§4.11	Stronger interpretations	240
	<i>CRITICAL EXCURSUS V: THE BODLEIAN QUATRAIN</i>	245
§4.12	Dyadic <i>varia</i> in the Rule’s representation	248
§4.13	The “Re-la, re-fa” Rule after 1600	253

§4.14 Comparison with <i>Noanoeane</i> and <i>Primum quaerite</i> prototypes	258
§4.15 From the <i>octoechos</i> to the “Re-la, re-fa” Rule	263

Appendix: Historical Sources, Texts, and Translations of the “Re-la, re-fa” Rule

1. Petrus de Cruce Ambianensi, <i>Tractatus de tonis</i> [c. 1260? c. 1290?]	266
2. Amerus, <i>Practica artis musice</i> (Italy, August 1271)	267
3. Jacobi Leodiensis, <i>Speculum musicae</i> (early 14c)	268
4. University of North Carolina Wilson Library MS 63 (Italy, before 1360)	269
5. Petrus de Amalfia (14th century), <i>Compendium musicale</i>	269
6. Goscalchus, <i>The Berkeley Manuscript</i> [Paris, 1375]	270
7. Avignon, Bibliothèque municipale 235 (“end of the 14th century”)	271
8. Florence, Biblioteca Riccardiana 688 (Avignon, 1381)	271
9. Princeton, Institute for Advanced Studies Codex Lowe (“14–15c”)	271
10. Seville, Biblioteca Capitulare y Colombina 5-2–25 (Venice, c. 1420)	272
11. Vienna, Österreichische Nat.bibl. Cod. 3646 (Mondsee Abbey, 15c)	272
12. London, British Library Lansdowne 763 (Waltham, c. 1450)	272
13. Catania, Bibl. Riunite Civ. e Antonio Ursino Recupero D 39 (1453–1473)	273
14. Rome, Vatican Library lat. 5129 (15c)	275
15. Parma, Bibl. Palatina 3597 (“Italy ... end of 15c”)	275
16. Anonymous [15c], <i>Quaestiones et solutiones</i>	276
17. Conrad von Zabern, <i>Novellus musicae artis tractatus</i> (c. 1460–70)	277
18. Guilielmus Monachus, <i>De preceptis artis musice</i>	280
19. Oxford, Bodleian Library Can.Lit.216 (Mantua, late 15c)	282

20. Bonaventura da Brescia, <i>Brevis collectio artis musicae (Venturina)</i> [1489].	282
21. Bonaventura da Brescia, <i>Breviloquium musicale</i> (1497)	284
22. Brussels, Bibl. du Conservatoire Royal Ms. M 16.857 (Italy, c. 1490)	285
23. Anonymous Carthusian Monk, <i>Tractatus de musica plana</i>	285
24. Salzburg, St. Peter's Abbey, a.VI.44 (1490), [<i>Tractatus de octo tonis</i>]	288
25. Utrecht, Universiteitstibliotheek 16 H 26 (Deventer? c. 1500)	291
26. Riemann's Anonymous, <i>Introductorium musicae</i> (c. 1500)	291
27. Johannes Cochlaeus, <i>Tetrachordum Musices</i> (Nuremberg, 1511)	293
28. Nicholas Wollick, <i>Enchiridion Musices</i> (Paris: 1512)	296
29. Stefan Monetarius, <i>Epitoma utriusque musicae practicae</i> (Cracow, 1515) ..	301
30. Andreas Ornithoparchus, <i>Musice Active Micrologus</i> (Leipzig, 1517)	302
31. Felstin, <i>Opusculum musice</i> (Cracow, 1517)	304
32. Iohannes Spangenberg, <i>Quaestiones musicae</i> (Nuremberg, 1536)	306
33. Martin Agricola, <i>Rudimenta musices</i> (Wittenburg, 1539)	308
34. Sebaldus Heyden, <i>De arte canendi</i> (Nuremberg, 1540)	309
35. Heinrich Glareanus, <i>Dodecachordon I</i> , (1547)	310
36. Adrian Petit Coclicus, <i>Compendium musices</i> (Nuremberg, 1552)	312
37. Hermann Finck, <i>Practica musica</i> (Wittenberg, 1556).....	314
38. János Czerey, <i>De musica plana</i> (Hungary, 17th century)	316
39. Adriano Banchieri, <i>Cartella musicale</i> (Venice, 1614)	319
40. Jean Denis, <i>Traité de l'accord de l'éspinette</i> (Paris, 1650).....	320
42. Matteo Coferati, <i>Il Cantore Addottrinato</i> (Florence, 1691)	321
43. J. Alfred Novello, "A Concise Explanation of the Gregorian Note" (1848)	322

44. <i>A Complete and Practical Method of the Solesmes Plain Chant</i> (1904).....	323
45. Agustoni and Göschl, <i>Einführung</i> (Regensburg, 1987).....	325
Bibliography	326

EPIGRAPHS

Est enim armonia plurimorum adunatio et dissidentium consensio.—Boethius, *De institutione arithmetica* II.32

For harmony is the unification of multiplicities and the agreement of those at variance.

Quid est musica, nisi quedam rerum pax et concordia? Unde auctoritas. ‘Omnia pace vigent,’ sine qua discordia rerum.—London, British Library Harl. MS. 281, f. 25r

What is music, if not a certain peace and concord of things? Thus the saying, “All thrive in peace,” without which things remain discordant.

Now some of these views have been held by many men and men of old, others by a few eminent persons; and it is not probable that either of these should be entirely mistaken, but rather that they should be right in at least some one respect, or even in most respects.—Aristotle, *Nicomachean Ethics* I.7, translation Sir David Ross

“You’d better not kno so much than know so many things that ain’t so.”—Josh Billings [Henry Wheeler Shaw]*

* Ralph Keyes, *The Quote Verifier: Who Said What, Where, and When* (New York: St. Martin’s Press, 2006), 3.

ABBREVIATIONS

- AM* *Antiphonale monasticum pro diurnis horis* (Tournai, 1934)
- AS* *Antiphonale Sarisburiense: a Reproduction in Facsimile of a Manuscript of the Thirteenth Century*, ed. Walter Howard Frere (London, 1901–24)
- CS* *Scriptorum de musica medii aevi novam seriem*, 4 vols., ed. Edmond de Coussemaker (Paris, 1864–76)
- CSM* *Corpus scriptorum de musica* (Rome, later Stuttgart, 1950–) [items listed by title]
- GS* *Scriptores ecclesiastici de musica sacra potissimum*, 3 vols., ed. Martin Gerbert (St. Blaise: 1784; reprint ed. Hildesheim: Olms, 1963)
- JAMS* *Journal of the American Musicological Society*
- LmL* Bayerische Akademie der Wissenschaften online Lexicon musicum Latinum
Informationen zur Musiktheorie des Mittelalters
- LU* *Liber usualis* (Tournai: Desclée, multiple editions)
- PM* *Paléographie musicale: Les principaux manuscrits de chant grégorien, ambrosien, mozarabe, gallican* [items listed by volume series and number]
- RISM* *Répertoires des Sources Musicales*
- TML* Indiana University School of Music Center for the History of Music Theory and Literature
THESAURUS MUSICARUM LATINARUM

EXAMPLES AND TABLES

Example 0.1 The medieval gamut: tetrachords, letter-names, solmization	4
Example 1.1 Antiphon <i>Missus est gabriel</i> in a Sarum manuscript	6
Example 1.2 Antiphon <i>Missus est gabriel</i> in the Hartker Antiphoner	21
Example 1.3 Antiphon <i>Missus est gabriel</i> in modern notation	25
Example 1.4 Antiphon <i>Missus est gabriel</i> in liturgical performance	30
Example 2.1 Byzantine Intonation Formulas and Western Melodic Prototypes	52
Example 2.2 Variants of the Mode-8 “Noeagi(s)”	55
Example 2.3 <i>Musica enchiriadis</i> : the modal tetrachord	57
Example 2.4 <i>Musica enchiriadis</i> : multiplication of the modal tetrachord	60
Example 2.5 Guido of Arezzo: Modal qualities of individual tones (<i>modi vocum</i>)	62
Example 2.6 <i>Johannis De Musica: Primum querite</i> antiphons with <i>neumae</i>	66
Example 2.7 Johannes: Modal Intonation, Tenor, and Termination	89
Table 2.1 Modal finals and tenors described by Johannes, with resulting intervals	91
Example 3.1 Psalm tone with formal segments	97
Example 3.2 Rhetorical functions in the psalm tone	102
Example 3.3 Melodic functions in the psalm tone	106
Example 3.4 Melodic functions expressed graphically	109
Example 3.5 Antiphon <i>Inclinavit dominus</i> (Lucca 601, 90)	110
Example 3.6 Antiphon <i>Inclinavit dominus</i> : melodic-functional analysis	111

Example 3.7 Antiphon <i>Lauda ierusalem dominum</i> (Lucca 601, 105) with analysis	117
Example 3.8 Figures 1–6 from Schenker’s <i>Der Freie Satz</i>	125
Example 3.9 Antiphon <i>Miserere mei deus</i> (Lucca 601, 89) with analysis	130
Example 3.10 Schenker’s analysis of the “Freude” theme of Beethoven	131
Example 3.11 Modal dyads in Jeppesen’s <i>Counterpoint</i>	135
Example 3.12 Hindemith’s <i>Dies irae</i> analysis	136
Table 3.1 Chailley’s modal cores in pentatonic reference D F G A C	146
Example 3.13 Responsory <i>Subvenite sancti dei</i> , in Chailley’s analysis	150
Example 3.14 Antiphon <i>Clamavi</i> , with melodic-functional analysis	155
Example 3.15 Hansen’s analysis of Communion <i>Pacem meam</i>	161
Example 3.16 Melodic-functional analysis of Communion <i>Pacem meam</i>	162
Example 3.17 From Hansen’s analysis of <i>Alleluia ... Iubilare</i> (Hansen 1979, 264)	166
Example 3.18 <i>Alleluia ... Iubilare</i> (Dijon 669): melodic-functional analysis.....	167
Example 3.19 Novack’s analysis of <i>Alleluia ... Pascha nostrum</i>	171
Example 3.20 Melodic-functional analysis of <i>Alleluia ... Pascha nostrum</i> (LU 779) ...	173
Example 3.21 McAlpine’s analysis of introits cited by Aurelian	176
Example 3.22 The Modes of Gregorian Chant	180
Example 3.23 Antiphon <i>Ego principium</i> (Lucca 601, 144).....	182
Example 3.24 Melodic-functional Analysis of Responsory <i>Subvenite</i> (respond only) ..	188
 Example 4.1 The Renaissance <i>Repercussio</i>	 186
Example 4.2 Modal Dyads and their transpositions, after Coclicus 1552	195
Example 4.3 Ornithoparchus’s <i>Claves</i> , with Porphyrian Tree.....	206

Example 4.4 Marchetto's Mode 1	22
Example 4.5 Marchetto's four <i>species communes</i> over regular finals <i>D, E, F</i> , and <i>G</i>	224
Example 4.6 Powers, translating and transcribing Tinctoris 1476.....	225
Example 4.7 Wollick, <i>Enchiridion Musices</i> (1512).....	248
Example 4.8 Glarean's "Re-la, re-fa" model (<i>Dodecachordon</i> , Book I).....	251
Example 4.9 <i>Noanoeane</i> formulas and "Re-la, re-fa" dyads compared	260
Example 4.10 <i>Primum querite</i> and <i>Noanoeane</i> analytical comparison	262

GENERAL INTRODUCTION

The corpus of Roman Catholic liturgical song known as Gregorian chant was the dominant musical repertoire of Western Europe from the end of the eighth century into the sixteenth; its tradition continued—altered and adapted, but still unbroken—through the latter part of the eighteenth century and into the nineteenth, by which period it was also practiced widely in the Americas.¹ Employed day and night in the churches, cathedrals, monasteries, and court chapels which were the principal centers of musical life, the chant of the Roman Church resounded from Hungary to Ireland, from Sweden to Sicily, and eventually from California to Peru, even as other repertoires—of secular song, instrumental dance, and sacred polyphony—rose to prominence and fell into disuse. To this day Gregorian chant retains official “pride of place” in Roman Catholic services throughout the world,² although in recent decades its custom is more honored in the breach than in the observance. Gregorian chant finds a home among some Protestant congregations, as it did within the Anglican and Lutheran traditions in the sixteenth and seventeenth centuries, for example. In the twentieth and twenty-first centuries it has gained a wide secular audience through concerts, recordings, and educational outreach, and it is prized by a global community of scholars, all thanks in large part to the ongoing project of research,

¹ See Kenneth Levy, et al., “Plainchant [plainsong]” §§1, 2.2, 7–10, and James W. McKinnon, “Gregorian Chant,” in *Grove Music Online*, ed. Deane Root. <http://www.oxfordmusiconline.com> (accessed November 27, 2013); also David Hiley, *Western Plainchant: A Handbook* (New York: Clarendon Press, 1993), 514, 524–25, 602–607, 615–21.

² Paul VI, *Sacrosanctum concilium* [Constitution on the Sacred Liturgy, December 12, 1963], 116. http://www.vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_const_19631204_sacrosanctum-concilium_en.html (accessed November 28, 2013).

restoration, publication, and performance undertaken from the middle of the nineteenth century by the Benedictines of Solesmes.³

These are reasons enough for Gregorian melody to be worthy of theoretical investigation. In addition, however, the chant is generally recognized as mother to the world's earliest surviving polyphony, and grandmother or more distant ancestor to many other repertoires instrumental and vocal. This basic fact, although regularly acknowledged in historical studies and reflected in classical repertoire through such examples as the Credo of the B-Minor Mass, is nevertheless seldom taken into account in the academic discipline of music theory. What was for centuries the *locus classicus* of theoretical discourse has become an unknown region, a place where there may as well be dragons. Without taking away from the work of the historians, ethnomusicologists, and liturgists who have tended these fields in recent decades, and indeed nourished by the fruits of their harvest, this study of tonal structure in Gregorian melody seeks to reclaim Gregorian chant as suitable territory for music theory.

Chapter One provides the practical, historical, and philosophical basis for suggesting that Gregorian chant might exhibit some kind of over-arching tonal structure, although perhaps not in conformity with received notions of mode, scale, and diatony. It demonstrates that such structure is recognized in historical documents and described there as a function of eight modes which govern all Gregorian melody. It also shows how the modal principle is intimately bound up with the practice and purpose of the liturgy in which it functions.

Chapter Two examines the doctrine, epistemology, and early history of the theoretical tradition embraced by medieval practitioners of chant, a tradition that describes and illustrates modes not as species of octave-spanning scale but as species of melody. Modes are exemplified,

³ See Hiley, *Western Plainchant*, 622–29; also Katherine Bergeron, *Decadent Enchantments: The Revival of Gregorian Chant at Solesmes* (Berkeley: University of California Press, 1998).

in this practical tradition, with brief melodies that function as modal prototypes, some drawn from the liturgy and others composed for teaching purposes. From liturgical practice this tradition derives a theory of melodic function, with the dyad of final and tenor as central to modal identity.

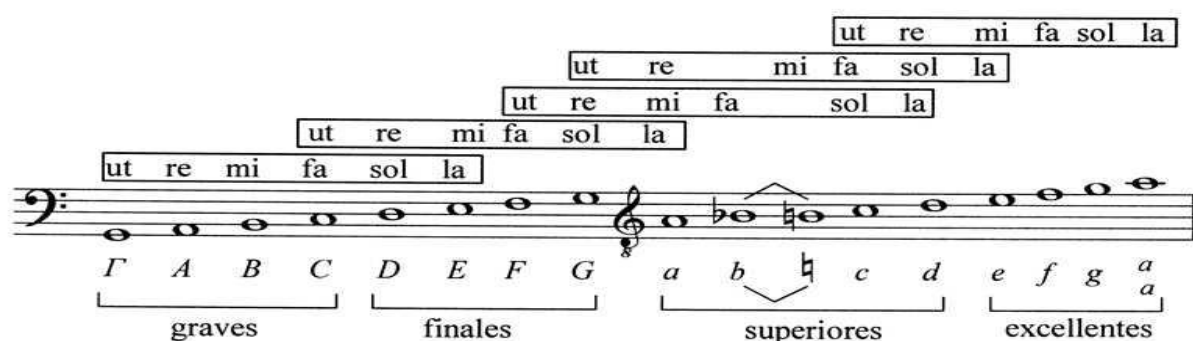
From the theoretical tradition described in Chapter Two, from the Schenkerian tradition of tonal analysis, and from research carried out in recent decades by the Solesmes monks and their intellectual circle, Chapter Three develops a new theory and method of analysis based on melodic functions demonstrated in Gregorian psalmody. With a review of previous applications of voice-leading models to Gregorian repertoire this chapter demonstrates how mode, conceived as a dynamic and dyadic relationship of tonal functions, operates in examples from the repertoire. Fundamental modal structures are thereby identified as modal archetypes not only melodic but also contrapuntal and thus harmonic, and a hypothesis is offered as to the function of Gregorian modality in general. I ultimately argue what Schenker's student Felix Salzer once proposed as "the basic principle of tonality," that is "*directed motion within the framework of a single prolonged sonority*" to be the basic principle of Gregorian modality as well,⁴ and I offer a hypothesis for the origin and necessity of such motion.

Chapter Four explores the history of the melody-type theoretical tradition and its model of mode-as-dyadic-harmony after 1200, which—according to principles developed in previous chapters—melodic-functional analysis then discovers to have been embedded all along in the melodic prototypes of earlier tradition.

⁴ Felix Salzer, "Tonality in Early Medieval Polyphony: Towards a History of Tonality," in *The Music Forum I*, edited by William Mitchell and Felix Salzer (New York: Columbia University Press, 1967): 35–98, 54, emphasis original.

Throughout the text I refer to constituent tones of Gregorian chant according to the system of letter-names established for them around the turn of the second millennium; these are always given in italic type as in **Example 0.1** below. These pitches are relative, not absolute, but the registral difference between *A* and *a*, for example, is important to distinguish. Pitch-classes without regard to register, when they enter the discussion, are given in Roman capitals (*A B C*, etc.). The example also includes the hexachords of solmization, which plays a major role in the discussion in Chapter Three and Chapter Four. The example, intended primarily as a review for the non-specialist, may be read historically from bottom to top: the tetrachords were identified in the ninth century, these letter-names assigned in the tenth, staff notation invented in the eleventh, and this system of solmization became basic to musical pedagogy beginning in the twelfth century. All of these analytical tools are understood as after-the-fact handles for investigating the nature of Gregorian melody, which generally pre-dates them. Other tools of analysis will be explained as they are encountered in the course of discussion.

Example 0.1 The medieval gamut: tetrachords, letter-names, solmization



Finally, with Latin texts I follow medieval practices of spelling (variable) and capitalization (used only for initials), whereas in English one capitalizes proper nouns including the generic title of a musical work: for example, “the Antiphon *Missus est gabrihel*.” As for

pronouns, I use the first-person singular for myself as author of this text and as originator of certain terms, theories, and analytical practices described herein; the first-person plural (“we”) is not editorial but refers to myself and the reader together, sometimes as an invitation.

CHAPTER ONE: A SIMPLE OFFICE ANTIPHON

§1.1 Grammar, rhetoric, levels of structure

Example 1.1 Antiphon *Missus est gabriel* in a Sarum manuscript¹



Consider the Gregorian antiphon shown in **Example 1.1** as it appears in an English noted breviary.² Scribal hands of the fifteenth century made these marks in accord with the Use of Sarum, the particular order of Roman Catholic liturgy then observed at Salisbury Cathedral.³ The antiphon itself, however—the unit of musico-liturgical practice these traces memorialize and represent—belongs to a wider community of persons, places, times, and customs. It appears in many hands and in dozens of sources from all over Europe, including the earliest known to provide musical notation for chants of the Divine Office.⁴ It shall serve as our guide to issues that arise initially with the project of establishing on secure historical grounds a viable theory and method of analysis for the tonal structure of melody in Gregorian chant.

¹ Salisbury, Cathedral Chapter Library 152; described AS I, 78.

² AS II, 34. Cf. *LU* 1416, *AM* 222.

³ On Sarum Use see David Hiley, *Western Plainchant: A Handbook* (New York: Clarendon Press, 1993), 583–84.

⁴ See examples 1.2 and 1.3 below, also PM XII *Antiphonaire monastique, XIII^e siècle: Codex F. 160 de la Bibliothèque de la Cathédrale de Worcester* (Solesmes, 1922), 18.

Consider the words being sung: *Missus est gabriel angelus ad mariam virginem desponsatam ioseph* translates as “The angel Gabriel was sent to the virgin Mary espoused to Joseph,” and agrees nearly to the letter with the manuscript tradition going back to the ninth century and the oldest known sources for Office texts.⁵ It abbreviates a longer passage from the Vulgate, the first sentence of the account in Luke’s Gospel of the annunciation to Mary that she was to conceive and bear Jesus, the Christ:

In mense autem sexto **missus est angelus gabriel** a deo in civitatem galilaeae cui nomen nazareth **ad virginem desponsatam** viro cui nomen **ioseph** de domo david et nomen virginis **maria**.⁶

The reduced text of the antiphon leaves out phrases specifying time and place (*In mense autem sexto*, during the sixth month [of John the Baptist’s gestation]; *in civitatem galilaeae cui nomen nazareth*, in the Galilean town named Nazareth). Also excised are the matter of Joseph’s ancestry (*de domo david*, of the house of David) and the angel having been sent from God (*a deo*). None of these is without significance: Jesus being conceived when John is six months in the womb, for example, puts their dates of birth at diametrical points in the annual cycle,⁷ an arrangement both fitting and indicative of the polarity that the author of Luke’s Gospel establishes between John the greatest of the Prophets and Christ the fulfillment of prophecy.⁸ Yet far from doing violence to the Biblical text, the antiphon serves and clarifies it.

For the antiphon represents this Gospel sentence in *analytical reduction*. Here Luke’s grand narrative, encompassing ages of time and spanning heaven and earth, boils down to the

⁵ University of East Anglia Project CURSUS, An Online Resource of Medieval Liturgical Texts, <http://www.cursus.uea.ac.uk/ed/c3794> (accessed March 8, 2010).

⁶ Luke 1:26–27.

⁷ Celebrated December 25 and June 24, respectively.

⁸ Cf. Luke 7:28, 4:21; Acts 13:32–33.

single decisive action on which all hinges. Nor does the antiphon's focus on the immediate Gabriel, Mary, and Joseph in any way deny the more remote God, Eve, and David from which each respectively emanates: the angel as sensible herald of the Unknowable, the latter two New Testament saints as fulfillment of Old Testament antitypes.⁹

Comparing the antiphon with its Gospel model demonstrates how rhetorical figures depend upon, elaborate, and prolong more basic grammatical structures. Luke employs the repetition of phrase-beginnings often called “anaphora,” for example, in the parallel dependent clauses *cui nomen nazareth* (whose name [was] Nazareth) and *cui nomen ioseph* (whose name [was] Joseph), and again in the final independent clause *et nomen virginis maria* (and the name of the virgin [was] Mary). The Antiphon eliminates the first of these three clauses; the name of the action's location (Nazareth) does not reach the same level of narrative structure as those of the actors. *Et nomen virginis maria* does survive, however resolved to its principal elements *virgo* and *maria*, and folded into the first reference to that personage. Thus Luke's expansive *ad virginem ... et nomen virginis maria* (to a virgin ... and the name of the virgin was Mary) becomes in the antiphon the more concentrated *ad mariam virginem* (to Mary the virgin), the name *maria* thereby suffering inflection to *mariam* according to the rules of Latin grammar. The phrase *viro cui nomen ioseph* (to a man whose name [was] Joseph) reduces to the name itself.

Such analytical abbreviation of scriptural source-material is not uncommon in texts of Christian liturgical chant.¹⁰ Medieval tropes, which elaborate and expand upon established

⁹ Mary as mirrored prototype of ancestral Eve is an enduring theme of Christian homiletics since the second century; in the Latin tradition, Gabriel's salutation to the virgin “Ave maria” (Luke 1:28) reverses the name “Eva.”

¹⁰ See Kenneth Levy, “Toledo, Rome and the Legacy of Gaul,” *Early Music History* 4 (1984), 49–99, for example at 64–66: “the compiler of the chant text was less concerned with adhering to strict biblical order and verbiage than with shaping a text in language that was both clear and concise.” See also Hiley, *Western Plainchant*, 74–75.

chants through rhetorical addition or interpolation, employ the same processes in reverse, again according to grammatical rules.¹¹ These practices demonstrate the communication, prolongation, reduction, and formal analysis of hierarchical structural levels in the words of Gregorian chant.

The antiphon's reduction occupies a middle ground, moreover, between Luke's more elaborate rhetorical construction and the fundamental structure upon which both longer and shorter sentences depend. Here the noun phrase *gabriel angelus* (the angel Gabriel) functions as subject, with the verb phrase *missus est* ([he] was sent) as predicate. Recognized by Aristotle as functions of logic as well as of grammar, subject and predicate remain "useful descriptive terms" in contemporary linguistic theory despite recent challenges to their definition.¹² Their conjugation may constitute a minimal condition for the complete sentence, as for example "Jesus wept."¹³

Conjugation requires parts of speech performing these functions not only to be present—by implication at least, if not in letter—but also to concord with one another: they harmonize, so to speak. Latin grammar particularly requires agreement of gender, case, and number. Therefore the antiphon's noun subject *angelus* (being masculine, nominative, and singular) takes as verb predicate the past participle *missus* (not the feminine *missa*, objective-case *missum*, or plural *missi*); it also demands the third-person-singular auxiliary *est* (not the plural *sunt*). Subject and predicate fulfill each its own structural function, both bound together in intimate agreement. An utterance lacking this formal arrangement may be sufficient to remind us of the story once told—

¹¹ On tropes see Hiley, *Western Plainchant*, 196–238.

¹² Klaus von Heusinger, "Information Structure and the Partition of Sentence Meaning," in *Function, Form, and Meaning: Bridges and Interfaces*, ed. Eva Hajičová, Petr Sgall, Jiří Hana, and Tomáš Hoskovec. Prague Linguistic Circle Papers 4 (Amsterdam and Philadelphia, John Benjamins, 2002), 278.

¹³ John 11:35.

the phrase *angelus ad virginem* suggesting the Annunciation, for example—but may not in and of itself supply the complete and coherent statement, the full stop.

This dissertation proposes that a kind of tonal grammar similarly governs the antiphon's melodic setting, that a kind of musical rhetoric likewise ornaments and enriches it, and that it coheres as a musical utterance by virtue of an analogous conceptual concord of structural functions. Much of this study is devoted to documenting how musicians for over a millennium have communicated their sense—usually more intuitive than scientific—of these principles at work in Gregorian chant. This is ancillary, however, to the original and rational analysis of how these principles guide and structure specific works and practices, and to the theory developed thereby of their generative and governing role in the repertoire at large.

Here is the argument in brief: melody in Gregorian chant arises from the interplay of melodic functions demonstrated in its psalmody, chief among which are the structural functions of final and tenor. Mode, which is not the same thing as scale, measures qualitatively as well as quantitatively the harmonic interval unfolded by a process of directed motion through modal degrees, a process leading a voice of tenor function from an initial state of consonant disparity with a voice of final function to an ultimate state of unification on the tone of the final. Achievement of this constructed unity is in more than one sense the end of chanting. Like the grammar of natural language, the modal process is enacted and perceived on a fundamentally intuitive basis, developed through practice and ingenuity, described with striking clarity in some past accounts, rather obscured by others, and demonstrable through methodical analysis.

Now analogies between language and music have been fruitful from the earliest theoretical descriptions of Gregorian chant, as with other repertoires before and since.¹⁴ Consider in that spirit how we as children master the grammar of our mother tongue through intuitive processes of speaking and listening. Well before undertaking any formal study of grammar, we internalize and in everyday speech manipulate complex rules of natural language—those governing subject-verb agreement, for example—which even as parents and teachers we may find difficult to define in the abstract.¹⁵ This study describes and builds upon a historical tradition that emphasizes similarly active and intuitive processes of musical training, a tradition that

¹⁴ The eighth-century treatise *De octo tonis* (On the Eight Modes) compares musical tones to the letters of speech: GS I:26; TML ALCMUS TEXT, http://www.chmtl.indiana.edu/tml/6th-8th/ALCMUS_TEXT.html (accessed November 27, 2013). A treatise transmitted in the ninth-century manuscript of the “Carolingian” Tonary of Metz (Metz, Bibliothèque Municipale 351) compares the eight modes to the eight parts of speech in Latin grammar: Walther Lipphardt, *Der Karolingische Tonar von Metz* (Münster Westfalen: Liturgiewissenschaftliche Quellen und Forschungen 43, 1965), 63. These are perhaps the earliest examples applying the analogy to Christian liturgical chant; see also Blair Sullivan, *The Classical Analogy between Speech and Music and Its Transmission in Carolingian Music Theory* (Tempe, AZ: Arizona Center for Medieval and Renaissance Studies, 2011); also Dolores Pesce, “A Historical Context for Guido d’Arezzo’s Use of *Distinctio*,” in *Music in Medieval Europe: Studies in Honour of Bryan Gillingham*, edited by Terence Bailey and Alma Santosuosso (Burlington, VT: Ashgate, 2007), 146–62; Karen Desmond, “*Sicut in grammatica*: Analogical Discourse in Chapter 15 of Guido’s *Micrologus*,” *The Journal of Musicology* XVI, no. 4 (Autumn 1998), 467–93; Calvin Bower, “The Grammatical Model of Musical Understanding in the Middle Ages,” in *Hermeneutics and Medieval Culture*, edited by Patrick J. Gallagher and Helen Damico (Albany, NY: SUNY Press, 1989), 133–45; and Harold S. Powers, “Language Models and Musical Analysis,” *Ethnomusicology* 24, no. 1 (Jan. 1980), 48–51. Powers deals with the issue also in relation to later repertoires of several traditions; see also, *inter alia*, Mark Evan Bonds, *Wordless Rhetoric: Musical Form and the Metaphor of the Oration* (Cambridge, MA: Harvard University Press, 1991); also Steven Feld and Aaron A. Fox, “Music and Language,” *Annual Review of Anthropology* 23 (1994), 25–53.

¹⁵ See María Teresa Guasti, *Language Acquisition: The Growth of Grammar* (Cambridge, MA: MIT Press, 2004), 1–4, or speak with a pre-school child.

favors hearing and singing over abstract computation as the primary means of understanding the tonality of chant as in a natural language of music.¹⁶

For just as not all descriptions of grammar that have been advanced in the history of linguistics are of equal theoretical value, likewise the history of music theory has seen paradigms more and less successful at discovering and communicating the grammar of Gregorian melody, paradigms this study will accept or reject as models primarily according to the depth and accuracy they display in respect to the actual behavior of the repertoire. Such a critical approach to historical theory as theory is to some extent separable from the study of historical theory as history: the dating of sources, establishment of texts, the weighing of originality and influence, etc. Scholars in recent decades have brought these to such a point of development, and have through new technologies made the fruits of their research so readily available, that rigorous assessment from the point of view of theory seems not only possible but necessary.

So far, our linguistic analogies have been related to questions of structure, cognition, and theoretical criticism. Add to them, finally, those below relating to methodology:

- 1) This study proposes a graphic representation of melodic structures similar in purpose and method (although not in appearance) to the parsing of sentences that was once the staple of school grammar and has more recently become the province of specialists in linguistics and computer science;
- 2) Like such exercises in grammar, this method is intended to be raised as a lamp to the imagination, not wielded as a cudgel to beat it down; and

¹⁶ Cf. James Hepokoski and Warren Darcy: “This is not to say that any skilled composer soberly pondered these choices, one by one, in the act of composing. Surely the most common decisions were made efficiently, expertly, and tacitly on the basis of norms that had been internalized (rendered automatic) through experience and familiarity with the style,” *Elements of Sonata Theory: Norms, Types, and Deformations in the Late-Eighteenth-Century Sonata* (New York: Oxford University Press, 2006), 9.

3) As the grammarian starts with brief and simple sentences, working by degrees toward more complex structures, so this study of melodic grammar begins with the musical setting of simple Office antiphons such as this *Missus est gabriel*.

Here both text and music are brief and to the point. As plainchant, moreover, *cantus planus*, the setting consists of unaccompanied melody in rhythm independent of the regular metric patterning of *mensurabilis musica*.¹⁷ This is not to say that a metrical approach to rhythm never played a role in at least some local performance traditions, or more generally in chants whose texts follow poetic patterns of syllabic meter or accent (hymns, tropes, sequences, etc.).¹⁸ Although there are several schools of thought and no little controversy regarding what might constitute the original or ideal interpretation of Gregorian rhythm,¹⁹ there is broad consensus that the greater part of the repertoire has for much of its history been performed with fairly even beats accented and unaccented in an irregular flow analogous to, and to some extent determined by, the unmetered prosody of the text it generally declaims.²⁰ For tonal analysis, the point is not that

¹⁷ Franco of Cologne defines *mensurabilis musica* as “song measured by long and short durations ... because in plainchant such measure is not so regarded” (*Mensurabilis musica est cantus longis brevibusque temporibus mensuratus ... quia in plana musica non attenditur talis mensura*); in other words long and short values may be present in plainsong, but do not attain structural significance. *Franconis de Colonia Ars Cantus Mensurabilis*, ed. Gilbert Reaney and André Gilles, CSM 18 (1974), 24–25; TML FRAACM TEXT http://www.chmtl.indiana.edu/tml/13th/FRAACM_TEXT.html (accessed November 27, 2014).

¹⁸ Hiley, *Western Plainchant*, 284.

¹⁹ See Hiley, *Western Plainchant*, 373–85. A particularly well-researched and compelling study is that of J. W. A. Vollaerts, *Rhythmic Proportions in Early Medieval Ecclesiastical Chant* (Leiden: E.J. Brill, 1958, repr. 1960).

²⁰ See Mary Berry (Mother Thomas More), “The Performance of Plainsong in the Later Middle Ages and the Sixteenth Century,” *Proceedings of the Royal Musical Association* 92 (1965–6), 121–34; John Caldwell, “Plainsong and Polyphony 1250–1550,” in *Plainsong in the Age of Polyphony*, edited by Thomas Forrest Kelly. Cambridge studies in performance practice (New York: Cambridge University Press, 1992), 6–31; also in the same volume Richard Sherr, “The Performance of Chant in the Renaissance and its Interaction with Polyphony,” 178–208.

chant must be performed this way but that it may be performed this way. Simple antiphons such as this *Missus est gabriel*, being separable from such complicating factors as metric patterning, harmonic accompaniment, and instrumental participation, provide nearly ideal conditions for studying the tonal structure of melody, especially but perhaps not exclusively as it relates to the Western European tradition. That is indeed how theorists in that tradition generally approached their discipline, at least from the ninth to the sixteenth century: they applied their wits to the chant first and foremost, and to polyphony only later, if at all.²¹ A modern approach to this repertoire may easily come to grief, however, without solid footing in historical and cultural context. The following section serves as an introduction to such issues, which will have direct bearing on our analysis.

§1.2 Origins, transmission, aesthetics

We call the Antiphon *Missus est gabriel* “Gregorian” not in the sense of preserving words or melody sung during the A.D. 590–604 reign of Pope Gregory I (although to some extent it might), but as belonging to the tradition of Roman Catholic liturgical chant named after that Saint and Doctor of the Church, a repertoire that art and legend often attribute to his personal authority—although the name may in fact have originally connected the repertoire to Gregory II, who reigned 715–731.²² The history of the origins and early development of Gregorian chant, a story still being written and revised in light of new research, is largely a tale of mutual influences on and from other liturgical traditions. These include the Old Roman with which it shares a

²¹ Thus for example Franco, in the introduction to his *Ars cantus mensurabilis*, must first explain that he will *not* treat plainchant: see Chapter Four, Critical Excursus V below.

²² See Hiley, *Western Plainchant*, 503–13; also James McKinnon, *The Advent Project: the Later Seventh-Century Creation of the Roman Mass Proper* (Berkeley: University of California Press, 2000).

“common musical fund,”²³ the ancient Gallican rite in France, which along with the Old Roman and Spanish Mozarabic rites the Gregorian supplanted entirely or in part, and the Ambrosian and Beneventan traditions, which were successful in resisting such Gregorian incursions.²⁴

The present historical consensus sees the core of the Gregorian repertoire taking firm and lasting shape through a synthesis of Roman and Gallican practices under the Frankish imperial dynasty whose central figure was Charlemagne (768–814).²⁵ This corpus of chant expands and diversifies over time, for example with various cathedrals and monasteries promulgating new offices for local saints, some of which make their way into an evolving Roman Calendar. Yet the pieces and practices established in Francia around the turn of the ninth century display remarkable tenacity and stability in their subsequent diffusion and centuries-long governance of sung liturgies throughout Western and Central Europe.

The stability of the repertoire’s melodic element is especially remarkable considering its initial transmission and early dissemination through oral tradition. The earliest known sources of Gregorian chant, from the time of Charlemagne and of his father Pepin, transmit texts without musical notation, as do many sources from later periods.²⁶ Instances of notation survive from the post-Carolingian ninth century, but mostly in theoretical treatises with systems and purposes that are different in kind from those of the period’s few remaining practical sources. The latter

²³ Kenneth Levy, *Gregorian Chant and the Carolingians* (Princeton, NJ: Princeton University Press, 1998), 8–9.

²⁴ See Hiley, *Western Plainchant*, 524–562.

²⁵ As proposed by Helmut Hucke, “Toward a New Historical View of Gregorian Chant,” *JAMS* 33, no. 3 (Autumn 1980), 437–67. Rosamund McKitterick suspects there may have been less of Rome in the mix than the Franks advertised; see her review of *Gregorian Chant and the Carolingians* by Kenneth Levy, *Early Music History* 19 (2000), 279–91.

²⁶ Kenneth Levy, “Charlemagne’s Archetype of Gregorian Chant,” *JAMS* 40, no. 1 (Spring 1987), 2–3; reprinted in his *Gregorian Chant and the Carolingians*, also in *Oral and Written Transmission in Chant*, ed. Thomas Forrest Kelly. *Music in Medieval Europe* 2 (Burlington, VT: Ashgate, 2009).

contain either no notation, or up to a few notated items, some incomplete.²⁷ The earliest known practical sources that notate sizable chunks of Gregorian repertoire date to the beginning of the tenth century, or perhaps the end of the ninth.²⁸ These appear in various parts of Europe and employ various regional scripts in pursuit of various notational strategies. Yet all are based on the same principle: they match chanted syllables of text to gestural units of rhythmic grouping and tonal contour, abstract melodic figures called neumes.²⁹

These early neumatic notations are adiastrumatic, that is, they specify neither pitch nor interval. Rich indicators of rhythm and articulation, they relate by contour no more than a handful of pitches in immediate succession. This tonal imprecision renders them insufficient for an accurate performance of the chant, as Hucbald of Saint-Amand complains in his music treatise of the late ninth century.³⁰ He says of an example indicating melodic descent:

²⁷ On the earliest examples of notation, their dating, and differences between theoretical and practical systems see Leo Treitler, “The ‘Unwritten’ and ‘Written Transmission’ of Medieval Chant and the Start-Up of Musical Notation,” *The Journal of Musicology* 10, no. 2 (Spring 1992), 131–91. The daseian notation of ninth-century theoretical treatises is treated in §2.3 below.

²⁸ These sources are listed in Levy, “Charlemagne’s Archetype,” 4.

²⁹ On neumes and their notation see Hiley, *Western Plainchant*, 340–46; also Leo Treitler, “The Early History of Music Writing in the West,” *JAMS* 35, no. 2 (Summer 1982), 237–79 (especially 244–48), reprinted in Kelly, *Oral and Written Transmission*; on the origin of neumatic notations see Charles M. Atkinson, “*De Accentibus Toni Oritur Nota Quae Dicitur Neuma*: Prosodic Accents, the Accent Theory and the Paleofrankish Script,” in *Essays on Medieval Music in Honor of David G. Hughes*, ed. Graeme M. Boone, ed.) 17–42 (Cambridge, MA: Harvard University Department of Music, 1995) also reprinted in Kelly, *Oral and Written Transmission*.

³⁰ Yves Chartier, ed. and trans., *L’Œuvre musicale d’Hucbald de Saint-Amand. Les Compositions et le traité de musique*, Cahiers d’études médiévales (Cahier spécial no. 5), (Montreal: Éditions Bellarmin, 1995); cf. GS I: 103–25; TML HUCCHAR TEXT http://www.chmtl.indiana.edu/tml/9th-11th/HUCCHAR_TEXT.html (accessed November 27, 2013). See also Warren Babb, *Hucbald, Guido, and John on Music: Three Medieval Treatises* edited, with introductions, by Claude V. Palisca. Music Theory Translation Series 3 (New Haven: Yale University Press, 1978), 1–46.

When you try to join the first note to the second, which you observe is lower, there is no way for you to know by what interval you should do it—that is, whether the second note, as established by the composer, should be distant from the first by one, two, or even three degrees [*puncta*]³¹—unless you happen to get it by ear from someone else.

Hucbald therefore proposes adding to these signs a system of pitch-specific letter symbols:

Just as phonemes (*voces*) and entire speeches (*dictiones*) of verbal expression are recognized in writing by means of letters, such that these ought not in any way cheat the reader with ambiguous indication; so when these [symbols] have been learned once and for all, every melody notated with them will be able to be reeled right off, even without tutor. This you can hardly attain with the notes that custom has handed down at present, and which by reason of variable location undergo deformation into figures no less variable, however profitable they are somewhat as an aid to memory. For they lead the beholder on a path ever uncertain.³²

Hucbald's statements make clear that the accepted practical notations of his day were supplements, not substitutes, for oral tradition. They also show that even in this oral state the chants were considered discrete and permanent musical works. Hucbald takes for granted that a given notation, however imperfect, is useful insofar as it helps the reader recall a specific melodic setting, the tonal disposition of which—what note ought to follow another, by what interval—has been ordained by a composer with an authority Hucbald likens to a force of law (*a*

³¹ “Secundam uero quam pressiore adtendis, cum primae copulare quaesieris, quonammodo id facias utrum uidelicet uno uel duobus aut certe tribus ab ea elongari debeat punctis, nisi auditu ab alio recipias, nullatenus, sicut a compositore statuta est, peroscere potes.” Chartier, *L'Œuvre musicale d'Hucbald*, 194; cf. GS I: 117. Translation: Charles M. Atkinson, *The Critical Nexus: Tone-System, Mode, and Notation in Early Medieval Music* (New York: Oxford University Press, 2009), 144; cf. Babb, *Hucbald, Guido, and John*, 36.

³² “Sicut per litteras, uoces et dictiones uerborum recognoscuntur in scripto, ut nullum legentem dubio fallant iudicio [in many mss. *indicio*]; sic per has omne melos adnotatum, etiam sine docente, postquam semel cognitae fuerint, ualeat decantari. Quod his notis quas nunc usus tradidit quaeque pro locorum uarietate diuersis nichilominus deformantur figuris, quamuis ad aliquid prosint rememorationis subsidium, minime potes contingere. Incerto enim semper uidentem ducunt uestigio.” Chartier, *L'Œuvre musicale d'Hucbald*, 194. Translation mine; cf. Atkinson, *The Critical Nexus*, 157–58; also *Hucbald, Guido, and John*, 36; *indicio* similarly preferred over *iudicio* (although not in Babb's translation), 46.

compositore statuta est). The performer seeks to replicate that melodic progression after the manner of a memorized recitation (*decantari*), but has until now lacked the sure and certain means to do so without guidance from outside the notation itself. Hucbald argues for a new technology here, but in support of an aesthetic agenda so well established as to require no defense of its own.

Even in this period, furthermore, tones and tonal motions within a given Gregorian melody were expected to contribute to a larger musical unity, as we read in the opening sentence of a treatise roughly contemporary with Hucbald's, called *Musica enchiriadis*:

Just as the elementary and indivisible particles of articulate utterance are morphemes (*littera*), syllables composed of which in turn compose verbs and nouns, and these likewise the woven web of finished discourse; so the seeds of melodious utterance are tuned pitches (*ptongi*) [from the Greek *phthongoi*], which in Latin are called sounds [*soni*], and in their ultimate resolution the whole concinnity of music ends.³³

Here elementary particles combine into functional units in the service of a common goal. In speech, that goal is the text of the oration brought to completion (*perfectae orationis textum*); in song, it is related-but-differing tones³⁴ moderated and governed to form a unitary containment and coordination of musical forces (*totius musicae continentia*) that is dynamic, directed, and

³³ "Sicut vocis articulatae elementariae atque individuae partes sunt litterae, ex quibus compositae syllabae rursus componunt verba et nomina eaque perfectae orationis textum, sic canorae vocis ptongi, qui Latine dicuntur soni, origines sunt et totius musicae continentia [in some mss. concinentia, concinnentia] in eorum ultimam resolutionem desinit." Hans Schmid, ed., *Musica et scolica enchiriadis una cum aliquibus tractatulis adiunctis* (Munich: Verlag der Bayerischen Akademie der Wissenschaften, 1981), 3. Translation mine; see fn. 36 below for the significant difference of this translation from others including Sullivan, *The Classical Analogy*, viii; James McKinnon in *Strunk's Source Readings in Music History, Revised Edition*, Leo Treitler, general editor (New York: Norton & Company, 1998), 189; and Raymond Erickson, *Musica enchiriadis and Scolica enchiriadis*, edited by Claude V. Palisca (New Haven: Yale University Press, 1995), 1. On the treatise's literary sources, dating, authorship, title, reception, etc., see Erickson, *Musica and Scolica*, xix–liv.

³⁴ The treatise goes on to define and illustrate *ptongi* as pitches tuned in tetrachordal mutual relation: see §2.3 below.

closed: its end achieves not only coherence but a final decision (*ultimam resolutionem*), whereupon like a spoken oration it ceases to sound (*desinit*). Grammar and logic permit interpretation on an additional level, with *tocius musicae continentia* not only the complete musical utterance but also the entire art and discipline of Music, which although ceaseless, nevertheless concludes its work in the resolution of differences.³⁵ Yet the rhetoric of parallel construction dictates that the primary sense must remain that of the musical utterance in temporal process as in spoken discourse.³⁶ Note also that the concern is with structural values, not written representations: *littera* in this context clearly points beyond letters as graphic signs to the linguistic elements they indicate.

These statements of ninth-century musicians are sufficient to dispel any qualms that regarding Gregorian melodies as “unified works of art, no less so than in the case of a sonata by

³⁵ A divine mission, as described in the autobiographical statement of the Muse of Harmony given in the *De nuptiis philologiae et mercurii* of Martianus Capella: “But when the Monad and first hypostasis of intellectual light was conveying souls that emanated from their original source to earthly habitations, I was ordered to descend with them to be their governess. It was I who assigned the numerical ratios of perceptible motions and the impulses of perfect will, introducing restraint and harmony into all things” (Sed cum illa monas intellectualisque lucis prima formatio animas fontibus emanantes in terrarum habitacula rigaret, moderatrix earum iussa sum demeare. Denique numeros cogitabilium motionum totiusque uoluntatis impulsus ipsa rerum dispensans congruentiam temperabam). Text and translation: William Harris Stahl and Richard Johnson, *Martianus Capella and the Seven Liberal Arts*, vol. I (New York: Columbia University Press, 1971), 204; Capella’s text as a staple of Carolingian education, 61–64.

³⁶ Usage is tortured and rhetoric ignored in translations of this passage with *continentia* (“continence,” the restraint of forces within, and the subject of a moral treatise by Augustine) rendered as inert ‘content.’ These require an obscure interpretation of the verb *desinit*: either this ‘content’ *reduces to* the phthongoi—never mind the overall context of building up, not breaking down—or it *resides in* the final resolution, *is bounded by* it, never mind the logical impossibility of a whole with many parts being entirely contained in one constituent. The present translation follows the common meaning of *desinit* (ends, leaves off), which completes the passage’s rhetorical parallel between words and music, in each case beginning with the smallest element and building up to the finished product.

Beethoven,” must depend on an aesthetic foreign to the Middle Ages.³⁷ Neither “work concept”³⁸ nor “paradigm of literacy” can be made alien to the literate and authoritative culture of medieval Christianity, even taking into account the widely accepted and reasonable view that much of the Gregorian repertoire developed through communal action over generations, and that many stages of its composition were improvisational.³⁹ The same is true of Beethoven’s music, after all.⁴⁰

The manuscript record bears eloquent witness to the efforts of Carolingian and post-Carolingian musicians to preserve these works of liturgical art. Different notations transmit the same melodic settings, although not always with neume-for-neume precision; their variance is

³⁷ Leo Treitler [quoting Willi Apel, *Gregorian Chant* (Bloomington: Indiana University, 1958), 362], “‘To Worship that Celestial Sound’[:] Motives for Analysis,” *The Journal of Musicology* 1, no. 2 (April 1982): 153–170, 159; reprinted in Treitler, *Music and the Historical Imagination* (Cambridge, MA: Harvard University Press, 1989), 53.

³⁸ “The conception of the musical work as a fixed, self-sufficiently formed unity, whose internal consistency and interrelation of subordinate parts in an architectonic structure reflects the aesthetic design of a creative composer.” Treitler, “Sinners and Singers: A Morality Tale” (review of *Re-envisioning Past Musical Cultures: Ethnomusicology in the Study of Gregorian Chant* by Peter Jeffery), *JAMS* 47, no. 1 (Spring 1994), 146 fn. See also Jeffery’s reply, *JAMS* 49, no. 1 (Spring 1996): 175–79.

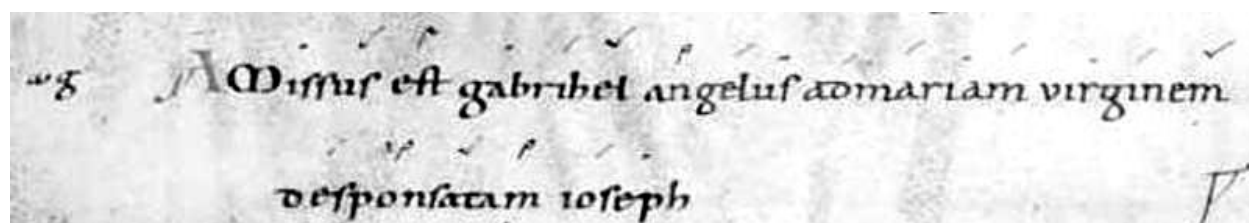
³⁹ Cf. Treitler, “The ‘Unwritten’ and ‘Written Transmission’ of Medieval Chant” 158: “The melodic tradition of Gregorian chant had very likely become stabilized in performance to a broad extent prior to the inscription and dissemination of the melodies in musical notation ... it is no longer necessary to frame this in terms of a sharp distinction between improvisation and performance from memory—the displacement of the former by the latter ... even after the wide dissemination of books with musical notation was under way, singers continued to rely on their knowledge of both individual melodies and of their idioms to support their ‘reading’ of the notations.”

⁴⁰ “Any technical study of Beethoven’s works must recognize that his compositional technique cannot be understood apart from certain concepts of musical structure which reached a definitive stage of development about a century before the composing of [his Piano Sonata,] op. 109. Many of these concepts are expressed within the practice of thorough bass.” Treitler (quoting Allen Forte), “Music Analysis in an Historical Context,” *College Music Symposium* 6 (1966), II.3; reprinted in Treitler, *Music and the Historical Imagination*, 71.

strongest according to region.⁴¹ Thus the Frankish melodies, even if originally developed through improvisation, must have become definite and fixed compositional entities before their diffusion and capture in various local notational systems—and yet not entirely fixed, and so perhaps not entirely definite.

Example 1.2 illustrates the state of practical notation nearly two hundred years after the death of Charlemagne: it shows the Antiphon *Missus est gabriel* as it appears (with variant spelling) in the antiphoner prepared by the monk Hartker for the monastery of Saint-Gall in the late tenth or early eleventh century.⁴² Its musical signs answer Hucbald's earlier description of neumatic notations in every respect, including their tendency to vary in shape from place to place—*pro locorum uarietate*—by which Hucbald may have intended the differences in regional scripts noted above, but perhaps also the different graphic forms a neume may take at different points in a given melody.

Example 1.2 Antiphon *Missus est gabriel* in the Hartker Antiphoner⁴³



⁴¹ See David G. Hughes, "Evidence for the Traditional View of the Transmission of Gregorian Chant," *JAMS* 40, no. 3 (Autumn 1987), 377–404; Kenneth Levy, "On Gregorian Orality," *JAMS* 43, no. 2 (Summer 1990), 185–227; also László Dobszay, "The Debate about the Oral and Written Transmission of Chant," *International Musicological Society Congress Report XV: Madrid 1992* [*Revista de Musicología* 16], 706–29; all reprinted in Kelly, *Oral and Written Transmission*.

⁴² St. Gallen, Stiftsbibliothek, Cod. Sang. 390–391, description and facsimile PM II/I *Antiphonaire de l'office monastique transcript par Hartker: MSS Saint-Gall 390–391* (980–1011) (Solesmes, 1900).

⁴³ St. Gallen, Stiftsbibliothek, Cod. Sang. 390, 38. www.e-codices.unifr.ch (accessed November 27, 2013).

Here, for instance, over the last syllable of the word *gabriel* we see the sign for the rising two-note melodic figure later called *pes* or *podatus* (‘foot’ or ‘footed’), the lower stroke of its graphic representation resembling a cartoon flexed foot extending from the leg-like rising diagonal. The same form appears over the third syllable of the word *desponsatam*. On the second syllable of *Missus*, however, the rising two-note figure takes a different shape, more like a fish hook than a foot. This alteration does not reflect a difference of pitch or interval, but rather one of rhythm or articulation, perhaps even of vocal character: the curving trace encourages a more flowing delivery of the melodic figure, rather than the deliberate and perhaps more sharply etched performance the angular form suggests.⁴⁴ Here then is an example of figural variation or “deformation,” to use Hucbald’s word, depending on a sign’s location within the melodic cursus.

Yet another graphic variation appears in the notation of liquescence, the alteration of musical pitch in the articulation of a verbal consonant. In Example 1.2, the *p*-shaped figure thus accommodates the *n* of *angelus*. Later medieval notations and more recent transcriptions represent such liquescent neumes by means of reduced-size noteheads, as in Example 1.3 below. Later in this study the reader will also encounter the neume called *quilisma*, represented in original notation and in transcription with a quivering figure something like that of a trill. “In most manuscripts the quilisma is nearly always used for the middle note in an ascending-third formation, sometimes only for a minor third,” its wiggly shape and apparent passing function suggesting an ornament.⁴⁵ Apparently of similar effect is the *oriscus*, which takes a similarly

⁴⁴ On graphic *ductus* and its musical interpretation see Luigi Agustoni and Johannes Berchmans Göschl, *Einführung in die Interpretation des Gregorianischen Chorals, 1: Grundlagen* [Regensburg, 1987], translated and annotated by Columba Kelly as *An Introduction to the Interpretation of Gregorian Chant by Luigi Agustoni and Johannes Berchmans Göschl, Volume I: Foundations* (Lewiston, New York: The Edwin Mellen Press, Ltd., 2006), 91–93, also 84–89 (neume tables, with key to abbreviations at 83).

⁴⁵ Hiley, *Western Plainchant*, 358.

zigzag sign in transcription as in original notation; it appears in Example 1.2 as the flag-like appendage to the virgule over the word *est*. Thus for Hartker's neumatic notation, as with the signs Hucbald knew a century earlier,

The customary notes ... are deemed quite useful in showing the slowness or swiftness of the melody, and where the sound demands a tremulous voice, or how these sounds are grouped together or separated from each other, also where they are closed lower or higher by reason of certain letters.⁴⁶

Hucbald therefore had not proposed eliminating these traditional signs from the liturgical books, but that his own diastematic notation be added to them.

Yet there is no evidence of Hucbald's notational system being taken up outside his treatise, whereas other elements of that work were indeed influential, and whereas neumes and their graphic signs continue to thrive for centuries. Hartker and others clearly found neumatic notations adequate to the task of preserving the chant entrusted to them, for from the beginning of the tenth century (or perhaps even earlier)⁴⁷ they regularly inscribed these notations, with great care and cost, in their treasured liturgical books. These efforts were so successful, moreover, that modern scholars have been able to recover most of the melodic content from the earliest noted Gregorian sources, principally by consulting more recent exemplars that supplement neumatic notation with later systems more specific in terms of pitch and interval. In

⁴⁶ "Hae autem consuetudinariae notae ... tarditatem seu celeritatem cantilenae, et ubi tremulam sonus contineat vocem, uel qualiter ipsi soni iungantur in unum uel distinguantur ab inuicem, ubi quoque claudantur inferius uel superius pro ratione quarumdam litterarum ... ad modum censentur proficuae." Chartier, *L'Œuvre musicale d'Hucbald*, 196; cf. GS I: 118. Translation: Atkinson, *The Critical Nexus*, 144; cf. Babb, *Hucbald, Guido, and John*, 37. For more on neumatic notation's positive aspects see Treitler, "The 'Unwritten' and 'Written Transmission' of Medieval Chant," 178–82.

⁴⁷ Levy proposes, in "Charlemagne's Archetype" and elsewhere, that the neumatization of Gregorian chant began in earnest around 800; other scholars estimate a date closer to 900, earlier instances being regarded as exceptional. The question is moot here, since neumes are not sufficient to conserve tonal content even from one year to the next in a single location, much less over generations and vast distances.

Example 1.1, for instance, neumatic signs are arrayed on and between staff lines, the system introduced by Guido of Arezzo (c. 990–c. 1033) and the preferred method of notation throughout the Latin West from the twelfth century onward. From Example 1.1 we may determine quite a bit about the melody as represented in Example 1.2, resolving further questions by consulting yet more sources, especially those closer to Hartker’s time and St.-Gall tradition.

Example 1.3 demonstrates this comparative method, presenting four versions of the Antiphon *Missus est gabriel* in modern transcription. Reading from top to bottom (and in reverse chronological order), the late-medieval Sarum version from Example 1.1 is followed by two from twelfth-century antiphoners equipped with staff lines: that of Lucca representing the Italian tradition, and that of Klosterneuburg the Austrian.⁴⁸ Informed by these and other sources, the fourth line of the example gives a reconstruction of the melody Hartker notated in the adiastematic neumes reproduced in Example 1.2.⁴⁹

⁴⁸ Lucca, Biblioteca Capitolare 601, 24 (identical reading at 376), facsimile PM IX *Antiphonaire Monastique (XII^e Siècle) Codex 601 de la Bibliothèque Capulaire de Lucques* (Berne: Herbert Lang, 1974); Klosterneuburg Stiftsbibliothek 1013, 24r, electronic facsimile: Austrian Academy of Sciences and Austrian National Library, *Mittelalterliche Handschriften in österreichische Bibliotheken* http://www.manuscripta.at/_scripts/php/digi.php?ms_code=AT5000-1013 (accessed November 27, 2012).

⁴⁹ Transcriptions offered herein for ease of reading by non-specialists follow certain conventions established for that purpose in modern-notation Solesmes editions: the basic rhythmic value is given as the eighth note; these beamed together represent neumatic grouping; quarter notes mark cadential points, for which both historical evidence and practical experience support a comparable lengthening. Expert readers may according to their own considered opinion lengthen, shorten, make proportional, etc., generally without disturbing the analysis of tonal structure for which this method of transcript is chosen as most convenient. Where rhythmic interpretation may influence the reading of a given passage, it will be so remarked. Transcription is introduced here for convenience only. No analysis, method of analysis, or theory proposed in this study depends upon transcription or method thereof.

Example 1.3 Antiphon *Missus est gabriel* in modern notation

Sarum (15c) *Missus est ga-bri-el an-ge-lus ad ma-ri-am vir-gi-nem de spon-sa - tam io-seph.*

Lucca (12c) *Missus est ga-bri-el an-ge-lus ad ma-ri-am vir-gi-nem de- spon-sa - tam io-seph.*

Klosterneuburg (12c) *Missus est ga-bri-el an-ge-lus ad ma-ri-am vir-gi-nem de- spon-sa - tam io-seph.*

Hartker (10-11c) *Missus est ga-bri-hel an-ge-lus ad ma-ri-am vir-gi-nem de- spon-sa tam io-seph.*

Hucbald's description (9c)

tone

semitone-plus-tone

semitone

lower

Over time, these notations lose rhythmic-articulatory nuance as they gain specificity of pitch: Hartker's indication of fluid delivery on the word *Missus* disappears in the twelfth-century sources (and from the notational tradition, thus the transcription's horizontal arrow as an *ad hoc* solution); these sources nevertheless preserve liquescents that go unmarked in the later Sarum notation. The inflection of the movable melodic degree, transcribed here first as B flat and later B natural, remains implicit in Hartker and Lucca but is made explicit in Klosterneuburg with an accidental *b* (medieval ancestor of the modern flat sign) and in Sarum through a change of clef. The times, places, and notations of the four sources differ, but the melody they transmit remains very much the same.

What accounts for this stability of tonal content over vast stretches of space and time? Certainly not the neumes themselves, which specify neither tone nor interval. Nor was this melody sung every day or every week, whereby it might be ingrained in the memory through brute force of habit. It belongs not to the Ordinary but to the Proper, so that as with thousands of

other repertoire items it may be sung several times in the course of a particular day or season but not revisited thereafter for months on end.⁵⁰

Among the mountains of evidence that later pitch-specific notations faithfully preserve the melodic content of earlier repertoire are remarks Hucbald makes about this same antiphon, by way of introducing intervals he later names as semitone, tone, and semitone-plus-tone (the semiditone, now usually “minor third”):⁵¹

The first interval is when two pitches stand close by one another in a division of smallest distance, so much that the difference between them may hardly be sensible, as is found in the antiphon *Missus est gabriel* at these places: *ma-ri-am*, likewise *uir-gi-nem*. Now the second is of more perceptible an interval, as in this: *Missus*, likewise *angelus*. The third one is a little further apart than that, as in this *Missus est* at *ad ma-*, likewise at *-riam virginem*.⁵²

The melody of this antiphon allows Hucbald to demonstrate each of these intervals ascending and descending between the same pairs of pitches, as the lowest level of Example 1.3 points out. Hucbald does not notate the melody, however, but relies instead on the student’s aural memory of it from musical practice. He thereby confirms that the twelfth- and fifteenth-century versions transcribed in Example 1.3 preserve at least some elements of the melodic setting transmitted orally before A.D. 900. Hucbald also provides confirmation for the intervallic relations of the pitches we assign to Hartker’s notations from the turn of the millennium. Still, as nearly always with the chant, some degree of variance remains: evidence both internal and

⁵⁰ On Ordinary and Proper see Hiley, *Western Plainchant*, 8, 22–24, 26, 148–49.

⁵¹ Chartier, *L’Œuvre musicale d’Hucbald*, 146; cf. Babb, *Hucbald, Guido, and John*, 19.

⁵² “Primus modus est, cum sibi duae uoces breuissimi spatii diuisione cohaerent, adeo, ut uix discrimen inter eas sentiatur, ut inest in antiphona: **Missus est Gabriel** <angelus>, ad id loci: **Ma-ri-am**. Item: **uir-gi-nem**. Secundus iam perceptibilioris est interualli. Vt in hoc: **Missus** <est>. Item: **Angelus**. Tertius adhuc paruo diductior. Vt in hoc: **Missus est** <Gabriel> **ad Ma-**. Item: **-riam uirginem**.” Chartier, *L’Œuvre musicale d’Hucbald*, 142. Translation mine; cf. Babb, *Hucbald, Guido, and John*, 16.

external to Hartker's antiphoner suggests, for example, that the first note of his version sounded *E* as in Klosterneuburg, rather than *F* as in Lucca and Sarum.⁵³

For many years, then, adiastematic notations such as those of Hartker were adequate for preserving Gregorian melody, both in the estimation of musicians as well as in fact, yet not sufficient in and of themselves, and not without room for variance. The overwhelming melodic correspondence of the sources attests to the presence of some other stabilizing force, an aptitude for retention in human memory on principles residing at some level or levels other than those occupied by neumes. An obvious candidate for this agent of melodic conservation is the audible long-term tonal structure described in the above-quoted opening sentence of *Musica enchiriadis*, which speaks not only of individual notes but of a "whole concinnity" that achieves ultimate resolution in its ending.

§1.3 Tonal trajectory, liturgical usage, mode

Having established for the Antiphon *Missus est gabriel* a musical text and to some extent a historical and aesthetic context, we are in a position to begin seeking out such structural principles. We shall be disappointed, however, if we limit our search to patterns familiar from more recent repertoires. For example, the ending of this antiphon on the tone transcribed as *G* is hardly predictable from its early emphasis on *F*. Not only does it start on *F* in our Italian and English sources, but, in all four versions the melody employs what we readily identify as *F*-major scale steps—at least at the beginning. On *F* the melody invariably has its first cadence, the phrase-ending that closes the melodic setting of the clause *Missus est gabriel angelus*. Within that phrase, moreover, the grammatical unit *gabriel angelus* is set to a unit of melody that rises

⁵³ PM II/I, 38; cf. Lipphardt, *Der Karolingische Tonar*, 58.

stepwise from *F* up to *b* (B flat), and thence descends stepwise through the same perfect fourth to *F* again. Following this cadence on *F*, the melody arpeggiates what we recognize as the F-major triad, first in ascent (*F a c* setting the syllables [*ange*]-*lus ad ma*-[*ria*]), and then in descent with *G* as a passing tone between *a* and *F*: [*virgi*] -*nem despon*-[*satam*]. Yet after all this, the antiphon proceeds to the final cadence on *G*.

Such a gesture might be understandable, in an F-major context, as a medial event: a phrase-ending on scale-degree 2 suggesting dominant harmony and a half cadence. Leaving aside the anachronism of such an interpretation,⁵⁴ we must reject it on grounds of performance practice, which again has direct bearing on our analysis. The antiphon's cadence on *G* sometimes functions medially, but more often and more fundamentally it acts as the conclusion of a larger musical and liturgical utterance. This may not be readily apparent from Example 1.1, in which the notation of the antiphon is followed immediately with that of the principal text it introduces and concludes. Here the Antiphon *Missus est gabriel* is connected to the recitation of the Benedictus (Canticle of Zachary) within the Office of Lauds and the liturgical season of Advent.⁵⁵ The intonation and termination of the melodic formula for that canticle appear just to the right of the antiphon's final note, above the abbreviation *Ps.* for psalmodic recitation, and the textual incipit *Benedictus* that follows. The formula indicated by intonation and termination belongs to Mode 8, the tonal category to which the Antiphon *Missus est gabriel* is thus assigned

⁵⁴ See Margaret Bent, "The Grammar of Early Music: Preconditions for Analysis," in *Tonal Structures in Early Music*, edited by Cristle Collins Judd. Criticism and Analysis of Early Music, volume 1 (New York: Garland Publishing, 1998), 29–31, 40–50.

⁵⁵ Lauds of Wednesday in Ember Week; cf. *Breviarium ad Usum Insignis Ecclesiae Sarum*, edited by Francis Procter and Christopher Wordsworth (Cambridge, 1882) vol. I, cxviii–cxix.

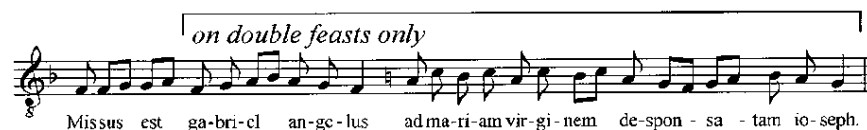
here as in the manuscript tradition generally, including Klosterneuburg, Lucca, and the Metz Tonary.⁵⁶

Example 1.4 shows how liturgical performance sets antiphon and canticle in mutual relation. Here the barline represents the caesura between hemistiches of recited text, double barlines signify ends of sections within the larger liturgical offering, and the final barline marks the end of the entire musico-liturgical unit. Whole notes represent the canticle tone's reciting note or *tenor*, the actual duration of which varies with the number of syllables it sustains: one or two in shorter hemistiches, in longer ones ten or more. It is the capacity of the reciting note for indefinite rhythmic expansion that allows verses of varying syllabic length to be sung to the same melodic formula. Within this *tenor*, moreover, are heard many different sounds: consonants both pitched and unpitched interrupt an everchanging stream of vowels, each with its own complex of audible frequencies. Yet all are perceived—and described in historical sources—as sustaining a single melodic tone, thus providing a primary and fundamental example of tonal prolongation in Gregorian chant.

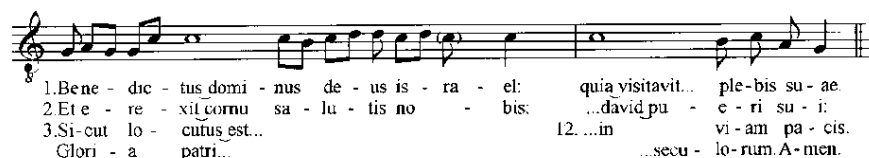
⁵⁶ Lipphardt, *Der Karolingische Tonar*, 58 (indexed 86).

Example 1.4 Antiphon *Missus est gabriel* in liturgical performance

Opening Antiphon



Canticle and Doxology



Final Antiphon



First the cantor or cantors intone the antiphon—that is, they sing just the beginning of it; the choir then immediately takes up the remainder of the opening antiphon only on double feasts, celebrations so named because their antiphons are sung through to the end both before and after the psalmody, thus “doubled.” On less solemn occasions the cantor leaves the antiphon incomplete, skipping ahead (after a brief caesura) to the first hemistich of the principal text. The text in this instance being a canticle, it is sung to a melodic formula chosen from a traditional menu of memorized canticle tones; from this generic menu the tone is selected that best fits the melody of the antiphon. Tradition provides similar menus of tones for psalms, tones for Matins responsories, and so on, assigning to each of these genres of Office chant one tone (at least) for each of the eight modes into which the entire repertoire is classified. Likewise at Mass, there are eight tones for the verses of the Introit, eight tones for the *alleluia* appended as a coda to the

Offertory in Eastertide, and so forth, again for each mode a tone.⁵⁷ The Cantic *Benedictus*, when connected on some other occasion with some other antiphon, is sung to whichever cantic tone best agrees modally with that antiphon. Likewise the Antiphon *Missus est gabriel* on another occasion (or in another local tradition) might introduce and close the recitation of a psalm instead of a cantic: in such case the cantor would initiate not the cantic tone of Mode 8, but the somewhat less elaborate psalm tone of the same mode.⁵⁸ Within the Divine Office, the greater part of each Hour is taken up with the chanting of psalms and canticles to such melodic formulas, the words and music of which are memorized separately, combined in choral performance, and seldom notated in full.⁵⁹

After the cantor has set the melodic formula in motion with the first hemistich of principal text, the choir joins in with the remainder of that verse set to the continuation of the recitation tone. This two-part formula is then repeated for each of the remaining verses. (Often the choir is divided into two sides, alternating verses between them.) After the last verse, the cantor again intones the formula, now to the words of the Lesser Doxology, which begins *Gloria patri* (Glory be to the Father ...) and ends *seculorum. Amen* (world without end, amen). *Gloria patri* is generally appended to psalms, canticles, and responsories of the Office, to the verse of the Introit at Mass, etc., all texts committed to memory. Usually in liturgical books only the termination of the melodic formula is noted, and below it only the final words *seculorum. Amen*, often abbreviated EUOUAE. Less often, the formula's intonation is given with the incipit of the

⁵⁷ Cf. *LU* 14–16 (introit tones), 95–97 (paschal codas), 112–17 (psalm tones).

⁵⁸ More ornate than both of these is the tone for the Introit at Mass; all three follow the same basic procedures, and all share significant melodic material. All fall under the general category of psalmody, recitation in the manner of a psalm. Nevertheless, the cantic tone and introit tones are not psalm tones, as they are often mistakenly called in academic discourse. Practical sources both medieval and modern insist on psalm, cantic, and introit tones as separate entities.

⁵⁹ See Hiley, *Western Plainchant*, 58–69; Apel, *Gregorian Chant*, 214–228.

principal text; only rarely is the text-incipit given with both intonation and termination as in Example 1.1. After the Doxology, the Office antiphon is finally sung through to the end, thus closing the offering of Psalm or Canticle.⁶⁰

So with this *Missus est gabriel* not only the antiphon, but also the larger musico-liturgical complex that it opens and closes, begins on *E* or *F* and ends on *G*. This, in combination with the emphatic recitation-tone tenor sounding *c* a perfect fourth over that final, must frustrate all but the most far-fetched attempts to fit a theoretical system in which tonal coherence depends on triadic functional harmony.

Theoretical models derived from ancient Greek lyre-tunings fail here as well, for neither antiphon nor larger setting expresses any particular octave species. In Klosterneuburg and Hartker, the antiphon confines itself to the sixth between *E* and *c*; in Lucca and Sarum, it stays within an even smaller tonal space, the fifth between *F* and *c*. The antiphon never reaches the upper *d* that appears in the recitation tone as upper neighbor to the reciting-note *c*. Low *D*, which might complete the octave below, is entirely absent from the musical utterance. Likewise missing is high *e*, which might complete the octave over *E*; in Lucca and Sarum, low *E* is absent as well. Analysis by species of modal fifth or fourth quickly runs into similar trouble. Especially disturbing to this line of reasoning are the augmented fourth outlined over *F* in Lucca and Sarum at *desponsatam*, and the diminished fifth in both Klosterneuburg and Hartker's St.-Gall tradition over the initial *E*.

For in the brief course of its melodic development this antiphon does not so much as remain within a single diatonic order. The degree above *a* is at first located at the semitone, on what medieval musicians called *b molle*, "soft b" (analogous to its modern descendant 'B flat'

⁶⁰ Where the Doxology is to be omitted, as for example in Passiontide, the closing antiphon follows directly the last verse of principal text.

and represented in this study by the sign *b*), but later in the antiphon that same degree is pitched a whole tone above, that is on *b durus*, “hard *b*” (analogous to its modern descendant ‘B natural’ and represented in this study by the sign $\flat$).

If at this stage we were to give up all hope of finding musical organization in this antiphon and in the repertoire it represents, we would not lack for distinguished company. A great music theorist, for example, tells us “those melodies appear to have been thrown together in a haphazard and irrational fashion,” and that therefore

We have to accept the fact that the majority of Gregorian chants lacked any guiding principle, thus placing themselves outside the scope of art in the intrinsically musical and formally technical sense. It was due to the suggestiveness of religion and the power of ingrown habits that such inartistic melodies could be memorized at all.⁶¹

A leading historian more recently takes a position more sympathetic, and yet in regard to tonal organization no less damning: “The order of events in those melodies is to be recognized by reference to the strategic position of standard opening, extending, and closing formulas far more than from the persuasiveness of any inner logic or syntax.”⁶² To the theorist the melody is empty noise, to the historian an empty shell chorded in external rhetoric.⁶³

To musicians of the Middle Ages, however, the tonal coherence of Gregorian chant was abundantly clear, and from the earliest technical descriptions of the repertoire they describe that

⁶¹ Heinrich Schenker, *Harmonielehre* [1906], edited and annotated by Oswald Jonas, translated by Elisabeth Mann Borgese as *Harmony* (Chicago: University of Chicago Press, 1954), 134, 136.

⁶² Leo Treitler, “Music Analysis in an Historical Context,” II.3; reprinted in his *Music and the Historical Imagination*, 74.

⁶³ Cf. I Corinthians 13:1, “Though I speak with the tongues of men and of angels, and have not charity, I am become as sounding brass, or a tinkling cymbal,” substituting Paul’s ‘charity’ with Schenker’s ‘coherence.’ Cf. also, in relation to Treitler’s comment, Matthew 6:7, “But when ye pray, use not vain repetitions, as the heathen do: for they think that they shall be heard for their much speaking.”

coherence as a function of mode. Consider the opening of the *De octo tonis* (On the Eight Modes), a treatise that “may perhaps date back as far as the late eighth century,”⁶⁴ and which appears both independently and as part of the larger *Musica disciplina* (Music the Discipline) compiled by Aurelian of Réôme sometime between A.D. 840 and 849.⁶⁵ It begins: “The musician ought to know that in Music there stand in close ranks (*consistere*) eight modes, by virtue of which every melodic progression (*modulatio*) is perceived to adhere unto itself as if by a kind of glue.”⁶⁶ Here the binding property of glue illustrates metaphorically the internal coherence mode gives to well-formed tonal motion—*modulatio*.

Much depends on our understanding this term. Aurelian employs it instructively in his Chapter XIII, for example, where he says of the Gradual *Tollite portas* that he recalls the *modulatio* of its verse’s opening phrase repeated nowhere else “in the prolixity of the entire antiphoner” except at the corresponding juncture in the Gradual for Easter Day, *Haec dies*.⁶⁷ Now the verse of *Tollite portas* begins with a ten-syllable clause, the setting of which ascends in

⁶⁴ David E. Cohen, “Notes, scales, and modes in the earlier Middle Ages,” in *The Cambridge History of Western Music Theory*, edited by Thomas Christensen (New York: Cambridge University Press, 2002), 310.

⁶⁵ *Aureliani Reomensis Musica Disciplina*, Lawrence Gushee, ed. (CSM 21, 1975); Joseph Ponte, *Aurelian of Réôme: The Discipline of Music (Musica Disciplina)* Colorado College Music Press Translations 3 (Colorado Springs: Colorado College Music Press, 1968). On the date of Aurelian’s treatise see *Aureliani Disciplina*, 15–16; also Barbara Haggh and Michel Huglo, “Réôme, Cluny, Dijon,” in Bailey and Santosuosso, *Music in Medieval Europe*, 50–52.

⁶⁶ “Octo tonos in Musica consistere musicus scire debet, per quos omnis modulatio quasi quodam glutino sibi adhaerere videtur”: note the singular *omnis modulatio*, that is each melody considered individually; this does not concern the affinity of melodies belonging to the same mode. GS 1:26, TML ALCMUS TEXT http://www.chmtl.indiana.edu/tml/6th-8th/ALCMUS_TEXT.html; cf. Cohen, “Notes, scales, and modes,” in *The Cambridge History of Western Music Theory*, 312.

⁶⁷ “Grad. Tollite portas principes, in eiusdem versu: v. ‘Quis ascendet in montem Domini’ ... istius modulatio versus ante primam distinctionem totam ... memini me non alicubi repperisse in prolixitate totius antiphonarii, nisi hic et in versu paschalis festivitatis responsorii, Grad. Haec dies, in eiusdem versu v. ‘Confitemini Domino.’” Gushee, *Aureliani Disciplina*, 99; cf. Ponte, *The Discipline*, 34.

pitch with the first three syllables. The next four syllables repeat, in the manner of psalmodic recitation, the goal-tone of that ascent; then there is a melisma on the last three syllables—the word *domini*. In the second chant, the eight-syllable phrase that begins the verse of *Haec dies* starts with the same melodic ascent as before, but it gives only two repercussions of the reciting note before launching into the melisma, now on *domino*.⁶⁸ The pitch-intervals and their order are all the same, only their rhythmic prolongation is different. Aurelian identifies both passages as one and the same *modulatio*, which we may therefore define as progression through well-formed pitch-intervals in melodic order, otherwise rhythmically indefinite. This is the more specific sense in which Aurelian and other chant theorists often employ the term, the more ancient and general senses “proportion, harmony” and “measured interval” remaining in the background.⁶⁹

The *De octo tonis* asserts mode as the unifying force holding together the individual *modulatio*, whereas it employs the military term *consistere* (to stand in formation, to hold the line) for the looser alliance of the modes as a group. Likewise at the conclusion of a treatise transmitted in the ninth century with the Tonary of Metz, we read that by these same eight modes “chant of every kind is governed and also bound together” (*regulatur ac perstringitur*: literally “ruled” as by statute and “bundled tight” as in a parcel or load for delivery).⁷⁰ A tonary is a catalogue of chant repertoire ordered by mode; these indeed classify “chant of every kind,” even those without psalmodic verses, in eight modal categories.⁷¹ As in the *De octo tonis*, the Metz

⁶⁸ Cf. *LU* 1269, 779.

⁶⁹ Christoph von Blumröder, “Modulatio/Modulation,” in *Handwörterbuch der musikalischen Terminologie*, ed. Hans Heinrich Eggebrecht and Albrecht Riethmüller, (Wiesbaden, Stuttgart: Steiner, 1971–2006), I.

⁷⁰ “Omnigena cantilena VIII tonis regulatur ac perstringitur.” Lipphardt, *Der Karolingische Tonar*, 63; cf. Cohen, “Notes, Scales, and Modes,” 312.

⁷¹ See Hiley, *Western Plainchant*, 325–31; also Michel Huglo, *Les tonaires: Inventaire, analyse, comparaison*. Publication de la Société française de musicologie, Ser. III, Vol. II (Paris: Heugel, 1971).

treatise describes the fellowship of these modes as separate from the internal unity that each chant gains from one or another:

Also deservedly this diversity of modes ... was deemed worthy, that of them a bound of union should be connected with a bond, naturally a loving embrace ... nor by any means ought mention be omitted, in conclusion least of all, of this union's business: that by fastening joyful things together they might reap the fruits of brotherhood.⁷²

So mode was recognized as the tonal adhesive of melodic progression in unity with itself, the modes themselves as individuals bound together by purpose as in a military unit or fraternal order, and their system as a model of Christian social behavior. More than a practical device for matching the recitation tone of psalm or canticle to the appointed antiphon, mode was nevertheless that as well.

For concern with tonal unity extends not only to *modulatio* within the antiphon, it also takes into account the relation of the antiphon's *modulatio* to that of the recitation tone. Medieval cantors took extraordinary care in matching the tone of psalmodic recitation with the antiphon appointed to introduce and close it, classing each not only by mode but also by *differentia*, the particular cadential termination of the recitation tone that best agrees with a particular class of antiphon within its mode.⁷³ In Example 1.2, for instance, Hartker or a close contemporary records the mode and *differentia* for the Antiphon *Missus est gabriel* at the left margin. Here “ωg” indicates Mode 8, sub-class 5: the Greek vowel omega stands for Mode 8, and the Latin

⁷² “Et merito hec [ms. ex] tonorum diuersitas ... dignum fuit, ut horum margo unionis uinculo utpote caritatiuo amplexu necteretur ... nullatenus debet obmitti quin saltim in calce sui negotii unionis compagine iocunda fruant fraternitate.” Lipphardt, *Der Karolingische Tonar*, 63.

⁷³ See Hiley, *Western Plainchant*, 58–68, 89, 326–29.

consonant *g* indicates the *differentia* listed fifth within that mode in the tonary accompanying Hartker's antiphoner.⁷⁴

This alphabetic modal notation is emblematic of yet another cultural element that must be taken into account in order to understand the evidence of musical discourse in the Middle Ages: the Latin tradition of Aristotelian logic (also known as dialectic), which along with grammar and rhetoric formed the *trivium* of medieval education. Following the practice of Boethius (c. 475–c. 526), whose translations and commentaries were basic texts of the discipline from the Carolingian era to the twelfth century, the four modes of logical syllogism are traditionally indicated with the vowels *a*, *e*, *i*, and *o*.⁷⁵ Hartker assigns these to the first four modes of music, supplying four additional vowels for modes 5–8, the Greek omega signifying the eighth and last. As chants of mode 8 are generally notated to end on *G* (the note in the gamut, not to be confused with Hartker's small *g* indexing the *differentia*'s location in his tonary), we have further confirmation here of our choice to transcribe Hartker's version of this antiphon to end on *G* as in later sources.

What is the nature of the association among antiphon, psalm tone, and mode? Before delving into technical details, let us consider what liturgical purpose a modal harmony between formulaic psalmody and idiomelic antiphon might fulfill. On a practical level, the matching of recitation tone to antiphon promotes uninterrupted musical performance. This is especially so at the moment when the choir, having recited the principal text and Doxology, must make the

⁷⁴ PM II/I, 50*–52*; Hiley, *Western Plainchant*, 333–34; Huglo, *Les tonaires*, 232–40.

⁷⁵ See Henrik Lagerlund, "Medieval Theories of the Syllogism," in *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/medieval-syllogism/> (accessed November 27, 2013); also John Marenbon, "Anicius Manlius Severinus Boethius," in *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/boethius/#8> (accessed November 27, 2013).

transition from recited formula to the initial notes of the final antiphon. A smooth melodic connection here helps keep the singers together and in tune.

It is worth considering also, in the context of Christian theology and its ritual enactment in the Divine Office, the liturgical aim of pairing psalm or canticle with antiphon in the first place. Scriptural recitation in the Divine Office is not only a memorial of the past, but also a meditation and offering in the present moment as well as a prophecy of the future; the antiphon relates it particularly to the present liturgical occasion, the here and now. Helmut Hucke describes what he calls the liturgical “advantage” of the choral psalm-with-antiphon: “the whole monastic community takes part in the Office of the psalms, and every Old Testament psalm is transposed into Christian revelation by the text of the antiphon.”⁷⁶ Fair enough, but musical agreement of antiphon with psalm or canticle might also argue more persuasively, and through choral participation might also involve the community more fully, than the mere juxtaposition of verbal texts. A modal-syntactical harmony of formulaic recitation tone and idiomatic antiphon not only has the practical advantage of helping the choir remain unified in the transitions between psalmody and antiphon, it also lends to the proceedings the rhetorical force of musical unity. The reader may perhaps experience this effect first-hand by singing through Example 1.4.

Yet at first glance the musical criteria for matching tone to antiphon may not be clear. The Mode-8 recitation tones rise to *d*, that is, a whole tone higher than this antiphon ever reaches. By measure of *ambitus*, total melodic range, the recitation tones of Mode 4 would make a closer fit: these range from *E* or *G* up to *b*, only a semitone below the antiphon’s highest note.⁷⁷ If instead of *ambitus* we consider the antiphon’s tessitura centered on *a*, then there are better choices in modes 1, 4, and 6: these have their reciting tone on *a*, whereas those of Mode 8 have

⁷⁶ Hucke, “Toward a New Historical View,” 464.

⁷⁷ Cf. LU 115, also Hiley, *Western Plainchant*, 59–60.

their *tenor* on *c*—on which the antiphon touches only briefly. If modal classification were based on thematic connections, then the tone of Mode 5 would surely win the day, both its intonation through the F-major arpeggio and its termination $\text{b}-c-a$ echoing motivic features of the antiphon.⁷⁸ What about beginning and ending pitches? The antiphon starts on *E* or *F*, whereas the recitation tone begins on *G*. As for endings, the chosen recitation tone does indeed terminate on the antiphon's final *G*, but other Mode-8 antiphons that end on this same *G* are assigned *differentiae* ending on other notes as high as *c*, and in some sources as low as *D*.⁷⁹ In general, a *differentia* may terminate on any note melodically consonant with the final, from the fourth below it to the psalmodic *tenor* at the third, fourth, or fifth above (in Mode 3 the *tenor* at the minor sixth can also be a terminus), nor is there any rule governing the interval between the end of the psalmodic recitation and the beginning of the antiphon, except that it must be melodically consonant.

One may be tempted to suspect that there is no musical connection, only a conventional one: that the Antiphon *Missus est gabriel* is classified as Mode 8 (tetrardus plagal) simply because such is the traditional modal assignment for melodies that end on *G* and do not reach very high above it. Position in relation to the final undoubtedly does constitute the difference between an authentic mode and its plagal, a distinction observed in the earliest tonaries. These classify chants first of all by the categories protus, deuterus, tritus, and tetrardus, terms the *De octo tonis* explains as derivations from the Greek for “first,” “second,” “third,” and “fourth,” respectively.⁸⁰ Each of these broad categories (later called *maneriae*) divides into two classes, authentic and plagal, for the full complement of eight modes. Tonaries dating to the late eighth

⁷⁸ Cf. LU 115; Hiley, *Western Plainchant*, 60.

⁷⁹ Cf. LU 117; Hiley, *Western Plainchant*, 60.

⁸⁰ GS 1:26, TML ACMUS TEXT.

and early ninth centuries are the earliest surviving witnesses of this system, but these are silent as to its musical criteria.⁸¹ The *Musica enchiridis* explains that an authentic and its plagal are similar to the extent they share the same final, but that they differ to the extent that the plagals (the “lesser” modes located “beneath” the authentics) have lower placement:

As any authentic mode (*tonus*) and that which is beneath it are governed and concluded by the same note (*sono*), even so are they taken for one mode; nevertheless they differ in this: that the lesser modes are given lesser spans in elevation, and any lower mode does not ascend further than the fifth note from its final, and this but rarely.”⁸²

Now the Antiphon *Missus est Gabriel* does indeed not ascend to the fifth note from its final *G*, but neither does it descend much below it. It shares classification in Mode 8 (tetrardus plagal), moreover, with an eleventh-century *Agnus Dei* that also ends on *G* but ascends to *f*, that is, higher than many chants of Mode 7 (tetrardus authentic).⁸³ Rather than assume that the *Musica enchiridis* is inaccurate in its description of modal categories, we might ask ourselves whether we are reading it accurately. *Ambitus* is mentioned here as a secondary characteristic of plagal modality, the primary test being a “lesser span of elevation,” a lower placement—perhaps, then, placement of something other than *ambitus*. The *Musica enchiridis* describes *ambitus* as a characteristic of plagal modality, not a cause. Perhaps then it is not so much that a melody is plagal because it does not range high above the final, but rather that it does not range high because it is plagal.

⁸¹ See Huglo, *Les tonaires*, 25–45.

⁸² “Cum eodem sono autentus quisque tonus et qui sub ipso est regantur et finiantur, unde et pro uno habentur tono, in hoc tamen differunt, quod minoribus tonis minora in elevando sunt spacia, et inferior quisque tonus non nisi ad quintum usque sonum a finali sono ascendit, sed et hoc raro.” Schmid, *Musica et scolica enchiridis*, 9. Translation mine; cf. McKinnon’s in *Source Readings*, 192; also Erickson, *Musica enchiridis*, 5 (subjunctive of causality in clause governed by *cum* mistaken for subjunctive of possibility, *cum* left untranslated).

⁸³ Cf. *LU* 33.

The *G* on which the Antiphon *Missus est gabriel* and its fellow mode-8 chants are notated to end, furthermore, belongs to a gamut based on a conflation of two ancient Greek lyre-tunings, a composite that Hucbald's treatise introduces toward the end of the ninth century.⁸⁴ (Hucbald's tone system was influential, not his proposal for its notation.) Hartker nearly one hundred years later may have known some version of this gamut, although it plays no part in his antiphoner or his tonary. Such a tone system was apparently unknown even to Aurelian, who manages to describe various idiomelic and recitation-tone *modulationes* (plural of *modulatio*) without it. It is most unlikely that anything of the sort was available to the cantor whose modal assignment of the Antiphon *Missus est gabriel* was inscribed in the Metz Tonary in the earlier part of the ninth century.⁸⁵ So although it later became common for tetrardus antiphons to be notated with an ending on *G* of the gamut, it cannot be this later notational practice that leads to the earlier assignment of antiphons to the tetrardus maneria. These melodies must possess some audible tetrardus property, and some feature that makes convenient their Guidonian notation ending on *G* of the tone-system adapted from Hucbald. Nor is this tetrardus property a simple function of scale. The plagal Antiphon *Omnis sapientia*, which has above its final the semiditone (minor third) and never the ditone (major third), thus conforms in scale and *ambitus* to Mode 2 (protus plagal), and yet in the Metz tonary and other sources it is assigned to Mode 8: its notation in the Guidonian system therefore requires flat *b* over the tetrardus final *G*, rather than all "natural" notes over the protus final *D*.⁸⁶ For these and other reasons, "the plainchant modes ... cannot be equated simply with scales."⁸⁷

⁸⁴ Chartier, *L'Œuvre musicale d'Hucbald*, 168–93; cf. Babb, *Hucbald, Guido, and John*, 25–35.

⁸⁵ Lipphardt, *Der Karolingische Tonar*, 200–01.

⁸⁶ Lipphardt, *Der Karolingische Tonar*, 57 (indexed 89); cf. *LU* 990.

⁸⁷ Hiley, *Western Plainchant*, 461.

Of what, then, does the perceived harmony between recitation tone and antiphon consist, and what are the ties that bind together the disparate notes of each? What precisely are these modes, in other words, and how do they work in Gregorian chant? These theoretical questions this study proposes to answer definitively and comprehensively; not so the more complex historical question of how theorists and practitioners of various stripes, in various places, and at various times imagined, illustrated, and explained mode in Gregorian chant. A rigorous assessment of historical theory will bear much fruit, however, as the following chapter continues the investigation begun here. What it finds is that practical musicians of the Middle Ages did not generally associate modes with fixed scales, with octave species, or with species of fifth and fourth. These measures were widely taught as modal properties in the universities, but the people doing the actual chanting (in the monasteries, churches, and cathedrals) often took a rather different approach. The monastic *Musica enchiriadis*, for example, defines mode thus: “Modi vel tropi sunt species modulationum”.⁸⁸ modes or tropes are species of *modulationes*.

⁸⁸ “Schmid, *Musica et scolica enchiriadis*, 22; cf. Erickson, *Musica enchiriadis*, 12.

CHAPTER TWO: MODAL THEORY IN THE *CANTUS* TRADITION

§2.1 The scale-based concept of mode in the Latin West

Musicians of recent centuries have been taught from childhood to identify modes as octave-spanning scales on the white keys of the piano: the Dorian beginning on D, the Phrygian on E, and so on. This pedagogical habit stems from a view of modes as archaic predecessors of major and minor keys, a view first expounded late in the seventeenth century.¹ It oversimplifies and in other ways distorts a theory of mode introduced by the Swiss humanist Heinrich Glarean (1488–1563) and popularized by the Italian theorist and composer Gioseffo Zarlino (1517–1590),² itself an attempt at refining a doctrine established by Marchetto of Padua in the early part of the fourteenth century.³ Marchetto, in turn, bases his modal theory on that of Berno of Reichenau (d. 1048), who constructs from species of diatessaron (perfect fourth) and species of diapente (perfect fifth) the seven species of diapason (perfect octave) that a contributor to the multilayered *Alia musica* (Another Music-Treatise) derives—sometime after Hucbald, whose

¹ Joel Lester, *Between Modes and Keys: German Theory 1592–1802* (Stuyvesant, NY: Pendragon Press, 1992), 86–90, 94–5, 111–17, 125–6. Historical developments summarized in this introduction receive further examination later in this chapter and in Chapter Four.

² Glareani *ΔΩΔΕΚΑΧΟΡΔΟΝ* (Basel, 1547); Henricus Glareanus, *Dodecachordon: A Facsimile of the 1547 Basel Edition*. Monuments of Music and Music Literature in Facsimile, Second Series – Music Literature LXV (New York: Broude Brothers, 1967); Heinrich Glarean, *Dodecachordon*, translation, transcription and commentary by Clement A. Miller. 2 vols. Musical Studies and Documents 6 (American Institute of Musicology, 1965); Gioseffo Zarlino, *Le Institutioni Harmoniche* (Venice, 1558), Part IV translated by Vered Cohen as *On the Modes*, edited with an introduction by Claude V. Palisca. Music Theory Translation Series 7 (New Haven: Yale University Press, 1983); Harold S. Powers et al., “Mode” in *Grove Music Online*, §III/4/ii–iii.

³ Marchetto, *Lucidarium in arte musice plane* (1317); Jan W. Herlinger, *The Lucidarium of Marchetto of Padua: A Critical Edition, Translation, and Commentary* (University of Chicago Press, 1985); Powers et al., “Mode” §II/4/ii.

tone system that anonymous writer uses—from descriptions of ancient Greek lyre-tunings (*tonoi*) transmitted to the Latin West via the *De institutione musica* of Boethius.⁴

This treatise of Boethius had influence on medieval music theory comparable to that of his logical works on the discipline of dialectic.⁵ To the limited extent that the *De institutione musica* treats scales and modes, however, these are of ancient Greek instrumental music, not of Christian liturgical chant.⁶ Until the beginning of the ninth century, furthermore, by which time the Gregorian repertoire was already established and its melodies for the most part fixed, the *De institutione musica* had fallen into “virtual oblivion.”⁷ Thus although the identification of ancient Greek *tonoi* with octave species is certainly ancient, the association of those with the modes of plainchant is more recent, and spun off from an earlier and altogether different approach that was established with the Gregorian repertoire around the time of Charlemagne. It was not until several generations later, perhaps a hundred years or more, that *Alia musica* first draped the scales of ancient Greek *tonoi* over one of the two diatonic systems that Hucbald had meanwhile adapted from Boethius—draped them upside down, in fact—and equated the results with the

⁴ Charles M. Atkinson, *The Critical Nexus: Tone-System, Mode, and Notation in Early Medieval Music* (New York: Oxford University Press, 2009), 171–201 (*Alia musica*), 202–11 (Berno’s species theory); T.J.H. McCarthy, *Music, Scholasticism and Reform: Salian Germany, 1024–1125* (New York: Manchester University Press, 2009), 18–23 (biography of Berno), 64–65 (his species theory); David E. Cohen, “Notes, scales, and modes in the earlier Middle Ages,” in *The Cambridge History of Western Music Theory*, edited by Thomas Christensen (Cambridge: Cambridge University Press, 2002), 331–38 (*Alia musica*), 351–55 (Berno and Marchetto); Powers et al., “Mode” §II/3/ii (*Alia musica*), §II/4/ii (Marchetto).

⁵ Calvin Bower, “Boethius,” *Grove Music Online*, (accessed November 27, 2013); John Marenbon, “Anicius Manlius Severinus Boethius,” *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/boethius/#8> (accessed November 27, 2013).

⁶ Anicius Manlius Severinus Boethius, *Fundamentals of Music*. Translated, with Introduction and Notes by Calvin M. Bower, edited by Claude C. Palisca. Music Theory Translation Series (New Haven: Yale University Press, 1989), xxxiv, 148–61.

⁷ Bower, “Boethius.”

eight modes by then already traditional in Gregorian theory and practice.⁸ Before this conflation of old and new modalities sometime between 885 (the earliest likely date for Hucbald's treatise) and 1036 (the latest for Berno's), Latin authors did not describe, define, or illustrate the modes of plainchant in terms of octave-spanning scales.

Hucbald, for example, ascribes to the modes neither scale-pattern nor octave. He does show the range of possible phrase-beginnings and phrase-endings for authentic modes and their related plagals, which for modes 1–6 do fill the space of an octave around their finals, but for modes 7–8 Hucbald shows possibilities ranging over the space of a ninth, from high *d* to low *C*.⁹ He also states that every mode makes use of the *synemmenon* tetrachord of his tone system,¹⁰ which is to say in somewhat later terms that every mode admits *b* as well as *♭*, thus rendering octave species beyond the pale.

The “white-key” approach, the seventeenth-century view it perpetuates, and the theories of Glarean, Marchetto, and Berno which led to it, all proceed from the equation of mode with scale: they describe and define mode as an arrangement of tones and semitones throughout the space of an octave. Such a concept of mode corresponds poorly with the actual melodic behavior of the Gregorian repertoire, however, as seen in Chapter One with the Antiphon *Missus est*

⁸ Jacques Chailley, *Alia Musica (Traité de musique du IX^e siècle). Édition critique commentée avec un introduction sur l'origine de la nomenclature modale pseudo-grecque ad Moyen-Âge* (Paris: Centre de documentation universitaire et Société d'édition d'enseignement supérieur réunis, 1965); Henri Potiron, “Théoriciens de la modalité,” *Études grégoriennes* VIII (1967): 29–37, 34–36; “La définition des modes liturgiques,” *Études grégoriennes* VIII (1967): 41–46, 42; Hiley, *Western Plainchant*, 461–63; Edward Gollin, “From Tonoï to Modi: A Transformational Perspective,” *Music Theory Spectrum* Volume XXVI, No. 1 (Spring 2004): 119–129.

⁹ Yves Chartier, ed. and trans., *L'Œuvre musicale d'Hucbald de Saint-Amand. Les Compositions et le traité de musique*, Cahiers d'études médiévales (Cahier spécial no. 5), (Montreal: Éditions Bellarmin, 1995), 202–13; cf. Warren Babb, *Hucbald, Guido, and John on Music: Three Medieval Treatises* edited, with introduction, by Claude V. Palisca. Music Theory Translation Series III (New Haven: Yale University Press, 1978), 39–44.

¹⁰ Chartier, *L'Œuvre musicale d'Hucbald*, 182; cf. Babb, *Hucbald, Guido, and John*, 31.

gabriel, for example. This patent discrepancy between accepted theory and documented practice has encouraged a recent trend in academic scholarship to regard mode itself as a pious fiction, “the Church’s one and only purely musical dogma.”¹¹ Even writers who are friendly toward a view of mode as an objective phenomenon of music, rather than mere social myth, seem unwilling or unable to shake off this orientation toward octave-spanning scales.¹² But just as no one subscribed to a scalar paradigm of Gregorian mode before its introduction in the *Alia musica*, many did not adhere to it afterwards either. This chapter recovers the history, doctrine, epistemology, and pedagogical method of the alternative tradition in which mode is conceived not as a type of scale but as a type of melody.¹³ This provides not only historical justification for the structural analysis proposed in later chapters, but also some of its basic concepts and tools.

§2.2 Rival theoretical traditions

David E. Cohen identifies two distinct strands of music theory in the Latin West, the *cantus* tradition and the harmonics tradition: the Gregorian repertoire and the “system of eight ‘tones’ or ‘modes’ used by the church to classify and organize those melodies” are the basis of the *cantus* tradition, whereas the harmonics tradition proceeds from “concepts, constructions, and

¹¹ Harold S. Powers, “Modal Representation in Polyphonic Offertories,” *Early Music History* 2 (1982): 43–86, 44; see also his “Tonal Types and Modal Categories in Renaissance Polyphony,” *JAMS* vol. 34, no. 3 (Autumn 1981): 428–70; also his “Is Mode Real? Pietro Aron, the octenary system, and polyphony,” *Basler Jahrbuch für historische Musikpraxis* 16 (1992), 9–52; also Terence Bailey, “Modes and Myth,” *Studies in Music from the University of Western Ontario* 1 (1976): 43–54.

¹² For example John Caldwell, “Modes and modality: a unifying concept for Western chant?” in *Music in Medieval Europe: Studies in Honour of Bryan Gillingham*, edited by Terence Bailey and Alma Santosuosso (Burlington, VT: Ashgate, 2007), 39: “It is the thesis of this essay that the eight-mode system is inherent in the structure of the octave in the form of two disjunct tetrachords of the form TST.”

¹³ Cf. Powers et al., “Mode” §I/3.

procedures of analysis adapted from ancient Greek harmonics.”¹⁴ Cohen and others trace efforts of medieval theorists to integrate these two,¹⁵ yet the evidence is strong that in the treatment of mode they remain opposed into the Renaissance and beyond. Frans Wiering documents a division extending into the seventeenth century between practicing church musicians who favor the term *tonus* for mode defined in reference to the melodic function of the modal final, and speculative theorists who employ the term *modus* for mode defined as octave species.¹⁶ This longstanding correspondence of profession, definition, and terminology indicates the persistence in later centuries of the rival traditions that Cohen observes in their infancy and adolescence. Regarding gamut and notation a broad consensus may have been achieved shortly after the turn of the second millennium, but the synthesis of *cantus* and harmonics traditions never brought into accord fundamental differences in their respective approaches to the question of mode.

The terms ‘*cantus*’ and ‘harmonics’ might seem to replicate the bounds of ‘*kirchlich-abendländisch*’ and ‘*pseudoklassisch*’ introduced by Rudolf Steglich in 1911, employed notably by Bernhard Meier, and translated into English by Ellen Beebe as ‘western ecclesiastical’ and ‘pseudoclassical’ in reference to “systems” of modality.¹⁷ Cohen’s terms have certain advantages, however. First of all, the *cantus* approach is and always was available to those not in Holy Orders, although it does assume a familiarity with the repertoire of Mass and Office. Nor was it a rejection of things ecclesiastical for a monastic such as Guido of Arezzo to incorporate elements of harmonic theory (the monochord, for example) in his musical doctrine and

¹⁴ Cohen, “Notes, scales, and modes,” 308; cf. Atkinson, *The Critical Nexus*, 168.

¹⁵ Cohen, “Notes, scales, and modes,” 339–54; Powers et al., “Mode” §II/2–3.

¹⁶ Frans Wiering, “Internal and External Views of the Modes,” in *Tonal Structures in Early Music*, edited by Cristle Collins Judd. Criticism and Analysis of Early Music, volume 1 (New York: Garland Publishing, 1998), 91–93; Wiering, *The Language of the Modes: Studies in the History of Polyphonic Modality* (New York: Routledge, 2001), 69–101.

¹⁷ Bernhard Meier, *The Modes of Classical Vocal Polyphony* [*Die Tonarten der klassischen Vokalpolyphonie*, 1974] trans. Ellen S. Beebe (New York: Broude Brothers, 1988), 36 fn.

pedagogical practice; many theorists participate in both *cantus* and harmonics traditions. The aspect of the harmonics tradition most strictly *pseudo* is the jumbled-up assignment of the Hellenistic names Dorian, Hypodorian, Phrygian, etc. for species of octave, our legacy from authors of the *Alia musica* misreading Boethius.¹⁸ Yet *cantus*-based discussions sometimes employ these familiar names—although Guido, for one, never does—nor are they necessarily present in harmonics-based teaching.

Steglich identifies fixed systems by institutional status, whereas Cohen identifies evolving traditions not according to the habits their practitioners might wear but by their habits of thought. And whereas ‘pseudo-classical’ suggests a lack of authenticity, Cohen’s terms ‘*cantus*’ and ‘harmonics’ identify the central principle of each tradition without devaluing the other. Joseph Smits van Waesberghe’s earlier opposition of a monastic *cantus* tradition with a quadrivial tradition of *musica* has historical validity to the extent that the latter term often signifies the mathematics-based philosophical discipline wholly separate from the art of performance.¹⁹ For Guido, on the other hand, the true master of *musica* is knowledgeable not only in harmonic theory but in *cantus* as well.²⁰

Wiering calls the harmonics-tradition view of the modes ‘internal’ because it takes into account “musical development,” and the *cantus*-tradition view ‘external’ in that it posits an

¹⁸ Potiron, “Théoriciens de la modalité,” 34–36; Gollin, “From Tonoï to Modi”; Cohen, “Notes, scales, and modes,” 331–338.

¹⁹ Joseph Smits van Waesberghe, *Muzikerziehung: Lehre und Theorie der Musik im Mittelalter*, Musikgeschichte in Bildern, III/3 (Leipzig: VEB Deutscher Verlag für Musik, 1969), 8–12; referenced in Calvin M. Bower, Review of *Hucbald, Guido, and John on Music: Three Medieval Treatises*, translated by Warren Babb; edited, with introduction, by Claude V. Palisca. Music Theory Translation Series III. New Haven: Yale University Press, 1978. *JAMS* vol. 35, no. 1 (Spring 1982): 157–67, 160.

²⁰ See Dolores Pesce, “Guido d’Arezzo, *Ut queant laxis*, and Musical Understanding,” in *Music Education in the Middle Ages and Renaissance*, edited by Russell E. Murray, Jr., Susan Forscher Weiss, and Cynthia J. Cyrus (Bloomington and Indianapolis: Indiana University Press, 2010), 25–36.

absolute function for the modal final.²¹ This study argues for the opposite conclusion: that harmonics-tradition measurements of mode reflect features of Gregorian melody that are primarily accidental and external, whereas *cantus* theory is attuned—however often more intuitively than rationally—to its internal structural process.

That being said, and inasmuch as developments within the *cantus* tradition do result in a “western ecclesiastical system” by the end of the eleventh century, Wiering summarizes it admirably: “The connection of modes and scales is rather weak, but the existence of two pitches with a particular function in each mode, the final and the reciting note, is fundamental.”²²

§2.3 Melodic prototypes and modal qualities of the *oktōēchos*

The *cantus* tradition illustrates, describes, and defines mode not as a kind of scale but as a kind of melody. Its characteristic document is the tonary, the earliest known of which dates to the end of the eighth century.²³ Most tonaries preface each of the eight principal divisions of Gregorian repertoire—each of the eight modes—with a brief melody or two, the primary function of which is not liturgical but pedagogical. These compositions do not appear in the earliest-surviving tonary-fragment, so it remains unclear whether they entered Western tradition with the eight-mode system before A.D. 800, or whether they were adopted sometime afterward.²⁴ Beginning in the ninth century, however, such melodies become commonplace in surviving tonaries and other documents of the *cantus* tradition. Their meaning and function have

²¹ Wiering, “Internal and External Views,” 90; *The Language of the Modes*, 71.

²² Wiering, *The Language of the Modes*, 5.

²³ Michel Huglo, *Les tonaires: Inventaire, analyse, comparaison*. Publication de la Société française de musicologie, Ser. III, Vol. II (Paris: Heugel, 1971), 26–29. This earliest tonary classifies chants for the Mass, further evidence that the eight modes were more than a practical system for matching Office antiphons with recitation-tones; see also §1.3 above.

²⁴ Terence Bailey, *The Intonation Formulas of Western Chant* (Toronto: Pontifical Institute of Mediaeval Studies, 1974), 7–8.

long puzzled modern scholars. Sometimes called “intonation formulas,” sometimes “type-melodies,” they are, it shall be argued here, not only typical melodies *in* the modes but melodic prototypes *of* the modes.

The paradigmatic antiphons that begin to appear in western sources in the ninth century have non-latinate vocables for texts, such as “Noanoeane” for Mode 1 and “Noeagis” for Mode 2. Aurelian says he asked a Greek to translate these into Latin; his informant replied that among his people they were considered untranslatable cries of joy: upon further reflection the Greek added that “In our language they are perceived as similar to what those driving [animals at] the plough, or otherwise what those running messages and calling out a make-way, are wont to let out”—but only their cheerful varieties—and also that they were perceived to “contain within them the *modulatio* of the modes.”²⁵

Aurelian would not have to travel far to find a Greek speaker to consult: visitors from the Eastern Empire were plentiful and influential in his post-Carolingian milieu. Modern scholars agree with Aurelian’s sense that these melodies were adapted from Byzantine practice, although the Byzantine manuscript tradition does not bear witness to them until some centuries later.²⁶ Thus Aurelian’s treatise and the treatises attached to the Metz tonary are the earliest extant

²⁵ “Etenim quendam interrogavi Grecum: ‘In Latina quid interpretarentur lingua?’ Respondit se nihil interpretari sed esse apud eos letantis adverbium... Memoratus denique adiunxit Grecus huiusmodi, inquiens: Nostra in lingua videntur habere consimilitudinem qualem arantes sive angarias minantes exprimere solent, excepto quod haec letantis tantummodo sit vox nihilque aliud exprimentis; estque tonorum in se continens modulationem.” *Aureliani Reomensis Musica Disciplina*, ed. Lawrence Gushee (CSM 21, 1975), 84; translation mine, cf. Joseph Ponte, *Aurelian of Reóme: The Discipline of Music (Musica Disciplina)* Colorado College Music Press Translations 3 (Colorado Springs: Colorado College Music Press, 1968), 25; cf. also Bailey, *The Intonation Formulas*, 20. On *modulatio* see §1.3 above.

²⁶ Bailey, *The Intonation Formulas*, 13.

evidence of these melodies in any tradition, Eastern or Western.²⁷ **Example 2.1** reproduces Terence Bailey's comparison of later Byzantine formulas (*ēchēmata*) in the left-hand column with Western formulas transcribed in the right-hand column, the latter from the *Commemoratio brevis de tonis et psalmis modulandis* (Brief Remembrance on Modes and Psalms Melodic).²⁸ This anonymous monastic treatise, dating from the end of the ninth century or beginning of the tenth, is the earliest to record the eight *Noanoeane* in pitch-specific notation. As in a tonary, the *Commemoratio brevis* places each of these as the first example for its respective mode.²⁹

²⁷ Bailey, *The Intonation Formulas*, 5, 7; Walther Lipphardt, *Der Karolingische Tonar von Metz* (Münster Westfalen: Liturgiewissenschaftliche Quellen und Forschungen 43, 1965), 12–13, 21, 32–33, 36, 40–42, 49, 62. The entire manuscript containing the Metz tonary is now online at <http://bm.mairie-metz.fr/clientbookline/Mediatheque/oeb/ms351/index.htm>; material relating to the tonary begins on the page indexed there as 134.

²⁸ Terence Bailey, *Commemoratio brevis de tonis et psalmis modulandis*, Introduction, Critical Edition, Translation (Ottawa: University of Ottawa Press, 1979); Hans Schmid, ed. *Musica et scolica enchiriadis una cum aliquibus tractatulis adiunctis* (Munich: Verlag der Bayerischen Akademie der Wissenschaften, 1981), 157–178.

²⁹ Bailey, *Commemoratio brevis*, 30–45; Schmid, *Musica et scolica*, 158–162.

Example 2.1 Byzantine Intonation Formulas and Western Melodic Prototypes³⁰

Protos
a - na - ne - a - nes

Plagios Protos
a - ne - a - nes

Deuterios
ne - a - nes

Plagios Deuterios
ne - e - a - nes

Tritos
a - ne - e - e - a - ne - e - e - e - es

Barys
a - a - nes

Tetrardos
a - a - a - gi - a

Plagios Tetrardos
ne - a - gi - e

Mode 1
no - a - no - e - a - ne

Mode 2
no - e - a - is

Mode 3
no - e - a - no - e - a - ne

Mode 4
no - e - a - is

Mode 5
no - e - a - ne

Mode 6
an - ne

Mode 7
no - e - a - ne

Mode 8
no - e - a - gi

Important distinctions are to be observed between the Western melodies and their Byzantine counterparts. Each Byzantine formula begins on a different note of the *D*-to-*d* octave, and each returns to that same starting-note at the end (Plagios Protos *D*, Plagios Deuterios *E*, Barys *F*, Plagios Tetrardos *G*, Protos *a*, Deuterios $\flat$, Tritos *c*, Tetrardos *d*). Thus the Byzantine melodies match well the description “intonation formula,” for each prepares a beginning note in

³⁰ Bailey, *The Intonation Formulas*, 12.

its intervallic context. The *Commemoratio brevis* melodies, on the other hand, begin with the corresponding notes of the Byzantine formulas but do not necessarily end there; the Western antiphons end on the modal final. Furthermore, each emphasizes the melodic tone that functions as *tenor* in the recitation tones of its mode, whether as first note (Modes 1, 5, and 7), as highest note (Modes 1, 3, 4, 6, 7, and 8) or with a widening of the vowel creating what I call a *timbral accent*: the modern trumpeter imitates this effect with the onomatopoeically named wah-wah mute (Modes 2 and 3: “e” to “a”; Modes 4, 7, and 8: “no” to “e”). The Western formulas do more than suggest the proper intonation to begin singing: they demonstrate where and how each mode sustains its own particular voice, where it falls to rest, and how it proceeds toward that ultimate goal.

These are the modes in a nutshell.

For not only are these Western formulas so concise that each completes its modal trek to the final in a single phrase, not only do they stand as the core text of early *cantus*-tradition modal pedagogy, and not only are they meant in that tradition to represent the modes in the heart of the student, they also describe melodic motion within a tightly circumscribed modal nucleus.³¹ These melodies of the *Commemoratio brevis* vary in intervallic range from a mere third, in the formula for Mode 6, to a sixth for that of modes 3 and 5; none spans the octave. Even within this melodic core some notes are skipped over (*F* in Mode 3, *b*/^h in Mode 7), suggesting a pentatonic rather than diatonic basis for the modes thus demonstrated.³²

The syllables are also closely circumscribed. The western formulas begin consistently with “No-,” rarely “Na-” and occasionally “A(n)”;

³¹ See Dolores Pesce, *The Affinities and Medieval Transposition* (Bloomington and Indianapolis: Indiana University Press, 1987), 5 *et passim*; also Jacques Chailley, “Du pentatonisme à l’octoéchos,” *Études grégoriennes* XIX (1980), 165–84.

³² See Chailley, “Du pentatonisme.”

penultimate, often prefaced by “(n)o-(n)e,” and usually moving in authentic modes to the final syllable “ne.” For the plagal modes the vowel of the final syllable is usually “i” sometimes preceded by “g” and sometimes followed by “s”; these consonants appear in no other position. “N” appears anywhere but the close. Vowels are a, e, i (sometimes spelled y), and o; diphthongs are not employed.³³ These vocable patterns may be seen as a step towards solmization, but solmization they are not. They help the melodic prototypes isolate the eight species of Gregorian melody from their normal liturgical and text-bearing functions, but they do not abstract individual notes from within that melodic flow. Rather than analyzing mode into constituent parts, these melodies encapsulate the basic shape of the whole.

Variation within the manuscript record testifies to the character and function of these melodies as holistic modal prototypes. **Example 2.2** reproduces Bailey’s comparative edition of the Mode-8 formula, eleven variants for an antiphon of only four to nine notes.³⁴ As a group, these have little in common in terms of individual melodic motions, and in terms of the gamut, not a single pitch. All are circumscribed within a diatessaron (perfect fourth), which in most cases reaches down from *c* to *G*, but in Variant 3 this span is from *F* to *C*. Most versions begin on the lowest note of this limited range, but Variant 9 begins on the step above, and Variant 11 starts at the top of the span. Some versions fill the space between these two notes with deuterus ♮ or *E* at the ditone (major third) over the final, whereas others leave that space empty. No immediate motion is common to all eleven variants except the whole-tone descent to the final.

³³ Bailey, *The Intonation Formulas*, 48–57.

³⁴ Bailey, *The Intonation Formulas*, 57; see 91–95 for sources of variants 1–10 and their dating ([late ninth or] tenth to eleventh century); 28 for the twelfth-century source of variant 11.

Example 2.2 Variants of the Mode-8 “Noeagi(s)”³⁵

1. AUR, BET, GAL, MAI, MON, NON, REI, RIP, TOI
No- e- a- gis

2. COM, ENC, LIE, MAG
No- e- a- (g)is

3. EIN
No- e- a- gi

4. ODO
No- e- a- is

5. BEB, REL
No- e- a- is

6. REB
No- e- a- is

7. WIN¹
No- e- a- gis

8. EM1
No- e- a- is

9. MAZ, MA3
No- e- a- gis

10. CAS
No- e- a- is

11. Paris, Bibliothèque Nationale MS lat. 7185²
No- e- a- gis

³⁵ Bailey, *The Intonation Formulas*, 57.

Yet for all their variation in surface detail, these are remarkably uniform in terms of the audible trajectory of the melody as a whole. Each progresses—usually after an initial ascent—from a tone of tritus quality (*F* in variant number 3, otherwise *c*) down the diatessaron, passing through an intermediate degree (*D* in variant number 3, otherwise *a*) situated a whole tone above the tetrardus final. With the prototype-antiphon of each of the other modes the manuscript record displays similar variety of detail and no less unity of overall shape, of Gestalt.³⁶

For the *cantus* tradition judges modal identity not by the quantitative measure of the scale on which melody travels but by the qualitative measure of the journey itself, which in turn chiefly depends on the quality of final destination. This qualitative orientation is reflected in the early theoretical notation of *cantus*-tradition sources: much of Example 2.2 is transcribed from a pre-Guidonian system in which each melodic note is identified as an avatar of one or another of the four modal qualities protus, deuterus, tritus, and tetrardus. The *Musica enchiriadis* introduces this “dasian” notation (its symbols recalling the *daseia*, indicator of the “h” sound in Greek) with the following explanation:

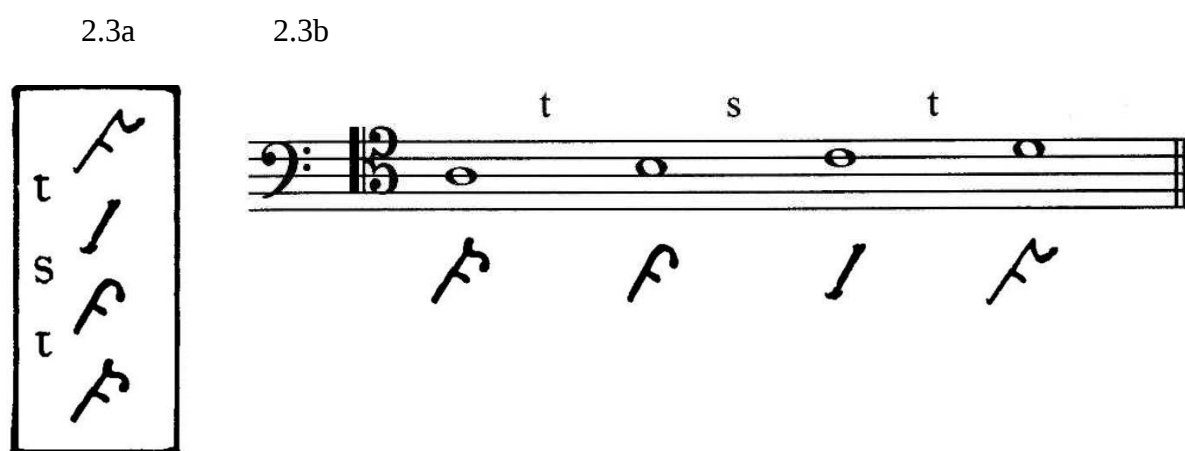
Not just any pitches [*soni*] are called tuned pitches [*ptongi*], however, but those that, by virtue of rule-governed distances between them, are suitable for melody. Of these a certain order thus both in going higher and lower is naturally extended, so that always four, and four of the same arrangement, follow one another. And the individuals of these four are correspondents each so dissimilar [literally: so diversely dissimilar among themselves] that not only do they differ in height and depth, but in that very height and depth each has by its own nature a distinguishing quality, which in turn for each of these the calculable distance from one to another above and below is determining.³⁷

³⁶ See Bailey, *The Intonation Formulas*, 48–56.

³⁷ “Ptongi autem non quicumque dicuntur soni, sed qui legitimis ab invicem spaciis melo sunt apti. Eorum quidem sic et intendendo et remittendo naturaliter ordo continuatur, ut semper quattuor et quattuor eiusdem conditionis sese consequantur. At singuli horum quattuor sic sunt competenti inter se diversitate dissimiles, ut non solum acumine differant et gravitate, sed in ipso acumine et gravitate propriam naturalitatis suae habeant qualitatem, quam rursus his singulis raturum ab invicem acuminis et laxionis spacium format.” Schmid, *Musica et scolica*, 3–4.

The treatise then gives dasian notation and intervallic analysis of this tetrachordal arrangement in a vertical diagram represented here in Example 2.3. At left, 2.3a shows the figure as it appears in Schmid's critical edition from medieval sources;³⁸ 2.3b shows two of the theoretically limitless number of possible realizations in specific tones of this abstract intervallic arrangement: *D* to *G* (bass clef), and *a* to *d* (tenor clef).

Example 2.3 *Musica enchiriadis*: the modal tetrachord



The treatise explains:

The first and lowest is called in Greek *protos*, or *archoos*; the second *deuterus*, a whole-tone distant from the protus; third the *tritus*, a semitone distant from the deuterus; fourth *tetrardus*, a whole-tone distant from the tritus. By a continuous multiplying of these an infinitude of pitches is woven, even so long as tetrachord

Translation mine, cf. James McKinnon's in *Strunk's Source Readings in Music History, Revised Edition*, Leo Treitler, general editor (New York: Norton & Company, 1998), 189–90; also that of Raymond Erickson in his *Musica enchiriadis and Scolica enchiriadis*, edited by Claude V. Palisca (New Haven: Yale University Press, 1995), 1–2. Both Erickson and McKinnon—as if unable to reconcile modal quality defined through any unit short of the octave—interpret the four tetrachordal pitches treated here as the four tetrachords of varying registers introduced only later; the same error infects the otherwise excellent introduction to the notation given by David Hiley, *Western Plainchant*, 393–94.

³⁸ Schmid, *Musica et scolica*, 4.

is followed by tetrachord of the same arrangement, until either ascending or descending they run out altogether.³⁹

Here the *Musica enchiriadis* borrows ‘tone’ and ‘semitone’ from the harmonics tradition to give a rational account of sounding qualities perceived intuitively. Much as modern children can learn to recognize by ear the chord qualities major, minor, diminished, and augmented, so those trained in the *cantus* tradition recognize the tonal qualities protus, deuterus, tritus, and tetrardus. It is a separate task to analyze the constitutive intervallic relationships that together render those emergent qualities.

The treatise illustrates the “continuous multiplying” of this tetrachord with a figure reproduced here as 2.4a.⁴⁰ This shows the arrangement of tonal qualities replicating itself as if without limit in the descending direction. The treatise explains:

For, as this little example shows, whether upward or downward you lead the pitches in series until the voice fails, such as it were [hereditary or official] succession of tetrachords shall not cease. The potency of these four sounds, furthermore, begets dominion over the eight modes, as will be discussed later in its proper place. By their companionable diversity all harmony is united.⁴¹

Only after thus examining the modal tetrachord in isolation and in the abstract, after thus demonstrating the ability of this tetrachord to replicate itself in an unbounded registral

³⁹ “Primus qui et gravissimus Grece protos dicitur, vel archoos; Secundus deuterus, tono distans a proto; Tertius tritos, semitonio distans a deuterio; Quartus tetrardus, tono distans a trito. Horum continua multiplicatione sonorum infinitas textitur, et tamdiu quaternis quaterni eiusdem conditionis succedunt, donec vel ascendendo vel descendendo deficiant.” Schmid, *Musica et scolica*, 4; cf. *Source Readings*, 190; cf. Erickson, *Musica enchiriadis*, 2.

⁴⁰ Schmid, *Musica et scolica*, 5.

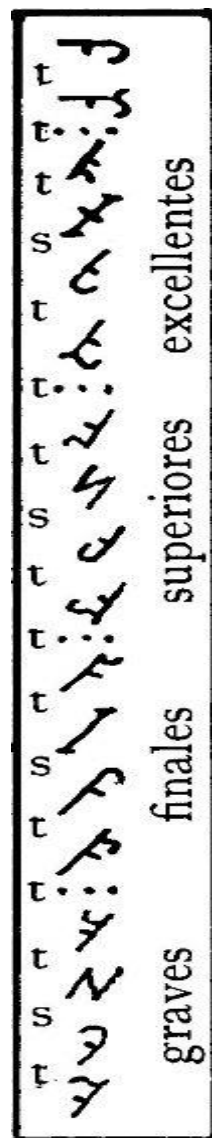
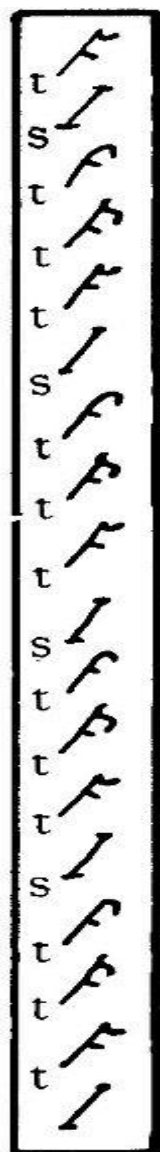
⁴¹ “Ut enim haec descriptiuncula ostendit, sive sursum sive iusum sonos in ordine ducas usque in defectum vocis, huiusmodi velut tetrachordarum successio non cessabit. Horum etiam quattuor sonorum virtus octo modorum potestatem creat, ut postea suo loco dicetur. Horum sociali diversitate toto adunatur armonia.” Schmid, *Musica et scolica*, 5; cf. *Source Readings*, 190; cf. Erickson, *Musica enchiriadis*, 2–3.

continuum, and only after intimating with a seeming paradox the four constituent tonal qualities as governors of mode and unifying forces of harmony, only then does the *Musica enchiriadis* introduce a concrete and specific system by which melodies of the repertoire may be notated for purposes of further investigation. That system is reproduced here as Example 2.4b and transcribed in 2.4c. Its non-diatonic disposition, with augmented octaves between what are here transcribed as low B-flat and $\flat$, between F and f -sharp, and above middle c , has puzzled harmonics-trained readers for centuries. What kind of scales are these? The answer, it should be clear by now, is that these are not scales at all in what has become the usual sense. The pitches of this system do not divide the octave as in harmonics teaching, but extend through higher and lower registers the *cantus*-tradition modal tetrachord.

Example 2.4 *Musica enchiriadis*: multiplication of the modal tetrachord

2.4a Abstract replication

2.4b Registral differentiation



2.4c The latter transcribed



Here symbols previously assigned to the basic abstract tetrachord appear without alteration as the second-lowest tetrachord, that of the finals. These are so called “because all melody must finish in one or another of these four.”⁴² They have harmonic value as well as melodic function: melody of each *maneria* is not only “ended by its own pitch,” but also “governed” by it.⁴³ The *protus*, *deuterus*, *tritus*, and *tetrardus* signs correspond respectively to the *D*, *E*, *F*, and *G* of Guidonian notation as in the transcription above, but are endowed as if by nature with modal identity as well as relative position. The same symbols appear again in the *graves* below and the *superiores* and *excellentes* above, but reversed or rotated to differentiate register. Thus in dasian notation every pitch is identified primarily by tonal quality, and by position only secondarily.

Such modal clarity is sacrificed in the alphabetical notation of the c. 1000 *Dialogus de musica* once attributed to Odo of Cluny, which in turn forms the basis for Guido’s staff notation and our own.⁴⁴ Nor was this sacrifice made unconsciously: as if to make up for a deficiency in the system itself, both the *Dialogus* and Guido’s *Prologue to his Antiphoner* include a figure assigning modal quality to each letter-named tone.⁴⁵ **Example 2.5** gives the lower part of Guido’s version. It puts alphabetical symbols in scalar order, with roman numerals above and below indicating the *maneria* governed by each: *I* rules and has the quality of Modes 7 and 8 (*tetrardus*), *A* Modes 1 and 2 (*protus*), *B* Modes 3 and 4 (*deuterus*), etc.⁴⁶ This fourfold modal

⁴² “Terminales sive finales dicuntur, quia in unum aliquem ex his quattuor melos omne finiri necesse est.” Schmid, *Musica et scolica*, 7.

⁴³ “Sui sono ... regitur et finitur.” Schmid, *Musica et scolica*, 7–8.

⁴⁴ GS I:251–64; sections translated in *Source Readings*, 198–210; TML ODODIA TEXT www.chmtl.indiana.edu/tml/9th-11th/ODODIA_TEXT.html (accessed October 12, 2013).

⁴⁵ Dolores Pesce, *Guido D’Arezzo’s Regule Rithmice, Prologus in Antiphonarium, and Epistola ad Michaelem: A Critical Text and Translation* (Ottawa: The Institute of Mediaeval Music, 1999), 430–31; *Source Readings*, 211–14.

⁴⁶ Pesce, *Guido’s Regule*, 430; *Source Readings*, 213.

identity of the individual note, which Guido calls *modus vocum* and rationalizes in terms of tones and semitones, is an important consideration for him as for the *Dialogus* author.⁴⁷ Since it is not preserved in the alphabetic notation itself, however, this sense of tetrachordal modal identity is destined to fade away over subsequent ages. As with any new technology, the *Dialogus* gamut brings loss along with profit.

Example 2.5 Guido of Arezzo: Modal qualities of individual tones (*modi vocum*)

VII	I	III	V	I	III	V	VII	I	III	V	I
<i>Γ</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>a</i>	♮	<i>c</i>	<i>d</i>
VIII	II	IV	VI	II	IV	VI	VIII	II	IV	VI	II

The *Dialogus* takes a crucial step in the articulation of *cantus*-tradition modal theory by defining mode—*tonus* or *modus*—as “the measurement that makes distinction of all song in its ending.”⁴⁸ “Quoted or paraphrased, this has probably been the most popular definition of mode.”⁴⁹ This “*omnis cantus* definition,” as Wiering calls it,⁵⁰ formalizes the discernments of earlier writers, however. We have just seen that the *Musica enchiridis* recognizes the final as

⁴⁷ *Guidonis Micrologus*, ed. J. Smits van Waesberghe, CSM 4 (1955), 117–18; Babb, *Hucbald, Guido, and John*, 63; see Pesce, *The Affinities*, 12–13, 18–22.

⁴⁸ “Tonus vel modus est regula, quae de omni cantu in fine dijudicat.” Note that it is really “the measurement,” not “a measurement”: mode (as a general principle) measures all or every song; any specific measurement (one mode or another) would render distinction only of those it matches. The *Dialogus* very clearly separates this formal definition of mode as a genus (GS I:257, cf. *Source Readings*, 207) from description of the number and kinds of species, that is, the eight modes, which comes later in the treatise (GS I:258–9, tr. in *Source Readings*, 208–09); it also differentiates between the ending (*finis*) of song in general and the specific final note (*finalis*) of specific song. (On genus and species, see §2.4 below.) Oliver Strunk’s 1950 translation, “A tone, or mode, is a rule which classes every melody according to its final” (*Source Readings*, 1st ed., 113) mistakes definition for description, and genus for species; subsequent translations reproduce the same errors. Cf. Powers et al., “Mode” §I/3; Wiering, “Internal and External Views,” 91; *The Language of the Modes*, 5; Atkinson, *The Critical Nexus*, 214, etc.

⁴⁹ Wiering, “Internal and External Views,” 91; *The Language of the Modes*, 5.

⁵⁰ *Ibid.*

modal governor.⁵¹ Similarly, the universality of the eight-mode system is already attested in the treatise attached to the Metz tonary⁵² as well as by Aurelian, who relates the following historical anecdote to his patron, a descendant of Charlemagne:

Since there were no few cantors who asserted that some antiphons existed which could be fitted to the measure of none [of the eight modes], therefore Charles, your worship's God-fearing majestic ancestor and father of the whole world, ordered them to increase by four, of which the added vocables are preserved here below:

ANANNO NOEANE NONANNOEANE NOEANE

Even because the Greeks were boasting that by their native ingenuity they had determined the modes to be eight, he wished to increase their number to twelve.⁵³

The Emperor's plan backfires. Not to be outdone by the Latins, the Greeks invent four new modes of their own, the vocables of which Aurelian likewise records:

NENOTENEANO NOEANO ANNO ANNES

Which modes, although it may be, have been invented in modern times by Latins as well as Greeks to have unusual syllabic signatures, nevertheless *modulatio* always reverts to the previous eight of them. And just as in grammatical discipline no one can overtop the eight parts [of speech] so that he lays on further parts, neither has anyone power to increase the quantity of modes; for unless someone were to create a *modulatio* of altogether alien genus, he could not render modes in greater abundance.⁵⁴

⁵¹ See fn. 43 above.

⁵² See §1.3 above.

⁵³ "Extitere etenim nonnulli cantores qui quasdam esse antiphonas quae nulle earum regulae possent aptari asserverunt; unde pius augustus avus vester Carolus paterque totius orbis iiii augere iussit quorum hic vocabula subter tenentur inserta: ANANNO [etc.] Et quia gloriabantur Greci suo se ingenio octo indeptos esse tonos, maluit ille duodenarium adimplere numerum." *Aureliani Disciplina*, 82; cf. Ponte, *The Discipline*, 24.

⁵⁴ "Qui tamen toni modernis temporibus inventi tam Latinorum quam Grecorum licet litteraturam inequalem habeant, tamen semper ad priores octo eorum revertitur modulatio. Et sicuti quit nemo viii partes grammaticae adimplere disciplinae ut ampliores addat partes, ita ne quisquam tonorum valet ampliare magnitudinem; quia nisi quis alterius fecerit generis modulationem prorsus nec

Neither the command of the most powerful man on earth nor the cleverness of the most expert liturgical musicians could do so, “for up to and through such time these were devised, the entire ecclesiastical repertory, Roman as well as Greek, in antiphons, responsories, offertories, communions [etc.] had run their course through these earlier modes.”⁵⁵

Aurelian’s exercise in the history of music theory shows that relations between Eastern and Western empires were uneasy even at their best. During the eleventh century, which saw the severance of already-weakened ecclesiastical and political ties with Byzantium, Western musicians supplemented the antiphons sung to the Greek-inspired *Noanoeane* vocables with similar melodies that were settings of Latin texts. Based on familiar passages from the New Testament, these also appear in tonaries at the head of each modal division. After a period of co-existence which lasted into the twelfth century,⁵⁶ the *Noanoeane* fell into disuse;⁵⁷ the Latin formulas continued to circulate into the fifteenth century. The pedagogical advantage of these, besides familiarity of idiom, is the opening word of each being the numeral of the mode thus realized in prototype. Example 2.6 reproduces the most widespread set of these as given in the c. 1100 music-treatise of Johannes.⁵⁸ Here are the texts of the first four, along with the scriptures referenced and their translations in the King James Bible. *Primum* *querite regnum dei*: Seek ye first the Kingdom of God (Matthew 6:33); *Secundum* *autem simile est huic*: And the second

tonorum poterit maiorem reddere magnitudinem.” *Aureliani Disciplina*, 82–83; cf. Ponte, *The Discipline*, 24.

⁵⁵ “Cum usque ad hoc tempus quo hi reperti sunt, omnis ordo tam Romane quam Grece ecclesiae in antiphonis, responsoriis, offerendis, communionibus per hos priores decucurrerit tonos.” *Aureliani Disciplina*, 83; cf. Ponte, *The Discipline*, 24.

⁵⁶ See for example Huglo, *Les tonaires*, plate IV: photograph of page from the c. 1122 *Liber magistri* (Book of the Master), Piacenza Biblioteca Capitolare C. 65, wherein Mode 2 is represented by both the more recent Latin formula and the earlier “Noeagis.”

⁵⁷ Bailey, *The Intonation Formulas*, 39–40.

⁵⁸ *Johannis Affligemensis, De Musica cum Tonario*, ed. Joseph Smits van Waesberghe. CSM 1 (1950); transl. Babb, *Hucbald, Guido, and John*. For more on this treatise and its author, see §2.6 below.

[commandment] is like [the first] (Mark 12:31); *Tertia dies est quod haec facta sunt*: Today is the third day since these things were done (Luke 24:21); and *Quarta vigilia venit ad eos*: The fourth watch of the night he cometh unto them (Mark 6:48).

Some localities developed other sets of Latin-texted prototypes, notably the Saint-Gall group beginning *Primum mandatum amor dei est* (“The first commandment is the love of God”), which is included in Hartker’s tonary.⁵⁹ Another set of Latin formulas with texts less colorful and more abstract are the *Ecce modus primus* exercises which the student performs for the master in *Scolica enchiriadis*.⁶⁰ These translate as “presenting Mode 1; presenting Mode 2,” etc. The treatise assumes such familiarity with these formulas that it does not bother to notate them.

Example 2.6 includes yet another set of pedagogical formulae, appended here to the *Primum querite* melodies (as was customary in tonaries with the *Noanoeane* melodies also) in the form of post-cadential melismas. These *neumae*, as they were called, were incorporated into the liturgy itself as *caudae* (codas), “special prolongations” of the final antiphon of the Benedictus at Lauds, of the Magnificat at Vespers, etc., on solemn occasions.⁶¹ *Neuma*, a loan-word from Greek, is literally ‘gesture,’ thus in chant a melodic figure, the melodic setting of a single syllable, a complete melodic phrase or air, and hence (by the twelfth century) the visual notation of any or all of the above. “Confused and amalgamated” with *pneuma*, ‘breath,’⁶² these modal airs came to mean all that and more: “In time they seem to have acquired an almost mystical significance, as representations of the ‘breath’ of the Holy Spirit.”⁶³ In the thirteenth

⁵⁹ PM II/I, 1–4, 193, 195–202, 456–458; Huglo, *Les tonaires*, 234–35, 240, 247.

⁶⁰ Schmid, *Musica et scolica*, 79; Erickson, *Musica enchiriadis*, 46.

⁶¹ Hiley, *Western Plainchant*, 331–33; Bailey, *The Intonation Formulas*, 16.

⁶² David Hiley, “Neuma,” in *Grove Music Online* (accessed November 27, 2013).

⁶³ Hiley, *Western Plainchant*, 333.

and fourteenth centuries they became tenors for polyphonic motets, and in the seventeenth century they were customarily played on the organ.⁶⁴

Example 2.6 *Johannis De Musica: Primum querite antiphons with neumae*⁶⁵

The image displays eight staves of musical notation, each representing an antiphon. The notation uses square neumes on a four-line staff. The Latin text is written below the neumes. The final note of each antiphon is marked with a finalis symbol (a stylized 'F' or 'G') and a letter indicating the final pitch: D, D, E, E, F, F, G, and G respectively.

- <1> Pri-mum que-ri-te re-gnum De-i. D
- <2> Se-cun-dum au-tem si-mi-le est hu-ic. D
- <3> Ter-ti-a di-es est quod haec fa-cta sunt. E
- <4> Quar-ta vi-gi-li-a ve-nit ad e-os. E
- <5> Quin-que pru-den-tes in-tra ve-runt ad nu-pti-as. F
- <6> Sex-ta ho-ra se-dit su-per pu-te-um. F
- <7> Septem sunt Spi-ri-tus an-te tronum De-i. G
- <8> Oc-to sunt be-a-ti-tu-di-nes. G

As with the *Noanoeane* group, the Latin melodic formulas and the *neumae* generally emphasize the tenor of the corresponding recitation tones before moving through a modal

⁶⁴ Huglo, *Les tonaires*, 389.

⁶⁵ *Johannis De Musica*, 86; cf. Babb, *Hucbald, Guido, and John*, 120–21.

nucleus—here somewhat expanded—to the final. Only the melodies of Mode 4 (deuterus plagal) deviate from this rule by emphasizing the third-degree *G* above the *E* final, rather than the fourth-degree *a* that functions as the reciting note for Mode 4 in modern liturgical books. Recitation on the third degree in Mode 4 is notable in some of the oldest chants of the repertoire, for example in the Antiphon of the Easter Introit *Resurrexi*.⁶⁶ In the same liturgy, however, we find another Mode-4 chant, the Offertory *Terra tremuit*, with clear emphasis on the fourth degree.⁶⁷ Both deuterus modes, the authentic (Mode 3) and its plagal (Mode 4) exhibit a flexibility of reciting note, with the tendency for the higher note to be favored in later centuries.

Also as with the *Noanoeane* melodies, the tone above the tenor—if included at all—clearly functions as an upper neighbor, such as the *d* above the reciting-tone *c* of the Mode-3 *neuma*. This is the only *neuma* that spans an octave. Of the Latin antiphons—measuring from the beginning of the melody to the initial note of the last text-syllable, invariably the modal final approached by descending step—none reaches farther than a minor seventh. Among the combinations of Latin antiphon with post-cadential *neuma*, only those of Modes 1, 3, and 8 fill out the octave, and only in the case of Mode 8 does this octave conform to the octave prescribed for it (*D–d*) in the harmonics tradition.

For rather than reflecting ancient Greek harmonic theory, the *Noanoeane*, *Primum querite*, and *neuma* prototypes represent a western adaptation of the *oktōēchos* (“sound divided into eight categories”),⁶⁸ a musical theory and practice that originated in seventh-century Palestine—probably in Jerusalem—and which was quickly adopted and subsequently retained in

⁶⁶ Cf. LU 777–78.

⁶⁷ Cf. LU 780.

⁶⁸ Peter Jeffery, “The Earliest Oktōēchoi: The Role of Jerusalem and Palestine in the Beginnings of Modal Ordering,” in *The Study of Medieval Chant: Paths and Bridges, East and West, in Honor of Kenneth Levy*, edited by Peter Jeffery (Rochester, NY: The Boydell Press, 2001), 148 fn.

“Latin, Byzantine, Slavonic, Syrian, Armenian, and Georgian repertoires” of Christian liturgical chant.⁶⁹ Among the Latin traditions, only Gregorian chant adopted this system, doubtless from Byzantine sources: hence the Greek-derived terms *protus*, *deuterus*, *tritus*, and *tetrardus* for tonal quality, and *authenticus* and *plagalus* for melodic character. Modern scholarship tends to characterize the system as a Greek and therefore foreign imposition on the Gregorian repertoire.⁷⁰ In its Palestinian origins, however, in its rapid diffusion through Western Asia, the Middle East, and Europe through Greek texts and liturgical practices, and in its tenacity over the course of centuries, the *oktoechos* is analogous to Christianity itself. We should regard its expression in Gregorian chant not as a foreigner, but as a naturalized citizen of the Latin West.

This is not to dispute that the eight-mode system was “[adapted] by Carolingian theorists to an existing body of traditional liturgical song with which it had not originally been associated,” nor does it deny “classification, adaptation, and adjustment” of the repertoire to fit the theoretical system.⁷¹ It does however challenge the hypothesis that the fit between the Gregorian repertoire and the octenary system “is not to be explained as the natural reflection of an inherent homology.”⁷² In the absence of significant homology there could be no musical reason for adopting and maintaining the system in the first place. If the application of the eight-mode system to Gregorian chant was no more than a Carolingian political conspiracy, why then did it not fade away during subsequent regimes, as did the Greek-derived *Noanoeane* texts? The octenary system was in place in the Gregorian repertoire well before there were named pitches, interval theory, or scales attached to it;⁷³ were not these also applied after the fact, and to the

⁶⁹ Jeffery, “Oktōēchos,” in *Grove Music Online* (accessed October 5, 2013).

⁷⁰ Powers, “Tonal Types,” 428, *e.g.*

⁷¹ Powers et al., “Mode” §II/1/ii.

⁷² *Ibid.*

⁷³ Cohen, “Notes, scales, and modes,” 313–14.

same body of liturgical song? Yet modern scholars have no trouble accepting these more recent theoretical impositions as inherent homologues with the chant repertoire.

Because the modal system was applied to the classification of Gregorian melody before diastematic notation, we may never know how the repertoire behaved before the introduction of either.⁷⁴ In any event the eight-mode system fits remarkably well with the Gregorian repertoire as handed down to us in the earliest notated manuscripts, much better than the octave-species principle borrowed from the ancient Greek science of harmonics.

§2.4 Introduction to Aristotelian Division

But to understand and fairly represent what medieval sources have to say requires some account of the broader culture that produced them. This section examines a curiously neglected aspect of the intellectual context and vocabulary of these sources and of music theory in the Latin West generally: the legacy of logic in the tradition of Aristotle. In Chapter One we saw how Hartker adapted the notation of modal logic to the notation of musical mode and *differentia*, for example. Several studies have treated the more subtle Aristotelian vocabulary of late-medieval music theory,⁷⁵ but little attention has been paid to the basic set of logical terms and concepts that inform the discipline throughout its history.⁷⁶ An introduction to those

⁷⁴ Peter Jeffery, *Re-envisioning Past Musical Cultures: Ethnomusicology in the Study of Gregorian Chant* (Chicago: The University of Chicago Press, 1992), 107; but see Jean Claire, “Les répertoires liturgiques latins avant l’octoéchos, I: L’Office ferial romano-franc,” *Etudes grégoriennes* XV (1975), 5–192.

⁷⁵ Recently, for example, John Haines and Patricia DeWitt, “Johannes de Grocheio and Aristotelian Natural Philosophy,” *Early Music History* 27 (2008): 47–98. David E. Cohen lists earlier publications by Gushee, Haas, Tanay, and Yudkin in “‘The Imperfect Seeks Its Perfection’: Harmonic Progression, Directed Motion, and Aristotelian Physics,” *Music Theory Spectrum* 23, vol. 2 (2001), 147 fn.

⁷⁶ A partial exception: “To Carolingian logical and dialectical studies we may probably trace the musical terms *differentia* and *diffinitio* (or *definitio*), which appear during the ninth century in connection with categories of psalm tones or modes ... Each psalm tone ... has several possible

fundamentals, and a brief sketch of their Western reception, demonstrates what it means for the *cantus* tradition to employ as it does the Aristotelian “predicables”—basic tools of definition—that are *genus*, *species*, and *differentia*.

For these are fundamental elements of medieval education, rudiments of the logical discipline taught to youth in monasteries and cathedral schools from the Early Middle Ages onward, and the common study of “all undergraduates in the arts faculties of medieval universities.”⁷⁷ From before the Carolingian period until the twelfth century, however, the Latin West knew little of Aristotle but in translations and commentaries by Boethius and Martianus Capella of a few ancient secondary texts, notably Porphyry’s introduction to the *Categories*; this intellectual foundation became known as the “old logic” after scholars translated into Latin a more complete Aristotelian canon, along with contributions by later Arabic, Greek, Jewish, and Persian philosophers.⁷⁸ Those additional texts and methods then formed the basis of the “new

endings, and each of these is identified as a *differentia* or *diffinitio*. Like the term *modus*, which was a fundamental concept in both music and logic, these two terms could be used for specific subcategories in both fields.” Nancy Phillips, “Music,” in *Medieval Latin: An Introduction and Bibliographical Guide*, ed. F.A.C. Mantello and A.G. Rigg (Washington, DC: Catholic University Press, 1996, repr. 1999), 300. C.W. Brockett, Jr., “*Saeculorum Amen* and *Differentia*: Practical versus Theoretical Tradition” *Musica Disciplina* 30 (1976) quotes Boethius applying ‘differentia’ to mathematical quantity and Cassiodorus in turn applying the quantitative species of ‘differentia’ to musical pitches and intervals, 28, also Odorannus of Sens defining ‘differentia’ in general, 13; Brockett treats the latter as another species of differentia, not recognizing in it the genus that comprehends all. William David Deason, “A Taxonomic Paradigm from Boethius’ *De divisione* Applied to the Eight Modes of Music” (DMA diss., Ohio State University, 1992) treats Aristotelian aspects of the interval-species theory developed by Berno of Reichenau and his followers in the eleventh century; the topic is further treated as part of the history of the same “South-German School” in McCarthy, *Scholasticism and Reform*, 109–46.

⁷⁷ Edward Grant, *God and Reason in the Middle Ages* (Cambridge: Cambridge University Press, 2001), 116.

⁷⁸ See Bernard G. Dod, “Aristoteles latinus,” in *The Cambridge History of Later Medieval Philosophy*, ed. Norman Kretzmann, Anthony Kenny, and Jan Pinborg, 45–79 (Cambridge: Cambridge University Press, 2008).

logic” studied along with the old throughout the first year of university training.⁷⁹ Logic, the *ars artium*, provided a common basis for discussion in every discipline, be it liberal, monastic, or otherwise.

In Aristotle’s logic the *διαφορά* (*diaphora*) is the criterion by which one makes what in Latin is called *divisio*—the separation of *species* within a given *genus*.⁸⁰ For example, ‘terrestrial,’ ‘aquatic,’ and ‘aerial’ establish divisions within the genus ‘animal.’⁸¹ Such an attribute that distinguishes within the genus is called by Latin commentators the *differentia*. Thus we discover in Aristotelian dialectic the model for the organization as well as the terminology of the medieval tonary.

That document, as we have seen, divides the genus ‘melody’ into eight species. The *Commemoratio brevis* makes this explicit: “And so we divide melody into eight modes (*toni*)—for that is what we name them—whose *differentias* and *proprietaes* (properties, characteristics) the ecclesiastic chanter, unless impeded by slow-wittedness, is at fault not to know.”⁸² Here the word *differentias* is employed in the general sense, as distinctive traits that make each species different from its fellows (in this case eight species of melody), not the narrow musical-technical sense, ‘varieties of terminal cadence for a given recitation tone.’ For the latter the

⁷⁹ For the full two-year curriculum in thirteenth-century Paris, see Michel Huglo, “Study of Ancient Sources of Music Theory in the Medieval Universities,” in *Music Theory and Its Sources: Antiquity and the Middle Ages*, ed. André Barbera (University of Notre Dame Press, 1990), 152–54.

⁸⁰ On *divisio* as derived from Aristotle’s *Categories* via Porphyry, see Haines and DeWitt, “Johannes de Grocheio,” 82 fn.; on *genus* and *species* in late-medieval treatises, see *ibid.*, 90; also Jeremy Yudkin, “Notre Dame Theory: A Study of Terminology, Including a New Translation of the Music Treatise of Anonymous IV” (Ph.D. diss., Stanford University, 1984), 60–61.

⁸¹ Robin Smith, “Logic,” in *The Cambridge Companion to Aristotle*, ed. Jonathan Barnes (Cambridge University Press, 1995), 52.

⁸² “Itaque in octo tonos, quos ita nominamus, melodiam diuidimus, quorum differentias et proprietaes ecclesiasticum cantorem, nisi ingenii tarditate obstante, culpabile est ignorare.” Bailey, *Commemoratio brevis*, 28; translation mine.

Commemoratio brevis employs the term *diversitates* (diversities).⁸³ It is Aurelian who first applies the term *differentia* to the *seculorum amen*.⁸⁴ The name stuck, and with good reason: as the prototype-melody provides a model by which to recognize the mode as species of melody, so the *seculorum amen* provides the means to divide each of these eight melodic species into subspecies. (Aristotelian division is a recursive process.)

What we gain from considering the Logical origin and significance of the term *differentia* is the understanding that the *seculorum amen* may not be merely the variant of recitation formula that a number of loosely related antiphons happen to be sung with, but the distinctive trait by which a *species of antiphon* may be distinguished within the mode as a genus. Sometimes there is commonality in the initial notes or melodic gestures of the incipits by which the antiphons are indexed in the tonaries, but just as often there is none. Perhaps modern scholarship has laid too much emphasis on the immediate connection from the end of the recitation tone to the beginning of the closing antiphon, and not enough on the broader agreement between the recitation tone and the whole antiphon for which the incipit acts as a cue. The medieval employment of the Aristotelian term *differentia* for the termination of the recitation tone suggests that such a cadential formula may reflect something about the antiphon's melodic structure, something that might otherwise prove difficult to pin down. The tonary's division of melodic repertoire into subgroups, with *seculorum amen* as *differentia*, puts into practice the Gospel principle of knowing the tree by its fruit.⁸⁵

⁸³ Bailey, *Commemoratio brevis*, 56, 109.

⁸⁴ Brockett, "Saeculorum amen and Differentia," 28; see *Aureliani Musica*, 87, 89, 103, 113, 120–21, 126; Ponte, *The Discipline*, 27–28, 36, 42, 47–48, 52.

⁸⁵ Matthew 7:15–20.

§2.5 Epistemology of the *cantus* tradition

With these Aristotelian tools in hand we can more easily differentiate between harmonics and *cantus* concerns and doctrines, thus avoiding the false assumption of harmonics-tradition meaning in *cantus*-tradition discourse. Where the *Musica enchiriadis* defines mode, for example, it makes reference to the ancient Greek *tonoi*, but in such a way as to make clear—if we read the Latin properly—that these belong to a genus alien to that of plainchant:

Modes or tropes are species of *modulationes*, of which was spoken above, such as protus authentic or (*vel*) plagal, deuterus authentic or (*vel*) plagal; otherwise (*sive*) Dorian mode, Phrygian, Lydian, etc., the names of which are derived from those of tribes.⁸⁶

Here four plainchant-modes are separated from three *tonoi* by the conjunction *sive*, which expresses exclusion—unlike the inclusive *vel* that connects authentic with plagals. Thus protus authentic and Dorian are not being compared or equated. Rather, each happens to be the first example of its respective genus: protus authentic illustrating definition 1 (plainchant mode), Dorian definition 2 (ancient Greek *tonos*). Here the modes of *cantus* theory with which the treatise is chiefly concerned, and the *tonoi* of the harmonics theory from which it derives names and mathematical descriptions for select intervals, are related by terminology but otherwise incomparable, like apples and oranges. Perhaps careless reading of this passage led the principal author of *Alia musica* to posit correspondences between authentic protus and Dorian, between authentic deuterus and Phrygian, etc., that did not exist in Greek theory, in the treatise of Boethius, nor in the plain language of the *Musica enchiriadis*.

⁸⁶ “Modi vel tropi sunt species modulationum, de quibus supra dictum est, ut protos autentus vel plagis, deuterus autentus vel plagis, sive modus Dorius, Frigius, Lidius, et ceteri, qui ex gentium vocabulis sortiti sunt nomina.” Schmidt, *Musica et Scolica*, 22; cf. Erickson, *Musica enchiriadis*, 12 [inclusive *vel* and exclusive *sive* both rendered simply “or”].

For the eight *tonoi* of Boethius and the eight modes of liturgical chant are not simply different approaches to the same problem but answers to different species of inquiry. The first, based on instrumental practice, seeks in mathematics a rational basis for the pitches through which melody flows. The second, based on vocal practice, describes the shape and character of the movement itself.

The *cantus* tradition offers guidance that is exemplary rather than prescriptive. Hucbald teaches in the *cantus* tradition, for example, when he defines melodic intervals in terms of motion within the Antiphon *Missus est gabriel* and other chants of the repertoire.⁸⁷ Here no mathematical definition is offered, but an appeal to the ear familiar with the given melody. We participate in this tradition when we teach beginning students that the ascending octave is the first interval of “Somewhere over the Rainbow.”

That particular motion is not employed in Gregorian chant, however. The intervals recognized in the *cantus* tradition are those through which the voice moves from one note to the next in chant melody, and the octave is not among them. Hucbald illustrates and lists nine melodic intervals: first semitone, then tone; thereafter he combines these fundamental categories to obtain larger motions, each a semitone wider than the last (tritone included!), up to four tones with a semitone—a span the size of a major sixth.⁸⁸ Theorists may recognize here an early description of abstract pitch interval (*ip*) conceptually independent of mode, scale, and octave division.⁸⁹ Hucbald goes on to generalize this additive process of interval construction.

“Wherefore if you add tone and semitone, the sound next in position springs forth, unto the ninth

⁸⁷ Chartier, *L'Œuvre musicale d'Hucbald*, 142; cf. Babb, *Hucbald, Guido, and John*, 16–17. See §1.2.

⁸⁸ Chartier, *L'Œuvre musicale d'Hucbald*, 140–47; cf. Babb, *Hucbald, Guido, and John*, 16–19.

⁸⁹ See Joseph N. Straus, *Introduction to Post-Tonal Theory*, 3rd ed. (Englewood Cliffs, NJ: Prentice-Hall, 2005), 8.

pitch,” he writes, a generic summary that French and English translators have imagined as a prescription to add yet another tone-plus-semitone to achieve a tenth interval and pitch, the octave—which term both misleading and misled they import into their translations, here defective.⁹⁰

Hucbald, on the other hand, makes clear he conceives the octave as belonging to a generic category altogether separate. Having already stated that no pitch interval greater than that of the major sixth is found in chant, and that even this span is difficult for the voice to negotiate,⁹¹ he writes:

Now do not think these pitch differences are to be reckoned among the consonances, which are the stuff of musical philosophy. For consonance is one thing and interval another. Consonance indeed is of two sounds the calculable and concordant combination, which shall in no other wise consist except by two sounds mutually raised so that they simultaneously convene upon one *modulatio*, as it is when man’s and boy’s voice sound in like manner, namely indeed in that which they customarily call “organization.”⁹²

Hucbald may intend *modulatio* here only in the sense of ‘harmonic proportion’ (the voices convene on a stable harmonic node, such as fifth or octave), but perhaps also in the sense of

⁹⁰ “Quod si adieceris tonum et semitonium, in nonam uocem mox sonus prosiliet.” Chartier, *L’Œuvre musicale d’Hucbald*, 148, tr. 149; Babb, *Hucbald, Guido, and John*, 19. *Quod si* usually means “thus, in view of which, accordingly,” as in my translation above; the relative pronoun for which Babb mistakes this *quod* would in this context require either the dative *cui* or the preposition *ad*. In Chartier’s French translation, Hucbald’s major sixth mysteriously disappears, its ninth place usurped by an “octave” composed of *ip* 8 conjoint with *ip* 3, that is, *ip* 11—the major seventh.

⁹¹ Chartier, *L’Œuvre musicale d’Hucbald*, 144; cf. Babb, *Hucbald, Guido, and John*, 16–17.

⁹² “Non autem putandum est has uocum discrepantias reputari inter consonantias. De quibus musicae pertractat subtilitas. Aliud est enim consonantia, aliud interuallum. Consonantia siquidem est duorum sonorum, rata et concordabilis permixtio, quae non aliter constabit, nisi duobus altrinsecus editis sonis, in unam simul modulationem conueniant, ut fit, cum uirilis ac puerilis uox pariter sonuerint, uel etiam in eo quod consueute organizationem uocant.” Chartier, *L’Œuvre musicale d’Hucbald*, 148; cf. Babb, *Hucbald, Guido, and John*, 19.

‘melodic progression’ (the voices convene on the same melody): an excellent description of the parallel-organum technique of his time.

Of the genus ‘consonance’ so defined—for which the *Enchiriadis* treatises employ the term *symphonia*—only the diapente and diatessaron belong also to the genus of melodic intervals. Thus for Hucbald, as in the *Enchiriadis* treatises, the octave is a feature of harmony, not of melody. And mode is—again as in the *Enchiriadis* tradition—a melodic process, one oriented toward the final:

Four [notes corresponding to the tetrachord *D–G*] ... are suited for bringing to completion four modes or tropes, which we now call *toni*, that is, protus, deuterus, tritus, tetrardus. Thus each of these four notes rules as its own subjects twin tropes: the principal, which is called authentic, and the subsidiary, which is called plagal ... Thus because no matter how variably hither and thither chant-melody may be driven about, by necessity is it all led back to one or another of these same four. Even for this reason are they called finals, since they take unto themselves all ending of that which is sung.⁹³

The *cantus* tradition emphasizes the melodic function of the final, generally without rumor of octave species—none is found in the *Enchiriadis* treatises, for instance, nor in the works of Guido. Guido does describe the octave-spanning disposition of tones and semitones relative to pitch-classes A–G (omitting *b*, which he finds problematic), but this in a discussion of affinities, similarities of quality shared by pitches with similar surroundings of tone and

⁹³ “Quatuor ... quatuor modis uel tropis, quos nunc tonos dicunt, hoc est, protus, deuterus, tritus, tetrardus, perficiendis aptantur: ita ut singulae earum quatuor chordarum geminos sibi tropos regant subiectos, principalem, qui autentus, et lateralem, qui plagius appellatur ... ita ut ad aliquam ipsarum quatuor quantavis ultra citraque uariabiliter circumacta, necessario omnis, quaecumque fuerit, redigatur cantilena. Unde et eadem finales appellatae, quod finem in ipsis cuncta, quae canuntur, accipiant.” Chartier, *L’Œuvre musicale d’Hucbald*, 200; cf. Babb, *Hucbald, Guido, and John*, 38–39.

semitone.⁹⁴ Guido describes such affinities as incomplete at the diapente and diatessaron, and complete only at the diapason. The expression of this greater affinity is an advantage of the *Dialogus* system over notations that assign each pitch its own sign unrelated to others in the same pitch class, for example the *a-to-p* letter-notation of the Dijon gradual-tonary.⁹⁵ Guido objects to the *Dialogus* system's *b*, however, because it makes *G* sound protus instead of tetrardus, *a* deuterus instead of protus, etc.⁹⁶ Guido's desire, as expressed in Example 2.5 above, is for every note to retain its modal quality as in the dasian notation of the *Enchiriadis* tradition. But the system he adopts from the *Dialogus de musica* makes this impossible.

Like the *Enchiriadis* treatises, the *Dialogus* assigns to only one tetrachord the role of finals: that of *D*, *E*, *F*, and *G*. Guido then makes explicit what may be inferred from the *Dialogus*'s own chart of modal affinities within the gamut: namely that *a*, $\natural$, and *c* may also, by virtue of their affinities to the regular finals, take on that melodic function; Guido prefers such transposition, in fact, to the employment of *b*.⁹⁷ Thus it is not the disturbance of the octave species that Guido objects to in the use of *b*—since affinity is incomplete at the 5th, transposition by that interval, which he recommends, has the same effect. What Guido seeks to avoid is unnecessary change in local tetrachordal quality, which for the *cantus*-trained musician is the primary measure of mode.

This tradition's chief concern is the training of young people to sing the repertoire. Guido follows the *Dialogus* in advocating the use of the monochord, in the harmonics tradition an

⁹⁴ *Guidonis Micrologus*, 117–32; cf. Babb, *Hucbald, Guido, and John*, 63–65; Pesce, *The Affinities*, 18–22.

⁹⁵ PM VII, *Antiphonarium tonale missarum, XIe siècle: Codex H. 159 de la Bibliothèque de l'École de Médecine de Montpellier* (Solesmes: 1901); see Atkinson, *The Critical Nexus*, 162–65.

⁹⁶ *Guidonis Micrologus*, 124–26; cf. Babb, *Hucbald, Guido, and John*, 64–65; Pesce, *The Affinities*, 20–22.

⁹⁷ *Ibid.*

instrument of scientific demonstration, as a means for children to practice singing in tune.⁹⁸ For the documents and practices of the *cantus* tradition reflect the concerns of the practical vocal musician. Its model and *raison d'être* is the flexible and error-prone intonation of the unaccompanied voice in motion, not the stable pitch relationships described by plucked strings as in ancient Greek theory and its extension in the medieval harmonics tradition. The relative positions of pitches in ancient Greek theory are modeled after and named for the arrangement of strings of an instrument—the kithara. Once tuned, the row of strings creates an inflexible set of tones in pitch order: a scale. The unaccompanied voice, however, articulates melodic motions within an infinite spectrum of pitches. It is the motion of the melody that one hears in the voice, a motion whose points of arrival may or may not correspond closely with an inert scale, and which in the chant repertoire certainly does not.

As with voice teachers today, the *cantus* tradition speaks to students in a language that is qualitative rather than quantitative, and informed by analogies with other disciplines. Thus we read in the version of *De octo tonis* attributed to Alcuin:

Tonus is the minimal part of musical measure. Just as the minimal part of grammar is the morpheme (*littera*), and as the minimal part of arithmetic is the unity, even in the same way as discourse arises and is built up from morphemes, or the multiplicative sum of numbers from the unity, even so from the line of pitches and *toni* every chanted melody is modulated.⁹⁹

Note that arithmetic is included in the discussion as an analogue to music, not its justification as in the harmonics tradition. If there seems to be confusion here between *tonus* as a musical pitch

⁹⁸ GS I: 252–53; tr. *Source Readings*, 200–201. Pesce, *Guido's Regule*, 458–61; tr. *Source Readings*, 216. *Guidonis Micrologus*, 91–92; tr. Babb, *Hucbald, Guido, and John*, 59.

⁹⁹ “Tonus est minima pars musicae regulae. Tamen sicut minima pars Grammaticae littera, sic minima pars Arithmeticae unitas: et quomodo litteris oratio, unitatibus acervus multiplicatus numerorum surgit, et erigitur; eo modo et sonorum tonorumque linea omnis cantilena modulatur.” GS I: 26; TML ALCMUS TEXT http://www.chmtl.indiana.edu/tml/6th-8th/ALCMUS_TEXT.html (accessed November 27, 2013).

and *tonus* as a mode then perhaps the confusion is our own, conditioned as we have been by training in the harmonics tradition to seek mode in scale rather than in tonal quality.

Guido further develops the analogy with verbal grammar: as in the final letters or syllables of the Latin word we perceive case and number of noun, person and tense of verb, etc., so with the conclusion of a chant the mode is fully revealed in the final.¹⁰⁰ Guido observes that the notes of a mode “in an amazing way seem to draw a certain semblance of color” from the final toward which they tend; he also notes—and this is typical of the *cantus* tradition—that this observation is “evident to trained musicians only.”¹⁰¹

For the epistemology of the *cantus* tradition is more experiential than rational. Wisdom is gained not by calculation, but by listening through to the end: “For at the beginning of a song, you are ignorant of what may follow; when indeed what shall have passed is concluded, you see.”¹⁰² Modal knowledge in the *cantus* tradition has more the character of revelation than reasoning. The trained musician, says Guido, recognizes the mode of a melody as spontaneously and intuitively as one might recognize the nationality of persons Greek, Spanish, Italian, German, or French.¹⁰³ Thus we learn that mode holds melodies together like glue, that a trained musician recognizes the mode reflexively, and that tonal quality is the basic unit of melody, but we are almost never offered an explanation how so.¹⁰⁴ Mode in the *cantus* tradition is not something to be explained so much as something to be experienced in singing.

¹⁰⁰ *Guidonis Micrologus*, 145; tr. Babb, *Hucbald, Guido, and John*, 67.

¹⁰¹ “Et praemissae voces, quod tantum exercitatis patet, ita ad eam aptantur, ut mirum in modum quandam ab ea coloris faciem ducere videantur.” *Guidonis Micrologus*, 139–40; tr. Babb, *Hucbald, Guido, and John*, 66.

¹⁰² “Incepto enim cantu, quid sequatur, ignoras; finito vero quid praecesserit, vides.” *Guidonis Micrologus*, 144; cf. Babb, *Hucbald, Guido, and John*, 67.

¹⁰³ *Guidonis Micrologus*, 158–59; tr. Babb, *Hucbald, Guido, and John*, 69.

¹⁰⁴ Potiron, “Théoriciens de la modalité,” 31.

The tradition does not lack philosophical richness or musical insight, however. For example, the dialogue between master and disciple that is *Scolica enchiriadis* distinguishes between melodic surface and tonal structure. Having been instructed that the quality of final determines mode, the student seems to suspect a tautology: “Does not the potency therefore of the final pitch alone produce whatever mode, as accounting for the trope or mode this or that pitch may be said to be of, in that the end of the melody settles on it?” To which the teacher replies, “Chiefly a certain power of whichever trope is perceived accounting for whichever final pitch it stands upon, in that the *trope in the act of ending* settles on it.”¹⁰⁵ The final is not merely a melodic stopping point, in other words, but the terminus of a structural process.

The pedagogical technique of *cantus*-tradition theory is based on the singing of chants and the memorization of melodies that function as paradigms of that dynamic process. The *Noanoeane* prototypes were so fundamental to ninth-century pedagogy that they served as prerequisite for instruction in tetrachords, notes, intervals, theoretical notation, even the location of notes on the (pre-Guidonian) hand.¹⁰⁶ Guido, speaking of the later *Primum querite* melodies, employs a metaphor that would resonate with his intended audience of young choristers: comparing a chant to these pedagogical formulas is like comparing the size of a robe to that of the body: which does it fit?¹⁰⁷ Just as important to *cantus*-tradition pedagogy, however, are the liturgical melodies themselves, especially those involving psalmodic recitation. In his discussion

¹⁰⁵ Emphasis mine, implied by parallel structure: “[D.] Ergone solius soni finalis virtus quemlibet modum efficit, ut ob id tropus vel modus illius aut illius soni dicendus sit, quod in eo finis meli constiterit? [M.] Praecipue quidem videtur vis cuiuslibet tropi ob id in quolibet finali sono consistere, quod in eo tropus finiando constiterit.” Schmid, *Musica et scolica*, 82; cf. Erickson, *Musica enchiriadis*, 48, also Pesce, *The Affinities*, 10.

¹⁰⁶ Chartier, *L’Œuvre musicale d’Hucbald*, 168–71, 182–83, 190–97; cf. Babb, *Hucbald, Guido, and John*, 26, 31, 35–37. Schmid, *Musica et scolica*, 14–20, 77–78, 82; cf. Erickson, *Musica enchiriadis*, 8–12, 45–46, 49; Tilden A. Russell, “A Poetic Key to a Pre-Guidonian Palm and the *Echemata*,” *JAMS* 34, no. 1 (Spring 1981), 109–18.

¹⁰⁷ *Guidonis Micrologus*, 150–51; tr. Babb, *Hucbald, Guido, and John*, 68.

of how to recognize modes, Guido says of the pedagogical and formulaic liturgical melodies as a group, “It is a wonder if someone who does not know these understands any part of what is being said here.”¹⁰⁸

As the student progresses through experience toward greater knowledge, so over the course of centuries the *cantus* tradition progresses in discernment. We have seen that *Musica enchiriadis* defines mode in its plural species, as *modulationes*. The *Dialogus* takes the further step of defining mode as a genus: the measurement that makes distinction of all song in its ending. Having derived eight modes from four tetrachordal qualities, and having attested, in agreement with the *Dialogus*, that every song is subject to, and takes its measure from, the mode of its final—to which doctrine he swears an oath, no less—,¹⁰⁹ Guido defines mode not as a song-artifact (*cantus*) but as a singing action (*cantio*): “For *tropus* is a species of chanting, even what is called mode.”¹¹⁰

¹⁰⁸ “Quas qui non novit, mirum est si quam partem horum quae dicuntur, intelligit.” *Guidonis Micrologus*, 154; tr. Babb, *Hucbald, Guido, and John*, 68.

¹⁰⁹ “Iure dicamus quia omnis cantus ei sit modo subiectus et ab eo modo regulam sumat, quem ultimum sonat.” *Guidonis Micrologus*, 145; cf. Babb, *Hucbald, Guido, and John*, 67.

¹¹⁰ “Est autem tropus species cantionis qui et modus dictus est.” *Guidonis Micrologus*, 157; cf. Babb, *Hucbald, Guido, and John*, 69. Babb’s reading here, “‘Trope’ is the aspect of chant which is also called mode” hardly fits the context: here at the end of his Chapter 13 Guido is not switching gears to introduce *tropus* as an aspect hitherto unconsidered: he has been discussing the subject of mode from Chapter 10, wherein he already introduces *tropus* as a synonym for *modus*. Elsewhere in the treatise (116, 123, 144, 197, 233) Guido uses the term ‘species’ always in the proper Aristotelian sense as a differentiated member of a larger set (the genus), never for an ‘aspect’ of a single entity. Immediately after defining *tropus* and *modus* as “species cantionis,” Guido goes on to say (in Chapter 14) that the trained musician recognizes them in the same holistic fashion as colors, smells, and national dress, that they have ethical qualities which regulate the behavior of humans and demons, and that they are ultimately mysterious to all but “Divine Wisdom” (*divinae sapientiae*, tr. Babb). Thus *tropus* as *species cantionis* is not to be understood as an “aspect of chant,” but a “species of chanting,” or perhaps, since it belongs to and influences spiritual forces, “species of incantation.”

§2.6 Johannes and the theory of melodic functions

Thus in stages the *cantus* tradition develops a theory of melodic function, which it communicates chiefly by means of example, analogy, and metaphor. Among medieval sources, the c. 1100 music treatise of Johannes provides the most complete and explicit survey of this theoretical system in analytic language and musical example.¹¹¹ This author, often identified erroneously in the later Middle Ages as Pope John XXII, more recently imagined as an Englishman (John Cotton) or Netherlander (Johannes Afflighemensis), was likely a monk “working within the south-German intellectual milieu.”¹¹² Whatever his nationality, Johannes is the first to identify explicitly the melodic function second in importance only to that of the final—a function that the *cantus* tradition had until then recognized only intuitively—and the first to specify by letter-name the tones that fulfill that function in dyadic relation with the final.

The *Musica* of Johannes contains little else that is new, but it encapsulates much that is essential. Building upon the recognition of the final tone as governor and arbiter of modal identity, Johannes, “the most illuminating of the medieval writers on the modes,”¹¹³ adds to this legacy by recognizing the fundamental modal function located on the reciting-note or *tenor* common to the recitation tones of any given mode. Theogerus of Metz, also of the south-German school, had already identified for each mode the psalmodic reciting-note as where its ‘seculorum amen’ begins—for no matter what the generic variety (psalm, canticle, or introit), and no matter

¹¹¹ *Johannis De Musica*; tr. in Babb, *Hucbald, Guido, and John*, 101–187. See §2.3 above, Example 2.6, and fn. 56.

¹¹² McCarthy, *Scholasticism and Reform*, 47–50; see also Claude V. Palisca, “Johannes Cotto,” in *Grove Music Online* (accessed November 27, 2013).

¹¹³ Palisca, “Johannes Cotto”; cf. Heinrich Bellermaun, *Der Contrapunkt*, 3rd ed. (Berlin: Julius Springer, 1887), 111: “[Johannes] zu den kenntnissreicheren Theoretikern seiner Zeit gehört.” On the importance of Johannes’s treatise to musicology in general see Michel Huglo, “L’auteur du traité de Musique dédié à Fulgence d’Affligem,” *Revue belge de Musicologie / Belgisch Tijdschrift voor Muziekwetenschap* 31 (1977), 19.

the *differentia*, the reciting note always carries through to the first syllable of the termination formula.¹¹⁴ From this liturgical practice Johannes abstracts a structural principle:

For just as there are eight modes (*toni*), even so there are, in relation to the same, eight tenors. ‘Tenor,’ moreover, derives from *teneo* (I hold, I sustain), as ‘radiant’ from ‘radiate’ and ‘splendor’ from ‘splendid.’ And indeed in music we call tenors where the first syllable of *saeculorum amen* of whatsoever mode is begun.¹¹⁵

By *toni* here Johannes clearly intends ‘modes’ and not ‘psalm tones,’ for there were already in his day no fewer than nine such tones including the Tonus Peregrinus. Nor can he be referring to the recitation tones in general as eight, for besides the nine tones for psalms there were and are an additional eight canticle tones, eight introit tones, etc., the differences among which the ecclesiastical chanter cannot afford to ignore, many of which terminate with *saeculorum amen*. It would be an error and a cause of confusion, for example, if one monk were to sing the Magnificat to the psalm tone while the rest of the choir sang the appointed canticle tone. The *tenor* is the same so long as the mode is the same, but the surrounding *modulatio* is different.

Thus it is erroneous to say that in this passage “the practical distinction between mode and psalm tone is obliterated in respect to the tenor.”¹¹⁶ For reasons just enunciated we can be certain that Johannes is speaking of psalmodic practice in general, not of the psalm tone in particular, and speaking of that practice as a particularly clear context for identifying the modal

¹¹⁴ GS II:183–96, 192–94; TML THEMUS TEXT http://www.chmtl.indiana.edu/tml/9th-11th/THEMUS_TEXT.html (accessed November 27, 2013). On Theogerus, see McCarthy, *Scholasticism and Reform*, 34–37; also Fabian Lochner, “Theogerus of Metz,” in *Grove Music Online* (accessed November 27, 2013).

¹¹⁵ “Sicut autem octo sunt toni, ita et octo eorundem sunt tenores. Tenor autem a teneo, sicut a niteo nitor et a splendeo splendor dicitur. Et tenores quidem in musica vocamus, ubi prima syllaba saeculorum amen cuiuslibet toni incipitur.” *Johannis De Musica*, 82; cf. Babb, *Hucbald, Guido, and John*, 117.

¹¹⁶ Powers, et al., “Mode” II/3/d.

function exemplified by the liturgical *tenor* of the psalm-, canticle-, and introit-tones. It is true that “the chapter title itself—‘on the tenors of the modes and their finals’—attributes the psalm-tone element to the mode,” but only to the extent that Johannes attributes to the mode the *tenor* held in common by psalm-, canticle-, and introit-tones. It is not Johannes who confuses which elements are practical and which theoretical, but his modern commentators.

Johannes goes on to specify the four pitches of the gamut that regularly act as tenors, and to specify their respective assignments among the eight modes, for which he also supplies the four regular finals:

1. Tenor *F* in Mode 2 (final *D*);
2. Tenor *a* in Mode 1 (final *D*), Mode 4 (final *E*), and Mode 6 (final *F*);
3. Tenor *c* in Mode 3 (final *E*), Mode 5 (final *F*), and Mode 8 (final *G*); and
4. Tenor *d* in Mode 7 (final *G*).¹¹⁷

Johannes notes the asymmetry of the tenors, *F* and *d* functioning as such in one mode each, whereas *a* and *c* are each the tenor of three; this he contrasts with the symmetry of the finals, each of which functions for one authentic mode and one plagal.¹¹⁸ Thus the eight tenors of which Johannes speaks are not these four psalmodic *tenor* notes each considered as a monad, but must be understood as the set of *eight species of tenor* each demonstrates in relation to a final, that is to say, as a member of a *modal dyad*. In liturgical practice the recitation tone does not necessarily touch upon the modal final reached at the end of the antiphon; Johannes’s meaning cannot therefore be limited to the formal function of the reciting note or *tenor* in the liturgical

¹¹⁷ *Johannis De Musica*, 82–83; cf. Babb, *Hucbald, Guido, and John*, 118.

¹¹⁸ *Ibid.*

tone of recitation, but must comprehend the abstract modal function realized in the complete musico-liturgical utterance of recitation-with-antiphon.¹¹⁹

Having thus defined the set of *modal tenors* as locations of psalmodic tenors in relation to their respective modal finals, Johannes goes on to characterize the musical and pedagogical functions of these eight species of tenor in a sentence of considerable poetic charm:

Quasi enim claves modulationis [modulationes] tenent, et ad cantum
cognoscendum nobis aditum dant.¹²⁰

Discrepancies in the manuscript tradition make translation difficult. Some of the more than twenty known sources of the treatise give the first phrase as “Quasi enim claves modulationis tenent”; others read the same but for “modulationes” with ‘e’ substituting for ‘i’ in the final syllable.¹²¹ Each reading makes sense; indeed each works in several senses, for each involves a pun. Gerbert’s reading, *Quasi enim claves modulationis tenent*,¹²² translates “For they [the tenors] hold as it were the keys of *modulatio*.” Here Johannes plays on the word *claves*, which, like its French cognate *clefs* and the English ‘keys,’ carries both musical and non-musical associations. In music theory, *claves* are letter-named positions in the gamut, at least from the mid-twelfth century through the Renaissance.¹²³ What evidence links this terminology to Johannes, writing around 1100? Aribio, in his music treatise of around 1070, calls letter-named

¹¹⁹ Cf. Powers et al., “Mode” §II/3/d.

¹²⁰ *Johannis De Musica*, 82; cf. Babb, *Hucbald, Guido, and John*, 117.

¹²¹ Ibid.

¹²² GS 2:243; TML JOHMUS TEXT http://www.chmtl.indiana.edu/tml/9th-11th/JOHMUS_TEXT.html (accessed July 21, 2011).

¹²³ See Fritz Reckow, “Clavis,” in Eggebrecht, *Handwörterbuch*. For the preservation in England of the medieval sense of the term well into the seventeenth century, see Jessie Ann Owens, “Concepts of Pitch in English Music Theory, c. 1560–1640,” in Judd, *Tonal Structures*, 183–246; see also in the same volume Candace Bailey, “Concepts of Key in Seventeenth-Century Keyboard Music,” 247–274.

steps of the gamut *claves* in no less than nine instances.¹²⁴ Johannes borrows extensively from Aribo, for example adapting his four-fold figure of intersecting circles to demonstrate the common pentachord within the ambitus of authentic and plagal modes of each *maneria*.¹²⁵ Johannes, who could hardly have been ignorant of Aribo's usage of *claves*, does generally prefer the Guidonian term *litterae* for positions of the gamut. If we allow Johannes in this particular sentence to employ 'claves' in a musical-technical sense, we find him attributing the term *tenores* to the property of reciting tones to dwell upon, sustain, and hold in place the tones of melody (*claves modulationis*), as if grasping them and not letting go. If he were writing in English, Johannes might say they are called tenors because they are tenacious.

The choice of Johannes to call melodic tones *claves* here (instead of his more usual *litterae*, *notae*, or *voces*) may be explained by the opportunity it provides for additional levels of punning. If in addition to the narrow music-theoretical meaning of the word *clavis* we consider its commonplace sense as 'door-key,' then *claves* and *tenent* take on new meaning in the phrase *claves tenere*, "to hold the keys." In Christian tradition this calls to mind the Apostle Peter, to whom Christ promises the keys to the kingdom of heaven.¹²⁶ For instance, it is to Peter's authority as keeper of the heavenly gate that the seventh-century King Oswius accedes, in Bede's account, to settle a dispute between Scottish and Roman liturgical traditions: "for this man is the gatekeeper ... who is proven worthy to hold the keys (*claves tenere*)."¹²⁷ This sense of the phrase

¹²⁴ *Aribonis de Musica*, ed. Joseph Smits Van Waesberghe. CSM 2 (1951), XXV (dating the treatise); 4, 21, 27, 32, 54 (letter-named notes referred to as *claves*).

¹²⁵ *Aribonis de Musica*, 18–20; *Johannis De Musica*, 94; cf. Babb, *Hucbald, Guido, and John*, 124. On Johannes's borrowings from Aribo, see *Johannis De Musica*, 29–30.

¹²⁶ Matthew 16:19.

¹²⁷ "Quia hic est ostiarius ille ... qui claves tenere probatur." Bede, *Historia Ecclesiastica Gentis Anglorum*, Book III, Chapter 15, §25; online at www.thelatinlibrary.com/bede/bede3.shtml#15 (accessed November 27, 2013). Chapter 66 of the Rule of St. Benedict prescribes the duties of the *ostiarius*, gatekeeper of the monastery, under the authority of the abbot; see §3.1 below.

claves tenere illuminates the hierarchy of modal functions: if the final is the mode's governor, then the tenor is his appointed deputy, the keeper of the keys. Yet another musical-technical sense Johannes may have intended relates to the practical maintenance of keyboard instruments: when an organ is being tuned, someone must "hold keys" while the tuner adjusts the pipes; thus a tone is sounded for a long time and in connection with another against which it must be tuned. This may be only a happy coincidence, however, as it is unclear whether the organs of Johannes's time and South-German milieu even had keys (*claves*), or if the organist had to pull a sliding tongue (*lingua*) directly out of the wind-chest in order to admit air to a pipe.¹²⁸

Johannes's modern editor adopts the more difficult reading "Quasi enim claves modulationes tenent."¹²⁹ Instead of the genitive singular *modulationis* we have the accusative plural *modulationes* which results in "For as if they were door-keys, they hold modulations." Could Johannes be likening melodic motions around the sustained tenor to the bulges and grooves on the straight shaft of a door-key? Research into the technical vocabulary of the medieval locksmith may be necessary to resolve this puzzle.

Modulationis better justifies Johannes's term 'tenor' by allowing *claves tenent* to signify both "they sustain the notes" and "they act as steward for a higher authority." With the reading *modulationes*, on the other hand, the connection between 'tenor' and the usage Johannes proposes is—well, tenuous at best. With *claves* no longer functioning as the direct object of *tenent* (*modulationes* being held now, not keys), why should *tenent* (they hold or maintain) be used here, and not the more idiomatic *habent* (they have)?¹³⁰ In any case, as the sentence

¹²⁸ See Barbara Owen, et al., "Organ" §IV.4–6, in *Grove Music Online* (accessed October 3, 2013).

¹²⁹ *Johannis De Musica*, 82.

¹³⁰ "Modulationes" is the reading that Smits Van Waesberghe finds in the majority of the thirteen manuscripts on which he bases his edition; he relates that Gerbert had only three sources at his

continues, the notion of key-as-unlocking-agent is developed with the following phrase “et ad cantum cognoscendum nobis aditum dant.” As a whole the sentence might best be translated “For they hold as it were the melodic keys, and give us access to understanding of song.”¹³¹

Johannes employs a notable poetic subtext also in his choice of comparisons for the etymology of the term ‘tenor.’ This comes from *teneo* (I hold or sustain), he says, as *nitor* from *niteo* (I shine), and *splendor* from *splendeo* (I shine, I am splendid). Thus Johannes likens the tenor to the radiant sun which governs from above, as indeed every recitation-tone tenor is raised up and sustained above the final until it sets with the cadence of the antiphon.¹³²

Johannes identifies yet another melodic function in the initial ascent to the tenor. This function arises in the opening segment of the recitation tone, also known as the ‘intonation,’ which Johannes dubs the *gloria* for its appearance with the opening word of the doxology *Gloria patri*. **Example 2.7** reproduces Babb’s transcription of Johannes’s example, in which for each of the eight modes the *gloria*’s initial ascent to the tenor is juxtaposed with a typical *seculorum amen* proceeding from the same. Thus Johannes reduces the two-hemistich recitation tone to a paradigmatic initial ascent, tenor, and termination. Bearing in mind that the *seculorum amen* may

disposal, one of which has since been destroyed: *Johannis De Musica*, 3, 82. Since the two surviving manuscripts Gerbert consulted belong to the “modulationes” camp, the lost manuscript must have supplied him with “modulationis.” (The recent destruction of manuscripts reminds us that we cannot assume the reading found in the majority of surviving sources was the reading of the majority in the Middle Ages.) The anonymous 12th-century *De tractatu tonorum*, an early adaptation of Johannes’s treatise, also gives the “modulationis” reading: Marius Schneider, *Geschichte der Mehrstimmigkeit: Historische und phänomenologische Studien* (Berlin: Gebrüder Bornträger, 1934; reprint ed., Tutzing: Hans Schneider, 1969), 110.

¹³¹ Cf. Babb, Hucbald, Guido, and John, 117.

¹³² Johannes dedicates the treatise to his abbot Fulgentius (“most shining” or “most illustrious”; cf. the English cognate ‘refulgent’): *Johannis De Musica*, 44; cf. Babb, *Hucbald, Guido, and John*, 101. By citing synonyms of that name’s root-word *fulgeo* (I shine, I flash [as in lightning]), Johannes associates his patron with his own flash of insight and signal contribution to musical science.

or may not reach the final of the mode, note that in this example the terminations of the plagal (even-numbered) modes descend to the final; those of corresponding authentic (odd-numbered) modes end higher.

Example 2.7 Johannes: Modal Intonation, Tenor, and Termination¹³³

(1) Glo - ri - a ... sae - cu - lo - rum A - men.

(2) Glo - ri - a ... sae - cu - lo - rum A - men.

(3) Glo - ri - a ... sae - cu - lo - rum A - men.

(4) Glo - ri - a ... sae - cu - lo - rum A - men.

(5) Glo - ri - a ... sae - cu - lo - rum A - men.

(6) Glo - ri - a ... sae - cu - lo - rum A - men.

(7) Glo ⁶ - ri - a ... sae - cu - lo - rum A - men.

(8) Glo - ri - a ... sae - cu - lo - rum A - men.

Thus Johannes identifies three distinct melodic functions in Gregorian chant: that of the *gloria* which rises to the tenor at the beginning of the recitation tone, that of the tenor which

¹³³ Babb, *Hucbald, Guido, and John*, 119; cf. *Johannis De Musica*, 85.

carries through the first syllable of *seculorum amen*, and that of the final of the antiphon. This last function he illustrates for each of the eight modes in a separate figure shown above as Example 2.6 (66). Johannes at no point juxtaposes the eight modal tenors with their respective finals as abstract pairs in modal order 1–8 as did the authors of many later treatises, some forty of which are surveyed in the Appendix to this dissertation and examined in Chapter Four below. Johannes and his audience of practiced chanters seem to have found sufficient the examples given here in Figures 2.6 and 2.7, as indeed for each mode the tenor identified in Example 2.7 is prominent in the corresponding melody of Example 2.6. Making explicit what Johannes leaves implicit, **Table 2.1** compares the modal finals of Example 2.6 with the tenors of Example 2.7, giving for each of the eight modes the particular pairing of final and tenor that Johannes identifies in terms of letter-named steps. Table 2.1 also calculates the resulting interval over the final identified in terms of tetrachordal quality.

Table 2.1 Modal finals and tenors described by Johannes, with resulting intervals

Mode 1	Final <i>D</i> , Tenor <i>a</i>	Diapente (perfect fifth) over protus
Mode 2	Final <i>D</i> , Tenor <i>f</i>	Semiditone (minor third) over protus
Mode 3	Final <i>E</i> , Tenor <i>c</i>	Diapente-plus-semitone (minor sixth) over deuterus
Mode 4	Final <i>E</i> , Tenor <i>a</i>	Diatessaron (perfect fourth) over deuterus
Mode 5	Final <i>F</i> , Tenor <i>c</i>	Diapente (perfect fifth) over tritus
Mode 6	Final <i>F</i> , Tenor <i>a</i>	Ditone (major third) over tritus
Mode 7	Final <i>G</i> , Tenor <i>d</i>	Diapente (perfect fifth) over tetrardus
Mode 8	Final <i>G</i> , Tenor <i>c</i>	Diatessaron (perfect fourth) over tetrardus

Thus the *cantus* tradition discovers in each mode a particular dyad of final and tenor, in every case a relationship of *harmonic consonance*. One might object that some of these dyads aren't perfect intervals: that of Mode 2 is a minor third, that of Mode 6 a major third, and that of Mode 3 a minor sixth. Didn't medieval theorists take the perfect octave, fourth, and fifth as consonances, and didn't they consider thirds and sixths to be dissonant?¹³⁴ The answer to which is the following: theorists of the harmonics tradition may indeed classify only perfect intervals as consonances (especially after Marchetto), but this is not always the case with their colleagues of the *cantus* tradition. For Guido, Johannes, and others, consonance (*consonantia*) is the category of interval by which chant melody moves harmoniously, a category that includes imperfect as well as perfect intervals—and usually not the octave. We must differentiate the concept of harmony in the *cantus* tradition from that of the harmonics tradition.

¹³⁴ I am grateful to Daniel Zimmerman for bringing up this question.

Guido, for example, recognizes six intervals by which note follows note in Gregorian chant: tone, semitone, ditone, semiditone, diatessaron, and diapente; these he calls consonances (*consonantiae*)¹³⁵ and locates them within the broader realm of intervals in general.¹³⁶ Guido recommends diligent study and training in these six consonances, “since by so few articulations all harmony is formed (*cumque tam paucis clausulis tota harmonia formetur*).”¹³⁷ With this use of the word *harmonia* Guido refers to the abstract principle of harmony, the joining together of disparate elements, as manifested in melodic tones. This invocation of the muse signals that Guido intends *consonantia* as consonance properly speaking: not just a sequence of tones but their agreement or concinnity, something of greater scope and weight than might have been suggested by terms Guido employs elsewhere for musical construction, such as *cantio* for the action of chanting or *modulatio* for the sequence of tones in melodic realization.

Guido’s list of consonances includes both the ditone (major third) as heard in the Mode-6 final-tenor dyad *F-a*, and the semiditone (minor third) as heard in the Mode-2 dyad *F-D*. The diapente-plus-semitone (minor sixth) of the Mode-3 dyad *E-c* exceeds the span of Guido’s largest consonance the diapente (perfect fifth), as indeed direct leaps of the sixth are extremely rare in the Gregorian repertoire. In Chapter 11 of the *Micrologus*, however, Guido notes the diapente-plus-semitone between final *E* and opening-note *c* in the Mode-3 antitype *Tertia dies est* as an exception to the rule that the opening note of a chant should agree with the final through one of these six consonances.¹³⁸ See Example 2.6 (above) for this melody as communicated by Johannes in a version very similar to Guido’s.

¹³⁵ As they are called in the earlier *Dialogus*: GS I: 255–6, tr. in *Source Readings*, 205.

¹³⁶ *Guidonis Micrologus*, 102, 105; cf. Babb, *Hucbald, Guido, and John*, 61.

¹³⁷ *Guidonis Micrologus*, 105–06; cf. Babb, *Hucbald, Guido, and John*, 61.

¹³⁸ *Guidonis Micrologus*, 140–41; cf. Babb, *Hucbald, Guido, and John*, 66.

In a discussion of two-voice organum, Guido admits the ditone and semiditone as “concord” (*concordiae*)—legitimate practical simultaneities—and in his musical examples touches upon both the Mode-6 dyad *F-a* and the Mode-2 dyad *D-F* as part of organa on the Mode-6 type-melody *Sexta hora sedit ad puteum*.¹³⁹ Thus we find in Guido:

1. the major third and minor third numbered among the consonances and conceived as elements of abstract harmony,
2. the minor sixth between the Mode-3 final *E* and tenor *c* cited as an exception to the rule that beginning notes should relate to the modal final through such consonance, and
3. major and minor thirds as legitimate harmonic intervals in the practice of organum.

Guido makes exception a second time for the extraordinary relationship of *E* and *c* in chants of the deuterus authentic (Mode 3) when he says that only in that mode is it allowed for beginnings and endings of medial phrases to rise higher than a fifth above the final.¹⁴⁰ Hucbald had observed that no chant begins or cadences higher than the fifth degree above its final,¹⁴¹ to which the *Dialogus* had admitted the exception of the diapente-plus-semitone *c* over *E* of Mode 3.¹⁴² Guido further specifies that chants of the protus and tritus plagal (Modes 2 and 6) do not begin or end phrases higher than the third degree above the final, whereas chants of deuterus and tetrardus plagal (Modes 4 and 8) begin as high as the fourth degree.¹⁴³ Guido thus finds in the repertoire a generally-observed upper limit for phrase beginnings and endings that corresponds

¹³⁹ *Guidonis Micrologus*, 201–202, 212; tr. Babb, *Hucbald, Guido, and John*, 78, 81.

¹⁴⁰ *Guidonis Micrologus*, 154–55; tr. Babb, *Hucbald, Guido, and John*, 68–69.

¹⁴¹ Chartier, *L'Œuvre musicale d'Hucbald*, 202; cf. GS 1:119b; tr. Babb, *Hucbald, Guido, and John*, 39.

¹⁴² GS I: 257; tr. in *Source Readings*, 207.

¹⁴³ *Guidonis micrologus* 155; tr. Babb, *Hucbald, Guido, and John*, 68–69. Compare the observation of the *Dialogus* that beginning on the fifth degree determines the mode to be authentic, §4.6 below. On the Mode-3 tenor's shift, from the fifth degree over the final in Hucbald's time to the sixth in Guido's, see §4.11 below.

precisely to the *tenor* of each and every mode: the sixth degree in Mode 3, the fifth in modes 1, 5, and 7; the third degree in modes 2 and 6; the fourth in modes 4 and 8 (compare Table 2.1 above). Yet Guido draws no explicit connection between these two phenomena (perhaps allowing the student to experience his own modal *Anschauung*?), nor is that connection made explicit even in the treatise of Johannes.

Having dispelled the notion that all medieval theorists considered thirds and sixths to be dissonances, having indeed observed Guido's admission of major and minor thirds in organum, and having found in Guido's rules for the upper limit of beginnings and endings of phrases an exact correspondence with the liturgical tenors of psalmody from which Johannes abstracts the concept of the modal tenor defined in relation to the modal final, nothing prevents us from understanding the modal dyad of final and tenor as a harmonic entity. It would be wrong not to acknowledge that terms such as 'consonance' and 'mode' are contested in the Middle Ages, however.

Hucbald, for example (as quoted in §2.5 above), does borrow from Boethius the definition of perfect octave, fifth and fourth as species of *consonantia* which he distinguishes as a theoretical category separate from the intervals by which Gregorian melody moves: of the latter he lists nine, from semitone to major sixth, and for most of these he cites examples from the repertoire both in ascent and descent.¹⁴⁴ The examples he cites for the tritone are settings that a later source with diastematic notation indeed shows skipping directly from $\natural$ to *F* and vice versa.¹⁴⁵ This interval is extremely rare in chant, however, *b* being substituted for $\natural$ in most cases of direct connection with *F*, and precisely to avoid the tritone that Hucbald demonstrates with

¹⁴⁴ Chartier, *L'Œuvre musicale d'Hucbald*, 142; cf. Babb, *Hucbald, Guido, and John*, 5–6, 19. See also §2.5 above.

¹⁴⁵ PM XII, 254/13 and 105/11, as noted in Babb, *Hucbald, Guido, and John*, 17.

these examples. In the context of the phrases they inhabit, however, each of Hucbald's examples could very well be sung with $\natural$: in each case that note can be heard striving upward toward c which follows more or less directly. Hucbald illustrates several instances of chants that include both the *synemmenom* tetrachord (which includes the pitch later noted b) and the *diezeugmenon* tetrachord (which includes the pitch later noted $\natural$) and although he offers no particular reason for the substitution, he does mention that they both appear in all modes and remarks that melodies of the tritus (modes 5 and 6) rarely lack such mixture.¹⁴⁶ As for the major and minor sixth, Hucbald manages to find at least one example of each as a direct leap in Gregorian chant.¹⁴⁷

Johannes also lists nine intervals (*modi*) "by which melody is woven together,"¹⁴⁸ but his list differs somewhat from Hucbald's: Johannes leaves out the tritone and adds the unison, which Hucbald regards as no interval at all.¹⁴⁹ Of these nine, Johannes says, six are called consonances (*consonantiae*): the same six that Guido recognizes. Johannes volunteers that these are so called because they often sound together or perhaps because they are related to the mathematical ratios sesquioctava (9:8), sesquitercia (4:3), sequialtera (3:2), or duplum (2:1), but he is unwilling to further explain how these harmonics-tradition consonances might be seen to justify those of chant practice.¹⁵⁰

Later chapters of this dissertation explore the theoretical and historical ramification of the functional theory put forward in the treatise of Johannes. Gregorian recitation formulas, moreover, remain the basis for modal discernment throughout the history of the *cantus* tradition. Yet in this tradition, as in the liturgical chanting of psalms, canticles, introits, and so forth, it is

¹⁴⁶ Chartier, *L'Œuvre musicale d'Hucbald*, 180–84; cf. Babb, *Hucbald, Guido, and John*, 30–31.

¹⁴⁷ Chartier, *L'Œuvre musicale d'Hucbald*, 142; cf. Babb, *Hucbald, Guido, and John*, 17.

¹⁴⁸ *Johannis De Musica*, 67; cf. Babb, *Hucbald, Guido, and John*, 110.

¹⁴⁹ Chartier, *L'Œuvre musicale d'Hucbald*, 138; cf. Babb, *Hucbald, Guido, and John*, 13–14.

¹⁵⁰ *Johannis De Musica*, 67–68; cf. Babb, *Hucbald, Guido, and John*, 110–11.

not the recitation formula that gets the last word, but the final of the concluding antiphon. In theory as in practice, the recitation tone depends on the antiphon.

Finally, although the treatise of Johannes is the first to make explicit verbal reference to the psalmodic tenor as a fundamental modal degree, the pedagogical formulas and the liturgical chants that he and previous authors recommend for modal understanding make this connection already unmistakable in the language of sounding music. Guido recommends specifically the responsories of Matins and the psalms of the Office.¹⁵¹ What these repertoires have in common is formulaic recitation: Office chants with psalm verses in simple reciting tones, responsories with more elaborate solo verses that also sustain and decorate the modal tenor. It is tempting to imagine that all Gregorian melody may have developed from the elaboration of these and similar recitation-formulas. The musical evidence of the sources and the modal theory of the *cantus* tradition suggest, however, that all chants of the repertoire, whether formulaic or idiomatic, simple or complex, enact in full or in part a singular melodic process, each according to the measurement of one or another of eight modes—and that these modes are marked to some extent by scale and ambitus but more fundamentally by a play of melodic functions, among which those of tenor and final are most strongly determining.

¹⁵¹ *Guidonis Micrologus*, 154; tr. Babb, *Hucbald, Guido, and John*, 68.

CHAPTER THREE: INTRODUCTION TO MELODIC-FUNCTIONAL ANALYSIS

§3.1 Formal, rhetorical, and melodic functions in the psalm tone

This chapter builds upon the *cantus* tradition of music theory, in critical dialogue with the Schenkerian tradition of tonal analysis and in counterpoint with recent proposals by the New Zealand musicologist Fiona McAlpine, to analyze Gregorian melody as the elaboration of a structural process of voice leading by which melodic functions inhabiting modal degrees are brought from an initial state of disparity to a final state of agreement. This modal process and its elaboration are represented graphically as the interplay of historically recognized melodic functions, of which tenor, final, and intonation are species.

We begin by following Guido's advice to seek understanding of Gregorian tonal organization by studying the psalmody of the Office.¹ Example 3.1 provides modern notation for the text of *Gloria patri* set to Psalm-tone 1 as sung at Vespers on Mondays throughout the year in connection with Psalm 114 and the Antiphon *Inclinavit dominus*.² From this practical example and from the traditional nomenclature of its formal functions we may in short order derive tools for an analytical method suitable to the larger repertoire.

Example 3.1 Psalm tone with formal segments

Intonation Tenor Mediation Tenor Termination

Glori - a pa-tri et fi-li - o, et spi-ri - tu - i sancto.
Sicut erat in principio et nunc et sem-per, et in saecula saecu - lo-rum. Amen.

¹ *Guidonis Micrologus*, 154; see §2.5 footnote 108 and §2.6 footnote 151.

² Cf. *LU* 113, 280. On transcription in general see §1.2 footnote 49; here as in Example 1.4 the single bar represents the medial caesura, and the double bar marks the formula's end.

The recitation tone proceeds through a series of formal segments beginning with the intonation; such traditional names reflect the function of each segment in the process of launching, sustaining, and articulating the melodic formula. The intonation fulfills its function in the opening hemistich by moving through modal degrees to the reciting note of the tenor segment, here—as in nearly every Gregorian recitation formula—with initial ascent. Having fulfilled its function, the intonation is generally omitted when the formula is repeated; subsequent verses begin directly with the tenor. In practice, *Gloria patri* likewise omits the intonation when sung in connection with Office psalms. Thus the intonation as noted in Example 3.1 is actually sung only with the opening word of the psalm; in practical performance the opening syllables of *Gloria patri* take the already-established reciting note as do the beginnings of all verses but the first. In the more elaborate canticle- and introit-tones, however, the intonation returns at the beginning of each verse of principal text and of *Gloria patri*.³

The intonation reaches its end on the reciting note, which the tenor thereafter sustains through an indefinite number of syllables depending on the length of the verse. Motion from the tenor is introduced in the first hemistich by the mediation; after the caesura, the second hemistich of the psalm tone begins directly with the resumed tenor. (The same holds true for the canticle tone, whereas the introit tone prefixes a second intonation to its post-caesura tenor.) From the

³ Cf. Example 1.4 (p. 30). It is therefore curious that what Johannes gives as examples of *gloria* are melodic figures of the simpler type associated with psalm tones rather than the more elaborate kind usually employed with tones for canticle or introit (compare the Mode-8 canticle intonation of Example 1.4 with the simpler Mode-8 *gloria* of Johannes in Example 2.7 (p. 89). Perhaps in Johannes's performance practice the choir recapitulated the intonation of the psalm tone at the beginning of *Gloria patri*, or perhaps the same simple intonation-figures were employed in his monastery for canticles as well as psalms of the Office. It may also be that Johannes was, like the present author, willing to offer an example that diverges slightly from liturgical practice in order to make a theoretical point.

tenor the second hemistich proceeds with new motion through the termination, which brings the melodic formula to a provisional close at the end of the verse.

Thus far we have recapitulated standard descriptions of the Gregorian recitation formula.⁴ Now let us examine each of its constituent segments with special focus on *function*, here intended in the general sense of “the action for which a person or thing is specially fitted or used or for which a thing exists” and “any of a group of related actions contributing to a larger action.”⁵ Harmonic functions of triadic tonality such as tonic, dominant, and subdominant have no bearing on the types of functions discussed here, aside from belonging to the same broad generic category, that of ‘function’.⁶

Models of function in the realm of human society may be found in the administrative offices of abbot, prior, dean, etc. as prescribed in the *Regula Benedicti*, or Rule of Saint Benedict (*RB*).⁷ In this foundational document of Latin monasticism, every member of the community has a job to do, a function to fulfill within in the monastery’s broader mission of Godly life and

⁴ Cf. Apel, *Gregorian Chant*, 210; Huglo, *Les Tonaires*, 13, 390–91; *LU*, 113–17. Our discussion and examples omit the flex (*flexa*), a motion from the reciting note to its lower neighbor as preparation for a breath in the midst of a very long first hemistich. A late-medieval addition to psalmodic practice (apparently borrowed from older tones for prayers, etc.), the flex does not appear in connection to psalmody in early sources such as the *Commemoratio brevis*. Its motion by whole tone or semiditone (never by semitone) confirms the pentatonic character of the chant (see §3.3 below). Cf. *LU* 98–103 (tones for prayers and prophecy), 113–17 (psalm tones), 119–23 (tones for absolutions, etc.); *AM* 1210–19 (psalm tones), 1233, 1237–38, 1240–41 (chapter tones, etc.); Apel, *Gregorian Chant*, 204–206, 208–10, 215–16, 323–24; Hiley, *Western Plainchant*, 342 and 344 (*flexa* as descending neume similar to *clivis*).

⁵ Merriam-Webster, Inc., *Merriam=Webster Online*, s.v. “Function” (www.merriam-webster.com/.../function, accessed February 24, 2013).

⁶ The extent to which such harmonic functions may result from development and adaptation of the functions and processes treated herein is a topic beyond the scope of the present study; prolegomena for such discussion may be found in my “Bedrock: The Modal Underpinnings of Schenker’s *Ursatz*” (paper delivered at the 2013 International Schenker Symposium at Mannes College in New York City).

⁷ See Timothy Fry, ed., *Rule of Saint Benedict 1980* (Collegeville, MN: Liturgical Press, 1981); also James W. McKinnon, “Benedict of Nursia” in *Grove Music Online*.

service.⁸ The function of the abbot, for example, is that of governing the monastery as father to the brethren: hence his title, from the Aramaic *abba*, father.⁹ Benedict prescribes a hierarchy in which all authority devolves upon and flows through the abbot, who rules in the place of Christ to whom he is ultimately answerable.¹⁰ *RB* provides examples by which we may understand function generally, in order to apply such understanding to musical relations specifically. Three key concepts in this undertaking are those of *action*, *agent*, and *aptitude*.

A function, which may consist of several component actions, requires an agent apt to the task. The abbot, for example, is charged with the judgment, correction, and care of offenders;¹¹ he calls the brethren to counsel and declares the matter for discussion;¹² he acts as general confessor,¹³ he fulfills special liturgical duties,¹⁴ he appoints the furnishing of sleeping quarters,¹⁵ he entertains guests at table,¹⁶ etc. He must display particular qualities in order to fulfill his demanding function, that of ruling souls for their salvation.¹⁷

An agent's function may extend to one or more subordinates, and it may pass from one agent—principal or subordinate—to another. The abbot, for example, may delegate some measure of his function and authority to a prior and to the deans of the monastery. These officers he appoints to act on his behalf, and if any prove unfit he may in due process depose and replace him with another more apt to the task.¹⁸

⁸ *RB* Prologue (references to *RB* are by chapter, not page number).

⁹ *RB* 2.

¹⁰ *RB* 2.

¹¹ *RB* 2, 24, 27–28, 44.

¹² *RB* 3.

¹³ *RB* 7.

¹⁴ *RB* 11.

¹⁵ *RB* 22.

¹⁶ *RB* 56.

¹⁷ *RB* 2, 64.

¹⁸ *RB* 21, 65.

Subordinates may themselves employ subordinates: in a large community, assistants may be assigned to the cellarer in charge of provisions or to the keeper of the monastery gate, both of whom function under the authority of the abbot.¹⁹ Some functions transfer from agent to agent with metric regularity, such as those of the kitchen help and that of the mealtime reader, duties which rotate weekly.²⁰ Other functions are maintained by their respective agents for longer and indefinite spans, such as those of the abbot, prior, and deans.

Benedict insists that the prior ought to be appointed by the abbot under whom he shall serve and not by some external authority, lest irreconcilable discord arise between the two.²¹ Thus functional aptitude may be measured not only in the character and behavior of the individual agent (abbot or prior as monad) but also in the harmony of agents bound together in common endeavor (abbot and prior as dyad).

A single agent may fulfill more than one function, whether in series (as in the case of a brother promoted from dean to prior and later elected abbot),²² in alternation (as in the case of the abbot's kitchen help, who upon finding themselves unoccupied are to take up some other task until they are needed again in the kitchen),²³ or simultaneously (as in the case of a dean or prior taking a turn as kitchen help or mealtime reader).²⁴ Finally, all the functions of the monastery—governance, sustenance, maintenance, prayer, and service—are fulfilled by a single agent in the case of the hermit who lives as a self-sufficient monad.²⁵ All of these considerations have parallels in the functional relationships of tones and segments of Gregorian melody.

¹⁹ *RB* 31, 66.

²⁰ *RB* 35, 38.

²¹ *RB* 65.

²² Cf. *RB* 2, 64.

²³ *RB* 53.

²⁴ *RB* 35, 38.

²⁵ *RB* 1.

Returning now to that specific application, we find that the psalm-tone formula displays not only formal functions as described above, but also further *species of function*. Formal functions in the psalm tone are rhythmic to the extent that they appear in ordered succession (intonation, tenor, mediation, caesura, tenor, termination). Some of these derive their names from their position in this rhythmic ordering, some from the *rhetorical functions* they fulfill. By ‘rhetorical function’ is intended the particular work carried out by a species of discourse. Examples of rhetorical functions in verbal text include those of definition, description, and instruction.²⁶ In music, the concept of rhetorical function has been applied to the exposition and primary theme of sonata form.²⁷

Example 3.2 Rhetorical functions in the psalm tone



Example 3.2 identifies rhetorical functions in the psalm tone’s melodic segments and analyzes their hierarchy in its rhythmic disposition of two hemistiches divided by a medial caesura. The rhetorical function of the intonation is to propose and herald the tenor to which it is therefore subordinate in the manner of upbeat to downbeat. Although this segment is sometimes called *initium* because it precedes in *temporal order*, the other traditional name *intonatio* (intonation) refers more precisely to its rhetorical task: the proposal or hypothesis *in tones* of the

²⁶ See Larry Selinker, Mary Todd-Trimble, and Louis Trimble, “Rhetorical Function-Shifts in EST Discourse,” *TESOL Quarterly* 12, no. 3 (Sep., 1978), 313.

²⁷ Hepokoski and Darcy, *Elements of Sonata Theory*, 23, 65.

tenor segment's reciting note or *tenor*, which precedes its herald in *logical order*.²⁸ Therefore I propose the recovered term *intonational* for the rhetorical function displayed by this melodic segment (recovered in the sense that the traditional name derives from the function, as 'abbot' from *abba*). The intonation's task of tonal hypothesis does indeed usually fall to an initial segment, as here in the psalm tone, but as a rhetorical function it can be carried out in other rhythmic positions as well or instead. In the introit tone, for example, the new intonation of the second hemistich decorates the post-caesura resumption of tenor rhetoric and tenor reciting note already established in the previous hemistich.

The rhetorical function of the tenor segment is that of assertion, of thesis. This it extends rhythmically by repercussion of the reciting note over the course of several syllables, and by subordination of the intonation, mediation, and caesura, all of which prolong it. We have seen how the intonation extends the tenor's authority in the manner of a forerunner or herald. The mediation, certainly named for its rhythmic position in the middle of the melodic formula, prolongs tenor rhetoric with melodic decoration; the caesura acts similarly through the agency of silence. Elaboration, transition, punctuation, and delay are the fruits of *medial rhetorical function* as displayed by mediation and caesura; *tenor rhetorical function* is extended through medial rhetoric in the psalm tone as in the monastery the function of cellarer or gatekeeper is extended through the labor of his assistants. Tenor rhetoric receives further prolongation after the caesura, with the resumption of monotonic recitation in the second hemistich. Neither of the two tenor segments asserts authority over the other; both are temporal expressions of the same rhetorical function.

²⁸ Cf. John the Evangelist's description of Christ as *logos* or Eternal Word of God, whose appearance in the flesh John the Baptist announces (John 1:1–8, 15).

The rhetorical function of the termination is to impose a limit on the extension of tenor rhetoric, a task it does by closing off the phrase with a cadence. Terminal rhetoric acts therefore not as subordinate to that of the tenor but in the manner of a rival or antagonist. Tenor rhetoric is that of thesis, terminal rhetoric that of antithesis. The tension between the two remains in play throughout the several repetitions of the melodic formula, which does not itself provide synthesis.

Rhetorical analysis along these lines may prove useful in the study of phrase rhythm and form. This dissertation is concerned primarily with the tonal structure and process of Gregorian chant and not with its rhythm, however. Therefore we proceed immediately to the observation that the rhetorical functions thus identified in the recitation formula are executed through voice-leading operations, that is to say, by *melodic functions*. The following discussion examines how each formal segment accomplishes its particular rhetorical task in the motion and prolongation of its constituent tones, and from the traditional names of those formal segments derives terms for the respective melodic functions thus demonstrated.

The intonation is a motion leading the singing voice and the listening ear toward the reciting note of the tenor segment: as with Psalm-tone 1, this motion is normally in ascent. Whatever its direction, the intonation acts as an index pointing toward its goal-tone and is thus subordinate to it. Intonational motion is not through random or unlimited pitches, moreover, but upon modal degrees tuned in relation to the goal-tone for which it provides tonal context. Such proposal or hypothesis of a tone to be prolonged, offered by motion through contextualizing modal degrees (usually ascending, and usually but not always initiating a new phrase), I call *intonational melodic function*, or more simply *intonational function*.

The tenor segment fulfills a load-bearing function: as the structural high point of melody—although not necessarily the highest note of all—the reciting note or *tenor* carries the weight of melodic tension. Having been hypothesized by the intonation, *tenor melodic function* resides in the reciting note, the very model of tonal prolongation. Changes of syllable within the tenor segment—which a spectrograph would register as a series of frequency-complexes varying according to vowel content and interrupted by the popping, buzzing, and hissing of vocal consonants—are heard by the musical ear not as an unrelated succession of variable sounds but as stages in the process of sustaining and quite literally prolonging a tone; through syllabic repercussion the *tone of tenor function* is prolonged rhythmically. We have seen that the historical term *tenor* derives from this characteristic rhythmic extension; it was Johannes who first employed it for the tonal function—or more precisely, for the modal function—thus extended.²⁹

Tenor function is further prolonged melodically by the psalm-tone mediation, typically with motion to the upper neighbor. We shall call *medial melodic function* that of subsidiary tonal motion, as exemplified in Psalm-tone 1 by the mediation's rise to *b* (B flat) which helps to keep the reciting note *a* aloft, as if with renewed energy. Under this definition, medial function may be viewed as a genus within which intonational function is a species.

Tenor melodic function is further prolonged (as with tenor rhetorical function) in the tenor of the second hemistich, through identity of function and—in all but one of the traditional Gregorian psalm tones—by identity of pitch. The exceptional Tonus Peregrinus shifts tenor

²⁹ Johannes in introducing *tenor* as modal function notes specifically that Guido employed the same term in reference to rhythmic duration: *Johannis de musica*, 82; Babb, *Guido, Hucbald, and John*, 118; see §2.6.

function down a step in its second hemistich, from *a* to *G*;³⁰ this exemplifies what I call the *transfer of melodic function* from one modal degree to another. As when the cellarer or prior dies and another succeeds to his office, the function survives and continues even as it falls to a new agent or office-holder.

Bringing the formula to a position of relative closure is the melodic function of the termination: not to a point of absolute finality, but in relation to the tenor a lesser degree of melodic tension analogous to the lowering of pitch on the final syllable or syllables of spoken clause or sentence, setting final syllables of psalm-verse, and having similar punctuating function. We shall call *terminal melodic function* such motion from a prolonged tone, motion that presses one prolongation to give way to another. As with intonational function, terminal function may be seen as a species of medial function. But whereas in relation to the tenor of the psalm tone the intonation, mediation, and caesura are subordinate and prolonging, the connection is loose and the motion inconclusive from the reciting note to the goal-tone of the termination. The disparity between them hangs in the air, a literal dis-sonance.

Having thus identified in the psalm tone these four species of melodic function (intonational, tenor, medial, and terminal), we may observe their operation in the individual notes of the formula. **Example 3.3** analyzes each note and note group accordingly.

Example 3.3 Melodic functions in the psalm tone

The diagram shows a musical staff with 15 notes, numbered 1 through 15. The notes are grouped into three main sections: TENOR (notes 1-4), TENOR (notes 5-8), and TERMINAL (notes 10-15). Note 9 is a whole note, while the others are half notes. Brackets and labels indicate the following functions:

- Notes 1-2: Intonational
- Notes 2-3: Medial
- Note 3: Med.
- Notes 5-6: Medial
- Notes 6-7: Terminal
- Note 7: Med.
- Notes 10-11: Terminal
- Notes 11-12: Tenor
- Note 12: Med.

³⁰ Cf. LU 117, AM 1218–19, Apel, *Gregorian Chant*, 212–13, Huglo, *Les tonaires*, 394–96.

Observe first of all that a melodic function is not limited to the formal segment from which its name derives. Note 2, for example, which passes within the intonational ascent, has medial function in relation to Note 1. Note 3 of the formula, which continues whatever syllable has been set upon by Note 2, may be heard as upper neighbor and therefore analyzed as medial in relation to Note 2. One might also read Note 3 as an anticipation of the *tenor*—as intonational, then—to the extent one hears an accent on Note 4.

Note 4 has tenor function on every level of structure; Note 5 has medial function as its upper neighbor. Note 6, although occupying the same pitch as the tenor, does not necessarily carry tenor function. Here *a* can be heard passing (medially) down to Note 7, *G*, which in relation to Note 5 is terminal. After this prolongation of the upper neighbor *b*, Note 8 returns to and prolongs tenor *a*, even within the formal mediation. Unlike formal functions, melodic functions are not bound to any particular melodic segment or rhythmic order. They raise, sustain, decorate, and lower melodic tension in various combinations and on various structural levels.

The caesura prolongs medially the tenor-functional *a*, which singer and listener retain mentally through the pause before Note 9. This moment of caesura, theoretically one of stillness and silence, is in practice full of the action and noise of the choir's communal breath-intake. Yet even a cough or sneeze may not disturb the sense of tonal continuity here, nor is the sounding of the tenor pitch immediately before and after the caesura responsible so much as the absence of tonal motion negating it. Even in the case of a very short second hemistich requiring the caesura to be followed immediately by the termination³¹—that is, even with the choir entering after the caesura on terminal *G* rather than tenor *a*—the tenor is mentally retained through the caesura from its establishment in the first hemistich. Indeed, the *a capella* choral performance of unison

³¹ Psalm 8:2, *e.g.*: “Quoniam elevata est magnificentia tua: **super caelos.**”

chant would be impossible if the innate capacity for mental retention of tone were removed from us: granted that in such a musical purgatory the listener might not perceive the slippage of pitch from hemistich to hemistich in solo singing, in group performance each chorister would enter after the caesura on his or her own arbitrary pitch, “like sheep ... every one to his own way.”³² Mental retention of tone—across spans of time, between musical phrases, and against the sounding of tones other than that to be retained—is no recent invention of Viennese music theory but a basic component of musical hearing and a vital skill of the choral musician.

After the caesura, Note 9 further prolongs rhythmically the *tenor* established in the previous hemistich. From there begins (in this particular psalm tone) a descending-third linear progression which functions terminally at the local level. Notes 10 and 11 (*G* and *F*) are thus linked functionally to the *tenor* even though in terms of formal segments they belong to the termination. Tenor *a* is functionally terminated at Note 12 with a motion to *G* which proves to be decisive when that *G* is then repeated in Note 13, the opening of the two-note ascending neume known as the *pes*. This neume continues the syllable onto Note 14, which is heard as an upper neighbor, a medial function. This syllabic prolongation lends to Note 13 the weight of timbral accent—like that of a shift between string tone and wind tone in orchestral music. In retrospect, then, Note 12 sounds as anticipation, an intonational function. On the local level, terminal *G* is invested with tenor function—a process I call *tenorization*—whereas the previously established tenor *a* is momentarily relegated to neighbor status. We observe here a transfer and *exchange of melodic function*: neighbor becomes tenor; tenor becomes neighbor. The motion to *G* is temporary, however: by the time Note 14’s medial function as upper neighbor is clarified by the

³² Isaiah 53:6.

return to *G* with Note 15, the formula is complete. The tenorization of terminal *G* lasts only until *a* reasserts tenor function at the beginning of the next verse's reiteration of the formula.

Example 3.4 represents these melodic-functional relationships graphically, with rhythmic values standing for relative weights of tonal structure. Half notes represent tones of structural function, quarter notes their prolongation, beams and slurs melodic-functional connection. Closed, stemless noteheads represent notes that function only on the local level.

Example 3.4 Melodic functions expressed graphically



Intonational function in the initial ascent to tenor *a* is noted here with an upward slur; a beam connecting the two quarter-note stems to the stem of the following half note might emphasize more strongly the harmonic relationship between the boundary tones *F* and *a*. Such harmonic connection remains difficult to define, however, in the verse-formula considered alone without the antiphon. The questioned slurs above and below structural tones *a* and *G* reflect a similar uncertainty: is the tenor segment the main event and the termination an appendage attached to it, or is tenor *a* subordinate to the terminal *G* to which it moves downward by step? In the absence of greater tonal context the two notes may be heard not to harmonize at all, but rather to clash. Indeed their dissonance is resolved only in the concluding antiphon, which completes the liturgical action as well as the musical utterance.³³ The antiphon is apt to the task because it provides the decisive fifth category of melodic function, that of the modal final.

³³ See §1.3, Example 1.4 (p. 30) and surrounding discussion.

§3.2 Melodic-functional analysis of the antiphon

Example 3.5 Antiphon *Inclinavit dominus* (Lucca 601, 90)



Example 3.5 transcribes into modern notation the Antiphon *Inclinavit dominus* as noted in the twelfth-century monastic antiphoner from Lucca, Italy.³⁴ The tone on which the last two syllables are set, *D*, displays final function: acting as the goal of motion, it closes the melodic structure. In theory at least, any tension we experience in the musico-liturgical complex of opening antiphon, psalm tone, and closing antiphon finds blessed release when the melody finally reaches that goal, indeed an “ultimate resolution” wherein a “whole concinnity of music ends.”³⁵ This is not to say that this goal is necessarily determined in the antiphon’s opening gesture or continuation, but that this is the goal its end reaches in fact, and in prospect of which Psalm-tone 1 is chosen as apt for delivery of the psalm-text and *Gloria patri*. Here terminal motion reaches a definitive cadence with the descending step to final *D* in the setting of the words *suam mihi*.

But what is it that descends? Not the tones themselves. Tones are positions; how music moves among them is a question for philosophy as well as music theory.³⁶ As a contribution to both I propose that when in voice-leading analysis we say, for example, “*G* goes to *F*,” what

³⁴ Lucca, Biblioteca Capitolare Codex 601, 90; facsimile PM IX *Antiphonaire Monastique (XII^e Siècle)* Codex 601 de la Bibliothèque Capitulare de Lucques. Paléographie Musicale IX (Berne: Herbert Lang, 1974); cf. LU 280. Translation: “The Lord hath inclined his ear unto me.”

³⁵ “Totius musicae continentia in ... ultimam resolutionem desinit.” *Musica enchiriadis*, 3; see §1.3.

³⁶ See Victor Zuckerkandl, *Sound and Symbol: Music and the External World*, translated by Willard R. Trask. Bollingen Series XLIV (New York: Pantheon Books, 1956), 82 and *passim*; also Lee Rothfarb, “Energetics,” in *The Cambridge History of Western Music Theory*, 928–29.

we're actually describing is a transfer of melodic function. In the Schenkerian tradition, by light of which this theory and analytical method were developed and with which they are designed to be congruent, the motion of the *Urlinie* may be seen as the process by which a voice of tenor function passes through modal degrees toward unification with a voice of final function.³⁷ How such a contrapuntal leading of voices might operate in a piece of monophonic chant is demonstrated in Example 3.6. This renders the antiphon transcribed in Example 3.5 in melodic-functional analysis according to principles outlined above and amplified below.

Example 3.6 Antiphon *Inclinavit dominus*: melodic-functional analysis

Mode-1 int. la sol fa mi re Mode i

Incli - na - vit domi - nus au - rem su - am mihi.

Example 3.6 presents analysis on two levels: that of the melodic foreground to the left of the double barline, that of the harmonic background to the right. (Exactly what is intended by ‘harmonic’ in this context will be made clear below in the analysis of the foreground counterpoint.) The Latin text of the antiphon is included in the foreground sketch for reference to the rhythmic realization of the musical surface; this may also prove useful for examining text-music relationships. All other graphic, literal, and numeric symbols introduced in Example 3.6 will be explained in due course.

The voice of final function is represented with downward stem; tenor stems go up. Turning first to the upper voice of the foreground, observe that the initial ascent of tenor function

³⁷ As I have argued in my “Bedrock”; see fn. 6 above.

takes the form of the intonation figure belonging to recitation tones of the first mode. (Compare the setting of the word *Inclinavit* in Example 3.5 with the psalm-tone intonation of Mode 1 as seen in Example 3.1.) This typical melodic segment, which we mark with the abbreviation “Mode-1 int.,” both signifies and helps to instantiate Mode 1. By leading upward through two whole tones from *F*, the figure establishes on *a* the tonal quality of the Mode-1 tenor, a defining mark of which is its having two whole-tone steps below.³⁸ A sign and yet more than a sign, the intonation figure is conventional through association with the psalm-, canticle-, and introit-verses of Mode 1 that it initiates throughout the yearly round of liturgy. This rhetorical association arises from, however, and is daily confirmed in, its melodic function tenorizing *a*.

Note that the text-setting of the antiphon, in which initial *F* is prolonged for two syllables, differs rhythmically from that of the psalmodic intonation, in which *F* carries only the first syllable. Like Aurelian, we recognize as one and the same *modulatio* two melodic segments that move by the same sequence of melodic intervals but differ in their durational proportions.³⁹ The beam connecting the stems of initial *F* passing through medial *G* to tenor *a* emphasizes this initial ascent as the melodic unfolding of the dyad *F-a*. Such harmonic emphasis is more apt in analysis of the antiphon than in that of the psalm tone alone (Example 3.4), which must remain provisional. It is the directed motion of tenor function from the reciting note of the psalm tone to the final note of the antiphon that provides the harmonic context necessary to relate each tone of the psalm-with-antiphon to its fellows and all the parts to the whole. But we delay further discussion of the harmony of the whole in order to focus on the action of the part that is the upper voice of the foreground.

³⁸ The mode-1 tenor is solmized “la”; the tone-sequence *F G a* is solmized “fa sol la.” See the discussion of solmization later in this section.

³⁹ See §1.3.

Following the initial ascent, tenor function sounds on *a* for only one additional syllable. Let there be no mistake: the tenor we are considering here is a tonal function, not a measure of rhythmic duration.⁴⁰ Although it is in the nature of tenor function to be prolonged, it is not necessarily lengthened in the antiphon by rhythmic repercussion as in the tenor segment of the recitation tone: it may also or instead be prolonged by other tones as in the mediation, or even by silence as in the caesura. Neither is tenor function confined to the reciting note in which it is most readily discerned, nor indeed to the modal tenor which the reciting note exemplifies. Tenor function is *sustain* function: it belongs to whichever tone the voice is sustaining, is about to sustain, or has just sustained, at least until the onset of another tone or tone-group that terminates it, or until the concinnity is either abandoned in mid-utterance or reaches fulfillment in the resolution to unity of tenor function with that of the final.

Such fulfillment is achieved at the end of a process of structural motion through modal degrees; this is heard in Example 3.5 and depicted in Example 3.6 with tenor function first established on *a* and then descending stepwise with transfer of function passing through *G*, *F*, and *E* before coming to rest on *D*, whereupon it meets and fuses with the voice of final function. This gradual drawing-near and eventual unification of structural voices I call the *modal process*.

The foreground level of Example 3.6 presents this temporally ordered descent of function as a structural and directed linear progression unfolding an atemporal harmonic sonority, that is, as an *Umlinie*. Here each degree through which this motion passes is labeled with a tonal quality in the system of *voces musicales* (ut re mi fa sol la) attributed to Guido of Arezzo and generally known as solmization.⁴¹ Solmization syllables are preferable in this context to the caretred Arabic numerals by which Schenkerian analysis identifies melodic degrees of the *Umlinie* in later

⁴⁰ Historically, the term is used in both senses: see fn. 29 above.

⁴¹ For a brief review of solmization see the General Introduction.

repertoires, not only because of the general importance of solmization in early-music pedagogy but also—among other reasons to be explored later—because the tonal qualities identified in these syllables are widely recognized in historical sources as marks of one or another of the eight modes. Chapter Four of this dissertation treats this historical topic in detail; there and in the Appendix the reader may peruse evidence of a widespread and long-lasting *cantus*-tradition mnemonic which recognizes mode in the intervallic and vocalic relationship of final and tenor. That mnemonic pronounces the Mode-1 species of this relationship as “re la.” That is to say, the Mode-1 final captures and prolongs the tonal quality solmized re while its tenor at the superior diapente captures and prolongs the tonal quality solmized la. Mode 1 remains re la, furthermore, whether notated to end on the regular Mode-1 final *D*-re as in the Antiphon *Inclinavit dominus*, transposed to co-final *a*-re with tenor *e*-la as in some other antiphons also classed under Mode 1, or whether located on *G* with *b* key signature, final *G* sounding as re and tenor *d* as la. Mode is thus recognized as an audible quality of melody independent of the contingencies of notation or pitch level.

Several sources transcribed in the Appendix and treated in Chapter Four recognize this relationship of tonal qualities not only as a sign of modal structure but as the functional essence of mode itself; this concept of mode as product of the intervallic and qualitative relationship of final and tenor is considered historically in Chapter Four and theoretically in the closing section of the present chapter. The nexus of ideas thus recovered from historical documents and developed in critical dialogue with the Schenkerian tradition may be reduced to the following: that each mode is in essence an interval, a *dyadic harmony* of tenor and final, the tonal conjugation of which is understood intuitively as with that of subject and predicate in verbal grammar, that this dyadic relationship is exemplified by the psalmodic reciting note in

conjunction with the final of the antiphon, and that this harmony is composed-out in Gregorian melody through elaboration of the modal process by which the separation of functional voices is resolved to unity.

Turning to the voice of final function in Example 3.6, note that its *D-re* does not physically sound until the end of the antiphon, but in the foreground analysis is extended back to the beginning as an implied tone. What so strongly implies final *D* here at the beginning is not so much the Mode-1 intonation figure of the opening (which is suggestive but not conclusive), but the modal process coming to rest on *D* at the end. In Gregorian melody, as with the sentence of verbal text, sometimes only after the presentation of all other grammatical and rhetorical elements there finally appears at the end the governing one.

Thus whether it happens to sound at the beginning or middle, or only at the end of the antiphon, the Mode-1 final *D-re* governs the whole of the process by which tenor function established on *a-la* is led down by step to rest on that final.⁴² In Example 3.6 the dyad outlined by this modal process is noted in two ways: on the foreground level, the voice of tenor function descends stepwise through ordered degrees across the span of the diapente (perfect fifth) from *a-la* to *D-re*, whereupon it meets and unites with the voice of final function. On the second level of analysis, that of arhythmic harmonic background, final *re* is represented as logically prior, its whole note connected via the diagonal unfolding symbol to the logically posterior half-note tenor *la*; together these form the dyadic harmony solmized *re la*, that is, Mode 1.

⁴² On the governing authority of the final over the entire musical utterance as witnessed by Hucbald, *Musica enchiridis*, *Dialogus de musica*, Guido, Johannes, and others, see §§2.3, 2.5, and 2.6 above.

Summarizing historical and theoretical arguments to be expanded upon below:

1. historical sources recognize the dyad of final and tenor as the mark or essence of mode, with the final enjoying logical priority;
2. in Mode 1, with which this Antiphon *Inclinavit dominus* is historically identified, tenor la is located at the superior diapente to final re; and
3. these and other final-tenor pairings are related harmonically but also separate and distinct; their deep-level dissonance is resolved by functional voices inhabiting them leading by modal process to unity on the tone of the final.

Thus in Example 3.6 the directed melodic progression of tenor function la-sol-fa-mi-re is seen both as the unfolding of the Mode-1 dyad re-la and as the action of the modal process by which tenor and final functional voices achieve unity from division.

The present proposal rationalizes what the *cantus* tradition treats as axiomatic, describes in metaphor and analogy, and promises will come to be felt with long experience. Consider, for example, the assertion of Hucbald and *Scolica enchiriadis* that the final brings to completion not only the melody but also the mode or trope, Guido's analogy between the final as determinant of mode and the Latin inflection of the final syllable as determinant of grammatical function, his observation that the experienced musician perceives foregoing notes as colored by the final, and his advice to withhold modal judgment until the final note is sounded.⁴³ All follow as logical consequents of the model here proposed, in which melodic structure is directed as a process toward the point where tenor and final functions unite at last.

⁴³ Chartier, *L'Oeuvre musicale d'Hucbald*, 200, cf. Babb, *Hucbald, Guido, and John*, 38; Schmid, *Musica et scolica* 82, cf. Erickson, *Musica enchiriadis*, 48; *Guidonis micrologus*, 139–40, 144–45, cf. Babb, *Hucbald, Guido, and John*, 66–67; all treated in §2.5 above.

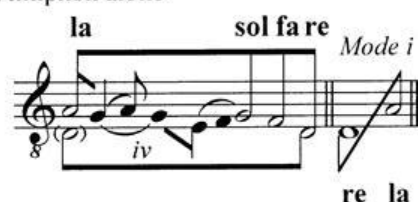
Example 3.7 provides transcription and analysis of the Antiphon *Lauda ierusalem dominum*, which comes from the same source as our *Inclinavit dominus* and has the same *Urlinie* boundary-tones *D* and *a*.⁴⁴ These again capture and prolong the tonal qualities of final *re* and tenor *la*, and so our analysis recognizes this chant also as belonging to Mode 1—as did the medieval cantor who assigned to it a *differentia* of the first psalm-tone. The melody of this antiphon differs somewhat in its particulars, however, from that of the previous example.

Example 3.7 Antiphon *Lauda ierusalem dominum* (Lucca 601, 105) with analysis

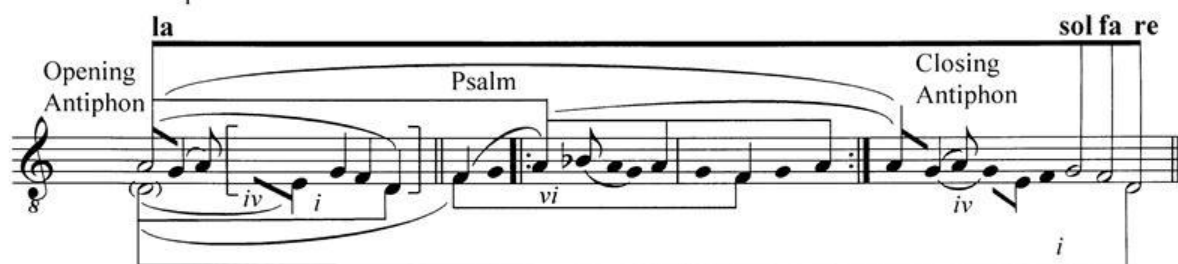
Antiphon with differentia



Antiphon alone



Psalm with Antiphon



This antiphon begins directly on the modal tenor *a*-*la* rather than with an intonational lead-in, demonstrating that such initial ascent is not obligatory. The initial ascent *F*-*G*-*a* in the Antiphon *Inclinavit dominus* represents an optional prolongation of tenor *a*, in other words, rather than a necessary component missing from *Lauda ierusalem*. Note also that the psalm tone responds to the different melodic situation by leading the termination (here noted with “euouae” for *seculorum amen* as in the original source) back up from *F* through *G* to end on the modal

⁴⁴ PM IX, 105; translation: “Praise the Lord, O Jerusalem.”

tenor *a*. It is not that the termination may not end on a tone other than that on which the antiphon begins, nor that the motion from terminal *G* to tenor *a* might pose any great difficulty in performance—for instances of these look no further than our *Inclinavit dominus* and its psalm tone. The evidence of antiphons and their *differentiae* suggests instead that medieval cantors matched one to the other not only for a smooth retransition to the beginning of the final antiphon but also for a *structural correspondence* between the recitation tone and the antiphon as a whole, thus harmonizing the former with the latter. Such harmony is demonstrated in the analysis above of the Antiphon *Lauda ierusalem* and its psalm-tone formula, which prolong and decorate the same modal tenor. Such structural correspondence of tenor in relation to final is what one finds also, for example, between the Antiphon *Missus est gabriel* and the recitation tones of Mode 8 to which medieval cantors assigned it: we have seen that these share neither scale, ambitus, tessitura, beginning-note, or melodic figure,⁴⁵ but through melodic-functional analysis we can demonstrate how both prolong tenor *c-fa* in relation to the final *G-ut* heard at the end of the closing antiphon.

The antiphon, unlike the psalm tone, must be able to stand on its own. Sung on most occasions with psalm or canticle, it may also be sung in the liturgy by itself, without any such recitation—as for example the antiphons for Benedictus and Magnificat that commemorate a liturgical occasion falling on the same day as a feast of higher rank.⁴⁶ Therefore the antiphon must be self-sufficient musically also. In the terms of the nineteenth-century theorist A. B. Marx, the antiphon is a *Satz*, a closed and self-contained setting, whereas the recitation tone is an open-ended connecting passage, or *Gang*.⁴⁷

⁴⁵ See §1.3.

⁴⁶ Cf. *LU*, 1080 ff.

⁴⁷ See Scott Burnham, “Form,” in *The Cambridge History of Western Music Theory*, 888–89.

A notable feature of the Antiphon *Lauda ierusalem* is the end of its structural descent moving directly from *F*-fa to *D*-re. With later repertoires this might be seen as a fault of composition or of analysis, but the uncrowded tonal space of Gregorian chant allows structural motion by *pentatonic step* spanning the semiditone, which in heptatonic music usually represents the leap of a third. In pentatonic melody this large step is sometimes filled in with an intermediate degree that chant scholars call a ‘*pien*,’ a term borrowed from Chinese theory.⁴⁸ Analogous to the chromatic passing tone of tonal music, the *pien* is unstable, optional, and not directly connected to deeper levels of structure. In Gregorian chant, it often receives the decorative neume called *quilisma*. In melodic-functional analysis, one may find uninterrupted linear descents of Mode 1 without *pien*-tone mi, solmized la-sol-fa-re (this *Lauda ierusalem*, for example), as well as others that include *pien*-tone mi (*Inclinavit dominus*, for example). In Mode 4 we may find descents solmized la-sol-mi as well as la-sol-fa-mi, and so on for all modes the nuclei of which feature structural motions spanning the semiditone. Structural tones generally retain their distinctive qualities in melodic context, moreover, whether or not a *pien* tone mediates their deep-level progression.

The scholarship of the Solesmes circle suggests—and experience with the repertoire confirms—that we should not consider the absence of a diatonic step to the final in *Lauda ierusalem dominum* an impediment to tonal closure; rather, we should regard the fa-mi-re portion of the structural descent in *Inclinavit dominus* as more filled-in than necessary, embellished with *pien*-tone mi in much the same way as in triadic music a step of the *Urlinie* might be elaborated with a chromatic passing tone, or as a leap in the bass arpeggiation of structural tonic (*Bassbrechung*) might be filled in with an optional supertonic or subdominant step. Indeed the

⁴⁸ Introduced to Western theory by the Romanian ethnomusicologist Constantin Brăiloiu: see Jacques Chailley, “Du pentatonisme à l’octoéchos,” *Études Grégoriennes* XIX (1980), 167.

analytical notation here proposed for the *Urlinie* with *pien* tone is taken directly from Schenker's for such stepwise composing-out of the *Basssbrechung*: observe that in Example 3.6 the auxiliary function of *pien*-tone *mi* within the tenor descent is noted with a flagged stem that approaches but does not reach the beam of the *Urlinie*.

So we find another reason for preferring solmization syllables to numbered scale degrees: calling tenor *a* over final *D* “scale-degree 5” in *Inclinavit dominus* would be misleading; calling it “scale-degree 4” in *Lauda ierusalem* would be confusing. Solmization of the melodic-functional *Urlinie* reflects not only the interval of structural motion (in this case the diapente), moreover, but in that interval's boundary-tones the dyadic combination of tonal qualities recognized in historical sources as modally determining. Mode 1 proceeds through the diapente *re la*, Mode 5 through a different diapente in which tenor and final both have the tonal quality *fa*, and Mode 7 through yet another in which tenor *sol* is heard in relation to final *ut*. Other modes move through other intervals, all fulfilling the modal process which draws voices of tenor and final function from harmonic disparity to functional unity on the tone of the final.⁴⁹

Destined to unite at the end of the antiphon, tenor and final voices may also meet earlier, perhaps even on a tone other than that of the final itself. Such a provisional meeting is seen in the foreground analysis of Example 3.6 where tenor function established on *a* sends an emissary, as it were, to the voice of final function. This it does with descending motion through *G* in the setting of the word *dominus*, to *E* on the first syllable of the following word, *aurem*. This *G*, decorated with its upper neighbor *a* as in the Termination of the psalm tone, acts as a go-between, a passing tone—by way of the pentatonic semiditone step—toward *E*, to which the voice of final function also moves momentarily and contrapuntally, rising by step from final *D*.

⁴⁹ See §§3.4 and 3.7 below.

Here tenor *a* and final-voice *E* unfold the interval solmized “mi la” and traditionally associated with Mode 4. This momentary prolongation of the Mode-4 interval within the larger Mode-1 process is noted in the foreground analysis of Example 3.6 with a lower-case Roman numeral *iv*. The same *iv* is noted again in Example 3.7 where the Antiphon *Lauda ierusalem* behaves similarly. Likewise in Example 3.7, where the psalm tone projects the fa-la dyad of Mode 6, the latter is noted with the Roman *vi*. These lower-case signs for modal prolongations should not be confused with those for scale-step harmonic functions (I, IV, V, etc.), which in Schenkerian analysis are noted in upper case.

The early prolongation of the Mode-4 dyad mi la in these Mode-1 antiphons is here understood as the product of neighboring motion in the voice of final function, which moves from *D-re* to *E-mi* under prolonged *a* heard as the tenor la common to both modes 1 (re la) and 4 (mi la). The melodic figure that results is so typical that it is commemorated in both Mode-1 melodic prototypes “Noanoeane” and “Primum querite.”⁵⁰ Typical, but not essential: what defines and enacts Mode 1—again I propose—is not the collection of melodic figures such as typically appear on the musical surface, but the deeper-level structure of voice leading from which these arise through the harmonic relationship of tenor la and final re, and as the elaboration of the modal process that ultimately resolves the disparity of that dyad into unity on the tone of the final.

Not every motion of descent from the tenor crosses into the voice of final function; what compels the reading of this *E* as upper-neighbor motion in the voice of final function rather than as part of the upper voice is the depth of plunge from tenor *a* through the diatessaron to *E*, as well as the proximity of the latter to final *D*. Generally speaking, structural functions of final and

⁵⁰ Cf. Examples 2.1 and 2.6 above; also Example 4.10 below.

tenor move by step; *modulatio* by diatessaron or larger interval leaps from one functional voice to another, whereas motions of ditone and semiditone may have to be judged on a case-by-case basis.

In both of these antiphons, then, tenor and final functions meet for the first time on *E-mi*, the upper neighbor of the tone on which they will eventually settle their differences for good. It is important to understand that in this model of tonal structure the final is not the final by convention or by fiat, but takes on that authority through the modal process and in counterpoint with the voice of tenor function. The action and process of investment of a tone with final function is what I call *finalization*. In Example 3.7, as in Example 3.6, *D-re* is finalized through the Mode-1 process; its upper neighbor *E-mi* is finalized for a shorter span within that process in relation to tenor *a-la*. Together these capture and prolong—here only momentarily—the Mode-4 dyad *mi la*, a product of voice leading notated with the numeral *iv*.

In Example 3.6, on the word *aurem*, tenor function passes back up to *G* but not so far as *a*, from which it had come. Downward motion through *G* and *E* has exerted terminal influence on the voice of tenor function, which here transfers from *a* to *G*. Having recovered that *G*, tenor function continues its structural descent through *F* and *E* to final *D*, where tenor and final functions are united at last. The same process is apparent in Example 3.7, only there without the structural participation of *pien*-tone *E-mi*.

§3.3 The proposed theory and method in relation to those of Schenker

There are differences as well as similarities between the theory and analytical method here proposed and those of Heinrich Schenker to which they owe an obvious debt. Schenker's voice-leading sketches trace directed motion within the context of a controlling triadic harmony,

the elaboration of which leads to artistic realization in the masterwork of the creative genius. In Gregorian antiphons such as *Inclinavit dominus* and *Lauda ierusalem* the harmony is not essentially triadic, nor is the melody necessarily a work of genius in the Schenkerian sense. Schenker, who likened the genius composer to a god, dealt almost exclusively with great works of undisputed masters. This study examines simpler musical utterances to describe the operation of the humbler tonal genius that gives ordinary humans the ability to compose and comprehend monophonic melody as with the grammar of natural language.

Over the course of a lifetime, Schenker employed his personal genius to develop a method of graphic analysis that demonstrates how the tonic triad generates and governs every level of structure in the tonal masterwork: from its gradual unfolding in the background, through various transformations of voice leading in middleground and foreground, to the musical surface—the notes sounded in performance. An examination of the theory behind that method may justify the selective application of its elements in the present proposal.

Raised like so many before and after him on eighteenth- and nineteenth-century extensions of harmonics-tradition theory, Schenker imagines the tonic triad to be derived directly from the first five partials of the overtone series as a natural acoustic phenomenon. He argues that this triad, through an artistic process modeled after its own generation from this chord of nature, gives rise to the remaining degrees of the major scale—well, most of them: scale-degree 4 at the perfect fourth above the tonic, which occurs neither in the overtone series nor in Schenker's recursive derivation of tones from triads built on the third and fifth of previous triads, he must therefore excuse as an artistic addition to the single natural system of diatony that he asserts the major scale uniquely to represent. With similar *ad hoc* appeals he argues that the wide interval separating the fifth partial from the fundamental in the actual acoustic series (two

octaves plus a major third) suffers abbreviation to the simple third in musical practice because of vocal limitations; the minor scale he ascribes to artistic disfiguration of the major, and so on.⁵¹

These theoretical foundations laid down in the early *Harmonielehre* and treated only cursorily in Schenker's later works are hardly mentioned in the Schenkerian literature.⁵² To the disciple their questionable aspects have little influence on the power of the analytical method, at least insofar as the masterworks of tonal music are concerned, and to the detractor they do not offer such low-hanging fruit as the ideological and aesthetic agenda for which Schenker developed them. Without denying the reality of overtones or the value of triads we may ask whether modes, scale-steps, and harmony might arise by other means, thus raising the possibility that coherence such as Schenker demonstrates in triadic tonality might proceed from some other type of sonority.

⁵¹ Schenker, *Harmony*, 20–41; *Der freie Satz* [1935] Translated and edited by Ernst Oster as *Free Composition* (New York: Longman, 1979), Sections 3–4, §§1, 4, 7, 9, 15–16.

⁵² But see Suzannah Clark, “Schenker's Mysterious Five,” *19th-Century Music* 23, no. 1 (Summer, 1999): 84–102; also Marva Duerkson, “Schenker's Organicism Revisited,” *Intégral* 22 (2008), 24–6.

Example 3.8 Figures 1–6 from Schenker's *Free Composition*⁵³

Background:
fundamental structure

1

2 (overtones)

3

4

5

6

Example 3.8 shows how Schenker's *Ursatz*, or fundamental structure, unfolds the tonic triad through arpeggiation in both upper and lower voices. The upper-voice *Urlinie* (fundamental line) descends by step from either scale-degree 3 ($\wedge^3$) as in Schenker's Figure 1, or from $\wedge^5$, or rarely with an octave descent from $\wedge^8$: that is, from a member of the tonic triad representing one of the first four upper partials of the overtone series, as depicted in Schenker's Figure 2.⁵⁴ The *Urlinie* leads from one of these triadic overtone-representatives to $\wedge^1$, which represents the fundamental of that series, through one or more passing tones: $\wedge^2$ in the descent from $\wedge^3$, or first $\wedge^4$ and then later $\wedge^2$ in the descent from $\wedge^5$, etc. In Schenker's mature theory, these intermediary degrees derive wholly from their function as bridges between members of the tonic triad.⁵⁵

Thus filled in with stepwise dissonance, the descending-arpeggiation *Urlinie* is counterpointed by the *Bassbrechung* (bass arpeggiation), which ascends from the root of tonic harmony to that of the dominant, thereby harmonizing the passing $\wedge^2$ of the *Urlinie* while at the same time arpeggiating the controlling tonic sonority; it returns to its origin in the root of that

⁵³ Schenker, *Free Composition*, volume 2: examples supplement.

⁵⁴ Schenker, *Free Composition*, §2.9.

⁵⁵ Schenker, *Free Composition*, §2.9.

sonority as the *Urlinie* reaches its goal-tone, $\wedge^1$. The coordination of *Urlinie* and *Bassbrechung* forms the fundamental structure, or *Ursatz*, of which Schenker's Figure 1 is a prototype.

Although made up of component *Urlinie* and *Bassbrechung*, Schenker's *Ursatz* is functionally indivisible: "Neither the fundamental line nor the bass arpeggiation can stand alone. Only when acting together, when unified in a contrapuntal structure, do they produce art."⁵⁶ The *Urlinie*, moreover, "represents the whole triad" of tonic harmony, and not only when it covers the span from $\wedge^5-1$ (in which case it passes through mediant $\wedge^3$), but also in the case of the *Urlinie* from $\wedge^3$ that does not touch on $\wedge^5$; here "the bass comes to the aid of the incomplete lines with the same arpeggiation."⁵⁷ Thus the *Ursatz* as discerned by Schenker unfolds a sonority that is both a product of the overtone series and necessarily triadic. This has consequences for analysis: it is duty to the triad and to its generating series of overtones that constrains the structural bass from remaining motionless as in Schenker's Figure 6.2, or from being directed toward a goal other than the dominant, as in his Figure 6.4.

Compare this with my Examples 3.6 (p. 111) and 3.7 (p. 117), in which the structural voice of tenor function descends by step as an arpeggiation not of triadic harmony but of dyadic harmony, specifically that of the Mode-1 tenor *la* in relation to its final *re*. The Mode-1 background sketch common to Example 3.6 and Example 3.7 represents this harmonic archetype with the tone of the final connected to and generating the modal tenor, not as an abbreviated representative of the vertical twelfth between the fundamental and third partial of the overtone series, but directly and *in situ* through a process of unfolding the simple diapente (perfect fifth), an interval of consonance in vocal practice generally and in Gregorian chant specifically. In this I

⁵⁶ Schenker, *Free Composition*, §3.

⁵⁷ Schenker, *Free Composition*, §14.

follow the practical orientation of the *cantus* tradition, however reserving the right to appeal to the harmonics tradition—although not necessarily to the overtone series—for further support.

Note that on this background level, which is logically prior to the rhythmic ordering of concrete melodic expression, the final appears first. This corresponds with the medieval mnemonic's treatment of the final as primary, for instance calling this first of eight modal dyads 're la.'⁵⁸ Furthermore, the final appears on this level as a whole note: not only is it more fundamental than the tenor which depends on it, but it is also more fundamental than any representative which might reach middleground, foreground or surface at the beginning, middle, or end of the melodic process.⁵⁹

As a diapente, furthermore, this particular dyad re la admits the possibility of triadic development through the addition of a mediant and consonant third element, in this case fa. This potential is partially realized in the initial ascent of *Inclinavit dominus*. Look again at Example 3.6 and note that there initial *F*-fa is shown connected via tenor stem to the implied final *D*-re, thus not only as a pentatonic neighbor but also as an arpeggiation.⁶⁰ Such triadic potential is realized even more richly in later repertoires, of course. The addition of a third tone consonant with each pole of the modal dyad is not possible in all modes, however. Modes 4 and 8 have

⁵⁸ See Chapter Four below.

⁵⁹ Cf. Schenker: "The treble voice, naturally, passes through notes of the Urlinie, among others, and the bass passes through notes of the conceptual scale-degree succession; but treble and bass are always to be held conceptually distinct from Urlinie and scale-degree succession ... Just as the underlying triad that is subjected to composing-out remains at the same time pure idea ... the Urlinie notes and the scale-degree notes likewise remain at the same time pure idea, even if they crop up in the course of the treble and bass voices." "Fortsetzung der Urlinie-Betrachtungen," translated by John Rothgeb as "Further Considerations of the Urlinie: I" in *Das Meisterwerk in der Musik I*, translated by Ian Bent and others, and edited by William Drabkin, as *The Masterwork in Music: A Yearbook, Volume I (1925)* (New York: Cambridge University Press, 1994), 105.

⁶⁰ These two functions are not mutually exclusive: for example, in tonal music the seventh of dominant harmony may be decorated with its upper neighbor which is also the chord root.

tenors at the diatessaron (perfect fourth) over their respective finals and are therefore particularly resistant to such triadic adaptation. In dyadic context this is not to be counted as a weakness, however.

Free of obligation to overtone or triad, our proposed voice of final function may move contrapuntally, as it does from final *D* to upper-neighbor *E* in the analysis of *Inclinavit dominus* (Example 3.6) and *Lauda ierusalem* (Example 3.7), but on the most fundamental level it remains stationary in the manner of a drone: I call it the *Urpunkt*. The difference between this species of lower voice and Schenker's *Bassbrechung* is the obligation of the latter to arpeggiate the tonic triad with motion to the upper fifth, thus gaining the root of dominant harmony and providing consonant support for scale-degree 2 of the descending *Urlinie*.⁶¹

The *Urpunkt* might best be understood as a genus of which Schenker's *Bassbrechung* is a species. Consider that unlike the *Urlinie*, which begins on one tone and ends on another, the *Bassbrechung* ends on the tonic where it began. To the extent the goal of its motion (the dominant) springs from and is an extension of the tonic from which it departs and returns, the lower voice prolongs that fundamental even in separating from it. Eliminate this motion of the lower voice and $\wedge^2$ of the *Urlinie* passes over a dissonance, an empty span (*Leerlauf*) such as Schenker recognizes with certain other degrees.⁶² Schenker himself depicts such an *Urpunkt* and resulting $\wedge^2$ -*Leerlauf* in his Figure 5 reproduced above. Granted that Schenker crafted this figure in order to contrast the third-descending *Urlinie* with that descending from $\wedge^5$ after an initial ascent, and thus no doubt suppressed the bass's obligatory motion simply to avoid distraction from his immediate argument, nevertheless the unwavering projection of the fundamental in the lower voice is very much to the point. Schenker posits the *Ursatz* as founded in diatony and

⁶¹ Schenker, *Free Composition*, §§17, 23, 27–28.

⁶² Schenker, *Free Composition*, §§36.

arpeggiating the chord of nature, and diatony and the chord of nature as deriving from the fundamental, but he makes no direct connection between the dynamic *Ursatz* and the inert fundamental.⁶³ That connection is clearly seen in his own sketches, however, not only in his Figure 5 but also in those where the appearance in middleground or foreground of a form of the fundamental structure—for which Janet Schmalfeldt offers the useful term ‘*Ursatz* replica’⁶⁴—acts as a prolongation, on a higher level, of the bass tone on which that subordinate progression begins and ends.⁶⁵

Yet Schenker denies that such an immobile entity as our *Urpunkt* might be capable of supporting structural descent. Of another figure showing the complete *Ursatz* with a third-descending *Urlinie* again in C major, he writes: “The linear progression of a third $e^2-d^2-c^2$, if based merely on the root of the I, would express only the single tone e^2 , not the fundamental progression $^3-2-1$. The bass lacks arpeggiation and so any movement whatsoever.”⁶⁶

Schenker’s warning is well taken in the context of tonal music, where such an unsupported third does indeed often represent motion to an inner voice and not a structural descent. In the simpler world of Gregorian chant, however, conditions may be somewhat different.

⁶³ Schenker, *Free Composition*, §§1–4.

⁶⁴ Janet Schmalfeldt, “Towards a Reconciliation of Schenkerian Concepts with Traditional and Recent Theories of Form,” *Music Analysis* vol. 10, no. 3 (Oct., 1991), 268.

⁶⁵ See for example Schenker, *Free Composition*, Figure 30a (Chopin, Mazurka op. 17 no. 3), mm. 1–16, 25–40 (*Ursatz* replica prolonging bass A-flat in higher foreground and middleground levels), 41–80 (*Ursatz* replica prolonging bass F-flat on middleground levels).

⁶⁶ Schenker, *Free Composition*, §31.

Example 3.9 Antiphon *Miserere mei deus* (Lucca 601, 89)⁶⁷ with analysis



It is difficult to deny hearing structural descent to the final in the brief melody transcribed and analyzed in **Example 3.9**, for example, difficult to maintain that *a* feels unresolved over *F* even in the absence of motion in the lower voice to *C* or to any point other than the final. For rather than a harmonic progression in *F* major (which it otherwise resembles, and of which it may be reckoned an ancestor), the process enacted in this little antiphon is that of Mode 6, for which it serves as an exemplar in the *Musica enchiriadis*.⁶⁸

Schenker's own published analyses of unaccompanied melodic passages are limited to examples of the eighteenth and nineteenth centuries, for which he posits both triadic background and implied functional harmonies.⁶⁹ Sometimes such harmonies further imply specific motions of a bass which remains at least partially noumenal, as in **Example 3.10**.

⁶⁷ PM IX, 89; cf. AM 38. Translation: "Have mercy on me, O God."

⁶⁸ Schmid, *Musica enchiriadis*, 18; Erickson, *Musica et scolica*, 11.

⁶⁹ See Schenker, *Harmony*, 50, 57 (J. S. Bach *WTC I* D-minor fugue, subject and imagined modal development), 81, 273 (passage in octaves from Chopin B-minor Etude), 112 (Wagner, English horn solo from *Tristan und Isolde*), 133 (German folk song), 143–44, 232–33, 264 (excerpts from solo violin works by Bach), 196–97 (Mozart Symphony No. 40/iv, beginning of development), 206 (melody from Wagner's *Das Rheingold* considered as if monophonic), 211–12 (left-hand melody of Chopin's B-minor Prelude, mm. 1–3 compared to chord of right hand), 238 (Beethoven Piano Sonata Op. 2, no. 2, mm. 1–8), 273 (Handel, ritornello passage of aria "The people that walked in darkness" from *Messiah*), 339–41 (passages from C. P. E. Bach keyboard fantasias, J. S. Bach cello suite); also his *Kontrapunkt* [two volumes, 1910 and 1922], translated by John Rothgeb and Jürgen Thym as *Counterpoint* (New York: Schirmer Books, 1987), vol. I, 8 (pedagogical melody by Riemann); also "The Art of Improvisation" (keyboard fantasias of C.P.E. Bach and Handel) and "The Largo of [J. S.] Bach's Sonata No. 3 for

Example 3.10 Schenker's analysis of the "Freude" theme of Beethoven⁷⁰

Without obligation to overtone or triad, however, the fundamental structure of the Gregorian antiphon requires no such bass arpeggiation, and so none is imagined in Example 3.9, for instance. Rather than move by leap like Schenker's *Bassbrechung* to and from the diapente over the final, the *Urpunkt* of the background remains stationary throughout. The voice of final function may decorate this *Urpunkt* in middle- and foreground layers, however, by departing from it contrapuntally, that is to say by semitone-, tone-, or semitone-step, with the result that the voice of final function may gain modal consonance with the voice of tenor function over some tone other than the final itself at some preliminary or intermediary stage in their mutual process toward unification. This we have seen in our analysis of the Mode-1 antiphons *Inclinavit dominus* (Example 3.6) and *Lauda ierusalem* (Example 3.7), where final function on *D* transfers locally to upper-neighbor *E*, thus forming a momentary and subordinate Mode-4 harmony (the dyad *mi la*) with tenor *a*.

Unaccompanied Violin" in *Das Meisterwerk in der Musik* I (1925); "The Organic Nature of Fugue" (*WTC* I C-minor fugue subject), "The Sarabande of Bach's Suite No. 3 for Unaccompanied Violoncello," and "The Prelude of Bach's Partita No. 3 for Solo Violin" in *Das Meisterwerk in der Musik* II (1926); also *Free Composition*, §78, Fig. 20 (Bach C-minor Passacaglia theme, fugue subject of Chromatic Fantasy and Fugue [the latter adapted from Schenker's 1909 annotated edition of the same work]); §234, Fig. 103, 3a) (*WTC* I C-sharp minor fugue subject); §243, Fig. 109e (unaccompanied passages by Haydn, Schubert, and Beethoven), partially reproduced here.

⁷⁰ Schenker, *Free Composition*, Fig. 109e)3.

Schenker showed little patience for modes, going so far as to reject a modal chorale harmonization by J. S. Bach in favor of his own C-major setting.⁷¹ Since Schenker regarded modal scales as gropings toward the major-minor system, and the minor scale as an artistic disfiguration of its parallel major, the question of contrasting *maneria*, modal quality determined by tonal quality of the final, has no place in his concept of tonal structure. Schenker does recognize the distinction between authentic and plagal, however, although not in such terms. Certainly he had no truck with defining authentic and plagal modes by higher and lower ambitus, the conventional measure with which he must have been familiar from the counterpoint text of Heinrich Bellermann if from no other source.⁷² But a basic feature of Schenker's theory is that the *Kopftone* (initial tone of linear progression) of the *Urlinie* is at a higher position in some pieces ($\wedge 5$ or $\wedge 8$), whereas in others it begins from a lower point ($\wedge 3$), and that this has far-reaching consequences for composition and analysis. This corresponds so closely to the *cantus*-tradition determination of authentic and plagal by position of modal tenor, higher in the authentic mode and lower in the plagal, as to constitute a kind of rediscovery. And although theorists of the *cantus* tradition may not have been equipped to describe in rational and detailed terms the structural ramifications of this distinction—lacking access to Schenker's theory of *Urlinie* and *Ursatz*—nevertheless they expressed an intuitive awareness:

- by matching psalmodic recitation-tones with antiphons featuring structural descent from the same tenor (Example 3.7, e.g.),
- with the *Noanoeane* and *Primum querite* formulas, which demonstrate the modal trajectory from tenor to final in melodic prototype (see §2.3),

⁷¹ Schenker, *Counterpoint I*, 34–37.

⁷² Bellermann, *Der Contrapunkt*, 3rd edition (Berlin: Julius Springer, 1887), 80 and *passim*. Schenker engages extensively with this text throughout his own *Counterpoint*.

- with brief liturgical antiphons in which that trajectory is particularly clear used as modal exemplars, or antitypes (Example 3.9, for example),
- with the theory of tenor function advanced by Johannes in the eleventh century (see §2.6), and
- with the late-medieval mnemonic that specifies the relationship of final to tenor for each mode, sources of which are gathered in the Appendix and treated in Chapter Four below.

Schenker showed no more patience for Gregorian melodies than for their modes. He quotes only three examples of plainchant, all in his 1906 *Harmonielehre*, and finds in their outlines so little prospect of structure that he throws all to the devil without further ado.⁷³ Before then and since, although the musicological literature teems with valuable descriptions of Gregorian melodic surfaces, some identifying typical themes and motives,⁷⁴ others local and regional variants,⁷⁵ others nuances of interpretation, historical lineage, etc.,⁷⁶ nevertheless methodical attempts to define or describe voice-leading structure (other than scale structure) in chant have been few. As recently as 1993 it was still “safe to say that the musical analysis of plainchant is in many respects still at a preliminary stage.”⁷⁷

⁷³ Schenker, *Harmony*, 134–37.

⁷⁴ See, *inter alia*, François-Auguste Gevaert, *La Melopée antique dans le chant de l’église latine* (Ghent, 1895; reprint Osnabrück: Zeller, 1967); also Alberto Turco, “Melodie-tipo e timbri modali nell’Antiphonale romanum,” *Studio gregoriani* 3 (1987): 191–241.

⁷⁵ See, *inter alia*, Hanoch Avenary, “The Northern and Southern Idioms of Early European Music: A New Approach to an Old Problem,” *Acta Musicologica* vol. 49, no. 1 (Jan.–June, 1977), 27–49; also David Hughes, “The musical text of the introit *Resurrexi*,” in Bailey and Santosuosso, *Music in Medieval Europe*, 163–80.

⁷⁶ See §1.2.

⁷⁷ Hiley, *Western Plainchant*, 47.

§3.4 Mid-twentieth-century precedents

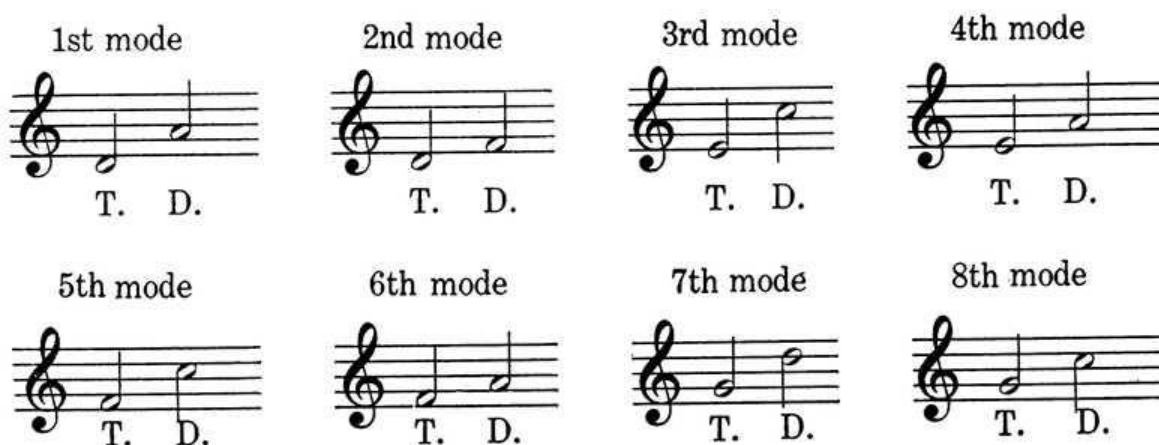
The association of mode with the pairing of final and tenor was not unknown even in Schenker's lifetime, although overshadowed then as now by scale-based paradigms. In the nineteenth century, both August Wilhelm Ambros and Hugo Riemann published accounts of the above-mentioned mnemonic as it appears in Renaissance sources.⁷⁸ Knud Jeppesen's *Counterpoint*, first published in Danish in 1931 (but not available in German until after Schenker's death in 1935), includes an introduction to Gregorian modes that distinguishes them from their scales, and which features transcriptions of the eight Introit tones as modal types.⁷⁹ From these Jeppesen derives a graphic summary of eight modal dyads, reproduced here as **Example 3.11**, which may for the moment serve to represent the eightfold set of final-tenor relationships as taught in the *cantus* tradition and treated in Chapter Four below. Jeppesen marks the final with "T." for tonic, and the tenor ("the tone around which the melody develops its 'state of tension'") with "D." for dominant.⁸⁰

⁷⁸ August Wilhelm Ambros, *Geschichte der Musik* vol. 2, 2nd edition (Leipzig: F.E.C. Leuckart, 1880), 54, 502–3; see §4.3 below. Hugo Riemann, "Anonymi Introductorium musicae (c. 1500)," *Monatshefte für Musikgeschichte* 29 (1897) and 30 (1898); see Appendix 26.

⁷⁹ Knud Jeppesen, *Counterpoint: The Polyphonic Vocal Style of the Sixteenth Century*. Translated by Glen Haydon, with a new foreword by Alfred Mann (New York: Dover, 1992), 59–82.

⁸⁰ Jeppesen, *Counterpoint*, 64; on 'tonic' and 'dominant' for final and tenor see §4.13.

Example 3.11 Modal dyads in Jeppesen's *Counterpoint*⁸¹



Jeppesen's treatment of mode is not geared specifically toward chant analysis, however, but as preliminary to the understanding of sixteenth-century polyphony.

Those few mid-twentieth-century writers who sought structural levels in chant itself did so within a wider search for universal principles. **Example 3.12** reproduces Paul Hindemith's analysis of the opening stanzas of the plainsong *Dies irae* according to a system and method he intended for "the music of all styles and periods."⁸² Hindemith's theory of tonality shares with Schenker's the premise of an octave-dividing background scale proceeding from the overtone series through replication of the major triad derived from its lower partials.⁸³ Also like Schenker, Hindemith posits this triad as the alpha and omega of music.⁸⁴ But Hindemith also posits a kind of dyadic harmony, each interval having a root and a comparative level of consonance which is fixed, pre-determined by the interval's position among the partials of the overtone series, and

⁸¹ Jeppesen, *Counterpoint*, 67, cf. Appendix.

⁸² Paul Hindemith, *Unterweisung im Tonsatz*, translated by Arthur Mendel as *The Craft of Musical Composition* (New York: Associated Music Publishers, Inc., 1942), 1:202–03.

⁸³ Hindemith, *Composition*, 22–56.

⁸⁴ Hindemith, *Composition*, 22.

measured by yet another set of acoustic phenomena: combination tones.⁸⁵ With these as guide, Hindemith finds the interval-root in the lower tone of the perfect fifth, major third, and minor third; he posits the upper tone as the root of the perfect fourth, minor sixth, and major sixth, the latter being conceived primarily as respective inversions of the former.⁸⁶

Example 3.12 Hindemith's *Dies irae* analysis⁸⁷

1. *Dies irae* Melodic Analysis

The image shows a musical score for 'Dies irae' with three staves per system. The top staff contains the melody with square notes. The middle staff, labeled 'Degree-Progression', shows intervals with brackets and labels like 'w' and 'N'. The bottom staff, labeled 'Step-Progression', shows the stepwise movement of the melody. The first system covers measures 1-4, and the second system covers measures 5-8.

The first level of Hindemith's chant analysis, placed directly above and below the square notes of the melody, brackets together brief melodic segments according to the dyadic roots thus imputed. For example, *D* is the root of the melody's initial four-note segment *F E F D*, its dyadic

⁸⁵ Hindemith, *Composition*, 57–74.

⁸⁶ Hindemith, *Composition*, 68–74.

⁸⁷ Hindemith, *Composition*, 203; cf. *LU* 1810.

harmony *D–F* decorated by neighbor *E* (marked ‘W’ for the German *Wechselnote*); the following two-note segment *E C* is rooted on *C*. Hindemith tracks the movement of these roots in a second level marked “Degree-progression.”

The third level of Hindemith’s analysis, marked “Step-Progression,” appears similar to the method proposed here but is in fact quite different. It does feature two melodic strands, the higher with stems ascending and the lower with stems descending, but these do not trace directed motion of structural voices. Hindemith’s step-progression is “the line that connects one high point to the next, one low point to the next, and one rhythmically prominent tone to the next, without taking into consideration the less important parts of the melody lying between these points.”⁸⁸ These are not necessarily structural motions, then, but the placement of rhythmic and registral accents. These fall into stepwise linear progressions, but without pre-determined goal, functional identity, or long-term harmonic significance.

Hindemith’s degree-progression, which proceeds by step or by leap, is likewise not directed toward any particular goal. It consists of emergent dyadic qualities that are local and unconnected to further harmonic functioning even in the immediate present: “it makes no difference to the melody degree-progression what harmony one imagines under the melody. The only thing that counts is the actual harmonic content of the melody itself.”⁸⁹

Overlaps in the brackets of Hindemith’s primary level reflect surface ambiguities which the degree-progression makes no attempt to resolve. In the second melodic phrase, for example (bar 2), *E* is shown as passing within a minor third on *D* but also as initiating a new harmony on *C*. Hindemith avoids declaring where exactly any such harmony begins or ends by placing each whole note of degree-progression in the center of the greatest possible span, rather than lining it

⁸⁸ Hindemith, *Composition*, 193–94.

⁸⁹ Hindemith, *Composition*, 186–87.

up with its essential moment of arrival. Echoing Guido, Hindemith explains that what is heard in the process of melody may have to be re-interpreted in light of later events; unlike Guido, Schenker, and the present author, Hindemith does not give priority to the final analysis but instead seeks to reflect the naïve listener's anticipation of possible outcomes:

The ear cannot hear what is going to happen. It relates each new impression to earlier ones. If a tone appears that could be the root of a group, everything which could easily belong to that group is related, retrospectively, to that tone. But perhaps it is immediately succeeded by another, which would form the root of a more comprehensive grouping. Then the new tone remains valid until the tones group themselves around still another ... Harmonic groups are not always clearly separated from one another: they overlap, and at times smaller groups form parts of larger ones ... Often their outlines cannot be definitely drawn, and different observers will form different opinions about them.⁹⁰

This last observation may to some extent apply to the model of tonal structure that this dissertation proposes, for although in most cases only one modal classification best represents the background, more than one interpretation is often possible, especially at levels closer to the foreground. This property, which I call *multivalence*,⁹¹ may at least partially account for the variability of chant melody in its early, oral layers of transmission.⁹² If what chanters hear and remember is, as I propose, not the order of each and every note so much as the shorter- and

⁹⁰ Hindemith, *Composition*, 184.

⁹¹ My concept of multivalence is similar to that of *Mehrdeutigkeit* (multiple meaning) as employed by Vogler, Weber, and others: see David W. Bernstein, "Nineteenth-century harmonic theory: the Austro-German legacy," in *The Cambridge History of Western Music Theory*, 781–82, 785–87; but whereas *Mehrdeutigkeit* generally refers to possibilities and reinterpretations of function that are decided in favor of one or another alternative in the progress of discourse, 'multivalence' refers to reasonable alternatives of analytical interpretation, such as are often possible with Schenkerian analysis of a given tonal piece. The presence of such alternatives (to the extent that each is in itself reasonable, coherent, and consistent) invalidates neither one or the other, nor do they together expose a weakness of analytical method: as with verbal punning, multivalence occurs when each alternative possesses its own integrity, in which case the plurality of interpretations may even be a feature worthy of remark.

⁹² See §1.2.

longer-term structures that those notes realize and represent, then smaller and larger differences of structural interpretation may yield smaller and larger differences in subsequent performance, and thus eventually smaller and larger differences in local tradition and its eventual notation. Multivalence at deeper levels may also at least partially account for historical disagreements about the modal class to which some melodies belong.⁹³ For mode, as its name suggests, is ultimately a means and not an end. In the method of analysis here proposed, the reduction to modal archetype at the most fundamental level of background depicts not an arbitrary social convention nor the fruit of a procreative life-urge among inanimate tones, but one of a limited number of measured trajectories from disparity to unity that musicians have discovered to be effective in resolving the problem of dissonance which is inherent with melodic motion.

The Soviet theorist Boris Asaf'yev more closely anticipates the present proposal by examining the Gregorian psalm-tone in a search for functional archetypes: from a Mode-8 formula he derives the schema “i:m:t” for *impetus, movere, terminus* (impetus, motion, terminus).⁹⁴ This models the formula’s rhythmic design, however, not its tonal structure. The latter—as demonstrated by Johannes with psalm-tone *gloria*, tenor, and termination (see Example 2.7 above)—might be described as i:s:t for *intonare, sustinere, terminare* (intone, sustain, terminate). But since the recitation tone is liturgically and tonally incomplete without the concluding antiphon, neither schema tells the whole story.

Several points in Asaf'yev’s *magnum opus* confirm and inspire aspects of the project at hand. Of the psalm tone’s initial ascent to the reciting note he writes: “It is as if the voice

⁹³ See Huglo, *Les Tonaires*, 402–412; Powers, et al., “Mode” §II/2/iii.

⁹⁴ Boris Vladimirovich Asaf'yev, *Muzikal'naya forma kak protsess* (Moscow, 1930–47), translated by James Robert Tull as *B. V. Asaf'yev's Musical Form as a Process: Translation and Commentary*. 3 vols. (Ph.D. diss., Ohio State University, 1977), 266–67, 310.

‘stealthily approaches’ the desired point of stability, but does not attack it immediately.”⁹⁵

Asaf'yev locates in the formula's opening motion the archetype for the “primary impetus (point of departure, moment of pushing off)” of musical utterance in general, citing as an example the introduction to the first movement of Beethoven's First Symphony, which he describes as approaching its opening tonic harmony with similar stealth: “The formula of medieval psalmody led the ear to the tone, proceeding through related, characteristic degrees of a given mode; the difference with Beethoven rests only in the degree of emphasis.”⁹⁶ Asaf'yev also recognizes other components of the psalm-tone as archetypal:

Let us presume that the elements which make up the center of the medieval intonational formula are contained in any theme of an overture or symphony, in any melody of a march ... there are already present in it ... the stage of impetus and ascent, the stage of the braking of motion, and finally, the central area of intoning (Tenor), here on only a single tone (the simplest form).⁹⁷

‘Intoning,’ in Asaf'yev's technical vocabulary, is the interpretive activation in a musical ‘formation’ of features by which ‘sound manifestations’ are related to one another in ‘conjugations’ that acquire meaning in society. Such features are ‘intonations,’ of which Asaf'yev's American translator James Robert Tull sees the interval as “the basic unit.”⁹⁸ Asaf'yev thus shares with the *cantus* tradition a view of interval as something greater than a quantitative relation: “Only the intonationally qualitative significance of an interval and its place in a system of conjugate tones (a scale or mode) determine its vital capacity in music.”⁹⁹ ‘Tone,’ in Asaf'yev's usage, similarly expands into a sense like that in *cantus*-tradition theory of *tonus* as mode-in-sounding-process: “Each initial feature of intoning has as its immediate goal the

⁹⁵ Asaf'yev, *Form as Process*, 267.

⁹⁶ Asaf'yev, *Form as Process*, 263, 267–69 (underlining original).

⁹⁷ Asaf'yev, *Form as Process*, 278, 301–02 (underlining original).

⁹⁸ Asaf'yev, *Form as Process*, 155.

⁹⁹ Asaf'yev, *Form as Process*, 603.

engaging of the consciousness ... in the tone in the sphere of musical formation, on the basis of a system of correlations of sound.”¹⁰⁰

The musical formation may be viewed as static (as with the harmonic background here proposed): “A totality is grasped by the mind as a crystallized unity in all the complexity of its correlations, and is found as a whole, to be completely at rest and in equilibrium.”¹⁰¹ It may also be viewed in its dynamic process (as with the foreground sketch here proposed):

If one examines a musical composition in its concrete reality—in motion, for it is, first of all a complex of mobile sound relations—then one must inevitably pass from the stage of the study of form-schemes (forms in immobility or crystallized intonations) to the observation of the stages of motion in music or the processes of its organization, and from observation to the study of the forces which serve as causes or stimuli of motion. This is the area of musical dynamics.¹⁰²

Asaf'yev emphasizes the dynamism of mode: “If there is nothing more than a series of sounds, a scale, or a set of ‘functions,’ the quality of the mode vanishes into thin air. A mode is always experienced as a formation.”¹⁰³ He also recognizes mode as a unity and describes its double nature as melodic instance and harmonic essence:

A mode is not a mechanical totality, but an intonational totality of melodic and harmonic links—the manifestation of the phenomenon of intervals in both the horizontal (melodic) and vertical (harmonic) sense ... A scale is a step-wise, graphic representation of the tones which comprise a mode, but the mode is defined only by the quality of the conjugations of intervals of the given system.¹⁰⁴

Finally, Asaf'yev (as translated by Tull) employs the phrase “transfer of function,” by which he describes the changing role of the note A-flat in the bars leading up to measure 130 of

¹⁰⁰ Asaf'yev, *Form as Process*, 266 (underlining original).

¹⁰¹ Asaf'yev, *Form as Process*, 240 (underlining original).

¹⁰² Asaf'yev, *Form as Process*, 241 (underlining original).

¹⁰³ Asaf'yev, *Form as Process*, 640.

¹⁰⁴ Asaf'yev, *Form as Process*, 760, fn. Cf. Jeppesen, *Counterpoint*, 62.

Schubert's "Wanderer" Fantasy, a change from local tonic to local dominant: "This is a significant example of the transfer of the function of a given tone into its opposite."¹⁰⁵ What Asaf'yev actually refers to, however, is a *transformation* of function—of harmonic function—which the A-flat undergoes. If we are to follow the *transfer* of tonic function in the passage, we must place our attention first on A-flat as root of tonic harmony and then shift our attention to D-flat as it becomes the new tonic. In tonal music such transfer of harmonic function is usually transacted, as in this instance, by leap in pitch-class space. In melodic-functional analysis of Gregorian chant we find the transfer of melodic function (as with Hindemith's step-progression and as in Schenker's *Urlinie*) generally *by step, in pitch space*. To be more precise, Gregorian melodic functions transfer from tone to tone generally *by pentatonic step, in dasian space*, that is to say, in the narrow span of the tetrachord and its immediate neighbors.

Curt Sachs, in a survey of melodic types with examples drawn from various cultures, cites the opening hemistich of the Gregorian Mode-3 psalm tone as a model for "centric melody," by which he refers to the rhythmic prolongation of a single tone with excursions to others more or less equidistant above and below.¹⁰⁶ The observation is unimpeachable in regard to the surface of the recitation tone taken in isolation. Like Asaf'yev, however, Sachs ignores the antiphon on which the recitation tone depends. In Mode 3, this must lead the melody far below in conclusion, from tenor *c* to final *E*. In context, then, the Mode-3 psalm tone shows the early upper-register prolongation that Sachs demonstrates to be characteristic of the melody-type he calls the "tumbling strain."¹⁰⁷

¹⁰⁵ Asaf'yev, *Form as Process*, 284.

¹⁰⁶ Curt Sachs, *The Wellsprings of Music* (New York: McGraw-Hill, 1965), 171–72.

¹⁰⁷ Sachs, *The Wellsprings*, 50 ff.

‘Centric’ and ‘tumbling’ might be useful terms for melodic-function pedagogy. On surface and foreground levels, authentic melodies principally develop above the final, whereas plagals tend to develop both above the final (in the voice of tenor function) and below it (in the voice of final function): one could say that authentic melodies generally tumble to conclusion, and that plagal melodies generally orbit the center. At the first level of the middleground, however, all modes in which the voice of tenor function achieves initial separation from the *Urpunkt* (that is to say, all eight traditional modes) may be regarded as tumblers, for all descend a considerable distance from tenor to final.

Sachs supplies a useful prototype for the implied final of melodic-functional analysis. Regarding what he calls “one of our most primitive examples, from Central New Guinea,” a “tiny motif” which begins on F, moves to D, and ends on E, he writes, “The example is remarkable because the central note comes last. But the two outer ones above and below cannot be thought of without a mental anticipation of the coming center.”¹⁰⁸ We shall see at the very end of this chapter a Gregorian example in which final *E* is similarly preceded—rhythmically yes, logically no—by neighboring *D* and *F*.

The analyses of Hindemith, Asaf'yev, and Sachs demonstrate a universalizing impulse characteristic of mid-twentieth-century musical scholarship. More recent inquiries into Gregorian tonal structure have approached the subject less as a global model than as a historical phenomenon. Research by the Benedictines of Solesmes and their associates has been especially fruitful in this respect.

¹⁰⁸ Sachs, *The Wellsprings*, 171.

§3.5 Precedents incorporating the pentatonic concept

In a remarkable series of articles, Jacques Chailley applies principles gleaned from the comparative movement of ethnomusicology such as Sachs represents—along with formidable historical and theoretical expertise—to propose:

- Gregorian modality as the outgrowth of a pentatonic scale-structure to which final and tenor are anchored as boundaries of a modal core,
- Gregorian mode as a schema of stepwise motion linking the boundaries of that scale-segment, and
- Gregorian melody as the elaboration of such motion, to which it may be reduced through multi-level analysis.¹⁰⁹

From this conception my own proposal derives several key features. As with Schenker, however, there are important differences as well as similarities.

Taking as a starting-point the scholarly consensus that Gregorian melody operates over a pentatonic framework, and momentarily putting aside traditional note-names, scales, and modes as accretions after the fact, Chailley posits a background scale that is anhemitonic, i.e., without semitone-step.¹¹⁰ Eventually he settles upon the pitch sequence D F G A C as a convenient reference for this abstract pattern of intervals (replicating at the octave, thus D F G A C D F G A

¹⁰⁹ Jacques Chailley, “Essai analytique sur la formation de l’octoéchos latin,” in *Essays presented to Egon Wellesz*, edited by Jack Westrup (Oxford: Clarendon Press, 1966): 84–93 (pentatonic scale and modal core); “Une nouvelle méthode d’approche pour l’analyse modale du chant grégorien,” in *Speculum Musicae Artis*, Festgabe für Heinrich Husman, edited by Heinz Becker and Reinhard Gerlach (Munich: Wilhelm Fink Verlag, 1970), 85–92 (mode as motion connecting core boundaries); and “Essai sur la composition des mélodies grégoriennes,” in *Scritti in onore di Luigi Ronga* (Milan: Riccardo Ricciardi, 1973): 91–97 (analysis of Gregorian repertoire); reprinted in sequence as “Du pentatonisme à l’octoéchos,” *Études Grégoriennes* XIX (1980): 165–84.

¹¹⁰ Chailley, “Essai analytique,” 84–85; “Du pentatonisme,” 166.

C, etc.).¹¹¹ The trihemitone step (here D F, also A C), although essentially incomposite (*incomposée*), may nevertheless be divided into tone and semitone by a *pien*, the higher or lower position of which depends primarily on force of attraction to neighboring tenor or final, and secondarily by force of repulsion from the tritone dissonance.¹¹² Over D, for example (with *pien*-tones noted in lower case), D e F G A b-natural C D shows higher positions of *pien*-degrees 2 and 6, yielding the so-called Dorian octave; lower *pien*-tones on the same degrees yield the so-called Phrygian: D e-flat F G A b-flat C D. This is traditionally notated, however—for lack of an E-flat in the gamut—as *E F G a ♮ c d e*. Any *pien* may become fixed by attraction or repulsion in higher or lower position, or it may balance competing interests by remaining mobile, all without disturbing the fundamentally pentatonic basis of the system.

But there is more to it than scale and octave. In Chailley's model, the action of mode takes place within a core segment of the background pentatonic, that segment bounded by tenor and final. This action consists of linear motion connecting those boundary-tones, which stand only a whole tone apart in the case of some "archaic" melodies; the modal cores of the "more definitive" later types are larger.¹¹³ These range in size from the trihemitone, as in Mode 2 (D e F in the reference scale, sometimes A b C: in traditional orthography *D E F* or *a ♮ c*), to the minor sixth of Mode 3 (A F), the latter of which is usually transposed—again because of the limits of traditional notation—to show *E* as final below tenor *c*.

E has no independent existence in Chailley's proposal, however, but when employed as a structural tone represents transposition made necessary by a historical system of notation that can accommodate mobile degrees only on the *b/♮* location of the gamut. Thus modal core *E F G*

¹¹¹ Chailley, "Sur la composition," 91; "Du pentatonisme," 179.

¹¹² Chailley, "Une nouvelle méthode," 87; "Du pentatonisme," 174.

¹¹³ "Essai analytique," 87; "Une nouvelle méthode," 85–86, 88; "Du pentatonisme," 168, 173, 175.

must stand for referential D e-flat F or A b-flat C, according to Chailley’s “etymological” analysis, with which he dismisses the tetrachord as “scholastic residue” of ancient Greek theory, and solmization as a late pedagogical accretion.¹¹⁴

Table 3.1 Chailley’s modal cores in pentatonic reference D F G A C¹¹⁵

Final-Tenor Interval	Scale segment (<i>Traditional notation</i>)		Comments	Traditional description
Semitone	(empty)		interval not in system	
Tone	0. F G, G A, or C D		in archaic melodies only	
Trihemitone (minor 3rd) incomposite but divisible by <i>pien</i>	1. D e F		<i>pien</i> ^2 high, ^6 mobile	Mode 2 regular
	Often confused	2. A b C	<i>pien</i> ^2 high, ^6 low (<i>f</i>)	Mode 2 transposed
		3. A b/b-flat C	<i>pien</i> ^2 mobile	
	4. D e-flat F (<i>E F G</i>)		^2 low, ^5 mobile (<i>b/b</i>)	Mode 4 archaic
	5. A b-flat C		^2 low, ^5 high (<i>e</i>)	
Major 3rd	6. F G A		[cf. Example 3.7]	Mode 6
Perfect 4th	7. D e-flat F G (<i>E F G a</i>)		final attracts lower <i>pien</i>	Mode 4 newer
	8. A b/b-flat C D		<i>pien</i> mobile	
	Often the same scale	9. C D e F (^7 = <i>b</i>) [cf. Fig. 2.2, line 3]	<i>pien</i> ^3 attracted up toward ^4 tenor	Mode 8
		10. G A b/b-flat C	mobile ^3 avoids tritone with flat ^7 [cf. Ex. 1.3]	
Perfect 5th	11. D e F G A		[cf. Fig. 3.5, Ex. 3.2]	Mode 1
	12. D e-flat F G A (<i>E F G A b</i>)		^2 tritone below tenor	Mode 3 archaic
	13. F G A b/b-flat C		<i>pien</i> mobile	Mode 5
	14. G A b[/b-flat] C D		[<i>pien</i> somewhat mobile]	Mode 7
Minor 6th	15. A b-flat C D e F (<i>E F G a b/c</i>)		final attracts low ^2, ^6 tenor attracts high ^5	Mode 3 newer

Table 3.1 summarizes Chailley’s analysis of Gregorian modal cores. Considering possible sizes from smallest to largest, Chailley asserts that tenor and final may not be separated by semitone because no such interval exists in the background pentatonic. From this we may

¹¹⁴ “Essai analytique,” 85, 90; “Du pentatonisme,” 166, 170.

¹¹⁵ “Essai analytique,” 87–93; “Une nouvelle méthode,” 86, 88–92; “Sur la composition,” 92–93; “Du pentatonisme,” 168–78, 180–81.

conclude that, in Chailley's paradigm, both tenor and final arise directly from the scale and not from some other principle (motion, for instance) of which the scalar arrangement might be more result than cause. There is no consideration of a final decorated by a tenor as neighboring *pien*, for example.

The pentatonic background contains several whole tones upon which a modal core may therefore be built, as in the "archaic" *Sanctus* and *Agnus dei* traditionally employed on ferial days (those to which are assigned no particular feast or commemoration) and in the Mass for the dead: these melodies feature recitation a whole tone above the final.¹¹⁶ Such small and undeveloped modal cores were soon replaced by larger varieties, says Chailley, which traditional theory treats as belonging to eight modes.

The second column of Table 3.1 enumerates the varieties of nucleus that Chailley proposes as modally privileged pentatonic segments. (The varieties are Chailley's, their numeration mine.) The semitone nucleus is an empty set. I have numbered as zero (0) the "archaic" whole-tone nucleus, representing referential segment F G, G A, or C D. In the table, the fifteen varieties listed by Chailley are assigned numbers 1–15 and expressed as scale segments with pitch-letters—main tones in capitals, *pien* tones in lower case—and also with Guidonian letters where those adopted by Chailley diverge from those of tradition. Chailley, who attributes such differences to insufficiencies of traditional notation, accounts these fifteen varieties as real structural categories associated more or less erroneously with historical stages of, and with orthographic transpositions of, the eight traditional modes—as noted in the rightmost column. What is striking is that these fifteen varieties exhaust every possible arrangement of *pien*-mediated pentatonic modal nucleus ranging in size from trihemitone to

¹¹⁶ "Essai analytique," 87; "Du pentatonisme," 168; see *LU* 62–63, 1814–15.

minor sixth, that is, the range of tenor-final dyads in the eight modes. Chailley thus provides an entirely new scale-structural solution to the age-old question of what constitutes the modes. His answer is that there are actually fifteen modes of active nucleus (sixteen, counting the archaic variety zero), which tradition takes for eight.

In its pentatonicism, flexibility, and regard for melodic-functional degrees of final and tenor, Chailley's proposal corresponds well to Gregorian melodic behavior and to certain aspects of the *cantus* tradition. It leaves much unexplained, however. First, if the pentatonic scale acts as source and background for the modal nucleus, what limits the latter to the minor sixth? Many Gregorian melodies extend in ambitus to larger intervals of the referential pentatonic, from the major sixth (F D, C A), minor seventh (D C, G F, A G), to the octave and beyond; should not modal cores link these boundaries as well? Why does the chant not feature a modal tenor at the major sixth, for example, or at least a psalmodic tenor? One might respond that the seventh is not a consonant interval by any measure, that the octave may be too wide a span for the sustained vocal effort necessary to establish tenor over final, and that there is in fact no known instance of Gregorian psalmody with tenor at the major sixth: all good answers, none derivable by Chailley's stated criteria. If Chailley's hypothesis were correct, in other words, there should have been more modes.

Chailley's paradigm is even less convincing when it comes to analytical reduction of repertoire. **Example 3.13** shows his analysis of the Gregorian Responsory *Subvenite*, that is, of the main section excluding the psalm verse and *Gloria patri*. In practice, these would follow after this principal segment (the 'respond'), alternating with repetition of its final segment *offerentes eam in conspectu altissimi*, which is here transcribed and analyzed on systems 3–4. There can be no objection to Chailley's choice not to include the verses, for the respond is self-

sufficient musically and certainly enough of an analytical challenge. This “nightmare of Gregorianists,” as Chailley calls it, is traditionally considered to exemplify an “aberrant Mode 4.”¹¹⁷ In traditional notation it begins on *D*, rises to *b* (B flat), descends to the octave below, and ends on the deuterus final *E*. Chailley, for whom that final must indicate a conventional transposition, re-transposes the melody to fit his referential pentatonic: beginning on G, ending on A, with a key signature of two flats representing lower-position *pien* tones traditionally notated as *F* and *b* over the regular deuterus final *E*. The transposition is not problematic, although we shall see that it is ultimately unnecessary. Problems in the analysis itself, however, draw attention to flaws in Chailley’s theory.

¹¹⁷ “Du pentatonisme,” 182.

Example 3.13 Responsory *Subvenite sancti dei*, in Chailley's analysis¹¹⁸

A Sub-ve - ni - te - sanc-ti De - i

B

C

D

E

A oc - cur - ri - te Ange - li Do-mi - ni

B

C

D

E

A sus-ci-pi-entes a-ni-ma-m e - jus of-fe-rentes e - am

B

C

D

E

A in cons-pec- tu Al- tis-si - mi

B

C

D

E

¹¹⁸ "Du pentatonisme," 183; cf. *LU* 1665.

Chailley presents five levels of structure, from the melodic surface of level A to a modal instantiation of his basic voice-leading paradigm, represented on level E as a series of whole notes rising and falling through the pentatonic segment A C D C A. What Chailley proposes as structurally basic is a roundtrip passage through the modal core: first stepwise upward from final to tenor, then stepwise down again. In this particular chant, the initial ascent to the tenor (traditionally *a* over final *E*, here transposed to D over final A) is preceded by a phrase that reduces to a prolonged whole-tone below the final. Chailley seems to regard this as a lower neighbor preceding the first statement of the final at the beginning of the second system. Here and elsewhere on levels B–E tonal relationships remain somewhat undefined, however, as do the mechanisms by which these are reduced to the single G of the deepest level in this first phrase. Many of these relationships are easily grasped by musical intuition and readily supplied by the practiced analyst, however.

More serious problems begin with the second system: as noted above, Chailley seems to understand the first phrase's prolonged G as incomplete lower neighbor to the A that begins the word *occurite*. G is lower neighbor to A, certainly, but does this particular G really function as lower neighbor to this particular A, and does the latter really function here as final? Chailley assigns to it whole-note structural weight despite its position in the midst of a linear motion starting from the cadential G of the opening phrase. This motion continues up through A, B-flat, and C on its way to D, the modal tenor and initial melodic goal from which the phrase later descends with a cadence. Some accentual weight may be reckoned to this A as the beginning of a new syllable, word, and phrase, but in the larger context its melodic function is clearly that of a medial passing note connecting the cadential G, from which it ascends, to the B-flat to which it quickly rises by semitone. Chailley's analysis weights this A so heavily as to require singer and

listener to forget what has come immediately before (the initial phrase with its beginning and cadence on G) and to ignore what follows immediately after (linear continuation directed to B-flat and beyond). The reason for this is clear enough: Chailley's theoretical regime demands an underlying pentatonic stepwise progression starting from final A and leading up to tenor D; there is no denying stepwise ascent and arrival on D by the end of this phrase, and so the poor passing A must be pressed into service as structural point of departure, in Chailley's analysis.

Chailley shows G prolonging final A again after the structural descent he depicts as having been completed at the antiphon's midpoint, with the words *angeli domini*. This he proposes despite the recovery of tenor D and cadential descent therefrom on the antiphon's final word *altissimi*, and despite this later passage repeating the earlier phrase's ordered tonal content (what Aurelian would call its *modulatio*), from the second syllable of *angeli*. In Schenkerian practice, one usually analyzes a repetition the same way each time it appears—to the extent that it functions in the same way in context. With repeated cadential passages, earlier descent is usually taken to represent motion to an inner voice; the last cadence is most often taken as structural. There are exceptions, but unless one is dealing with a series of strophes, or an echo, coda, or special case, the general idea is that harmonic and melodic tension remain in play until their release in the final cadence. Chailley's theory of chant structure allows no such analytical nuance: he must take stepwise ascent and descent through the modal core where he finds it, and the only pentatonic stepwise rise and fall he discerns in this melody takes place in the second system of his analysis, from the A final up to tenor D and back again.

Melodic-functional analysis of this *Subvenite* is offered at the end of this chapter. For now, let us consider the pentatonic rise and fall through the modal core that Chailley proposes as a general paradigm. Examples of such progression, up by step from final to tenor and then down

again the same way, are not hard to find in Gregorian repertoire: the Antiphon *Miserere mei deus* (Example 3.9), may serve as a model. But many other melodies begin partway between final and tenor (*Inclinavit dominus*, for example), beside many more that begin on the tenor directly (*Lauda ierusalem*, for example), and others yet that begin with a large leap from final to tenor, as in the Mode-1 *Primum querite* (Example 2.6, line 1). These four types of initial approach to the modal tenor are found among the manuscript variants of the Mode-8 “Noeagi(s)” gathered in Example 2.2: variants 1–4 and variant 10 open with a leap from final to tenor, variants 5–8 rise from final to tenor through pentatonic steps (some with *pien* elaboration), variant 9 rises to the tenor from an intermediate-degree initial, and variant 11 begins on the tenor directly. What all have in common is the modal process by pentatonic step *from* tenor to final, which in Mode 8 forms the diatessaron descent solmized “fa (mi) re ut.” Unlike Chailley, melodic-functional analysis considers initial ascent to the tenor *Kopftön* of the fundamental line as optional, attainable by step or by leap, representative of arpeggiation in any case, and generally subordinate to the more obligatory stepwise motion of tenor function toward the final. All of this agrees with Schenker’s mature theory of the *Urlinie*, which in earlier stages of his career ran both up and down like Chailley’s.

Also like Schenker early on, Chailley operates on the premise that tonal structure moves over a pre-existing scalar background based on a chain of fifths.¹¹⁹ The *cantus* tradition invokes no such scale, indeed sometimes no scale at all, the logical priority of which may be questioned on general principles.¹²⁰ A scale once established as an intonation (in the Asaf’yevian sense) may

¹¹⁹ “Essai analytique,” 86; “Du pentatonisme,” 167.

¹²⁰ Cohen, “Notes, scales, and modes,” 313–14; cf. Victor Zuckerkandl, *The Sense of Music*, (Princeton, NJ: Princeton University Press, 1959), 25: “The scale is not the beginning of music. Figuring out a scale first, then building melodies from the material of the scale: this is not the

certainly reinforce patterns of voice leading as a railway line does commerce between cities. Such commerce, however, and compelling interest in furthering it, usually precede and motivate the laying of the track. So it may be that voice leading logically precedes and motivates the construction of scale patterns, rather than the other way around.

Nor is it the case, as Chailley would have it, that modal cores of semitone span do not exist in Gregorian chant. **Example 3.14** shows three versions of the ferial Antiphon *Clamavi*: two in transcription from practical sources, and the last in melodic-functional analysis.¹²¹ The Klosterneuburg version begins and ends on *E*, ranges down to *C*, and rises to *F*; the version from the modern Monastic Antiphoner presents the same audible Gestalt in a variant notated to begin and end on *a*.¹²² At either pitch-level, tenor function rises only to the semitone above the final. Dom Jean Claire of Solesmes examines this and other ferial Office items as remnants of chant practice from before the Frankish recension and preceding the introduction of the eight-mode system to western music theory.¹²³ Claire reasons that, the ferial Office having been established before those of the ever-expanding temporal and sanctoral cycles, such ferial antiphons and their psalmody preserve a more primitive form of chant melody.¹²⁴ He has also demonstrated that they

way music develops. People sing. Melodies appear. Scales are later theoretical abstractions, the result of reflection about the tonal material used in melodies.”

¹²¹ Translation: “I cried out, and he heard me.” NB: ‘ferial’ refers to the weekly cycle of Hours attached neither to Sundays and other feasts commemorating events in the life of Christ (the temporal cycle or *Temporale*) nor to those commemorating saints (the sanctoral cycle of *Sanctorale*): Monday at Lauds, e.g.

¹²² Klosterneuburg Stiftsbibliothek 1013, 66v, electronic facsimile: Austrian Academy of Sciences and Austrian National Library, *Mittelalterliche Handschriften in österreichische Bibliotheken* http://www.manuscripta.at/_scripts/php/digi.php?ms_code=AT5000-1013 (accessed November 27, 2013); AM 111.

¹²³ Jean Claire, “Les répertoires liturgiques latins avant l’octoéchos, I: L’Office ferial romano-franc,” *Études grégoriennes* XV (1975): 5–192.

¹²⁴ Claire, “Les répertoires,” 12.

exhibit “modality of a single element”: not a dyad of tenor and final on separate degrees, but a monad that fulfills both functions.¹²⁵

Melodic-functional analysis easily accommodates this paradigm—indeed it gains valuable theoretical perspective from it. Instead of linear motion from an initially-separated tenor to later unity with the voice of final function, we find in such melodies the functions of tenor and final united throughout upon a single tone, around which others remain locked in close orbit as neighbors, lower thirds, etc.—often resulting in melodic forms Sachs might call ‘centric.’

Example 3.14 Antiphon *Clamavi*, with melodic-functional analysis

The image displays a musical score for the Antiphon *Clamavi*. It consists of three staves. The top staff, labeled 'Klosterneuburg (12c)', contains the text 'Cla - ma - vi et ex - au - di - vit me.' The middle staff, labeled 'AM (20c)', shows a different melodic setting. The bottom staff provides a melodic-functional analysis, with a box highlighting a specific melodic segment. This segment is labeled 'mi' and 'ii', indicating its functional relationship to the mode.

Claire identifies three such modes, each a family proceeding from its own mother tone (*corde mère*). Sharing Chailley’s assumption of a pre-existing pentatonic background,¹²⁶ Claire locates these cordes mères on adjacent pentatonic pitches C (*corde-mère do*), D (*corde-mère ré*), and E (*corde-mère mi*). The mother tone on C has neighbors at the semitone below and the whole

¹²⁵ Claire, “Les répertoires,” 11, fn.; see also Jean Claire, tr. Thomas Forrest Kelly, “Modality in western chant: an overview,” *Plainsong and Medieval Music* 17, no. 2 (2008), 101–27. Claire Maître, “La modalité du plain-chant au moyen âge,” *Musurgia* 4, no. 3 (1997), 31–42 offers a *précis* of modal theory after Jean Claire, with examples (including further variants of the Antiphon *Clamavi*, 39).

¹²⁶ Claire, “Les répertoires,” 11, fn.; cf. “Modality in western chant,” 116.

tone above, that on D the whole tone both above and below, and that on E the whole tone below and semitone above. I propose that melodic-functional analysis adopt these three categories with the following modification: rather than associating mother tones and their modal families with fixed pentatonic pitches, let us instead follow medieval and Renaissance practice and identify their emergent tonal qualities by means of solmization syllables.¹²⁷ These attach to various tones of the gamut, as in this *Clamavi* the tonal quality mi attaches to the notated *a* in some sources, and to *E* in others. Example 3.14 reflects the contingent nature of notated pitch, and the identity of tonal structure in the two versions transcribed, by presenting analysis of both on a single system provided with two clefs: reading the bass clef shows the final as *E*-mi, whereas the soprano clef with B-flat signature locates the final on *a*-mi. The pitch-level is accidental; what is essential is the sounding Gestalt.

I thus propose that melodic-functional analysis recognize the mode of this *Clamavi* not as that of pentatonic-background E but as that of solmized mi. Similarly, Claire's mode-with-semitone-below-the-final will be recognized not as that of corde-mère *do*, which in French refers to the fixed pitch C, but as that of corde-mère *fa*, which I intend to refer not to the modern pitch F but to the emergent tonal quality indicated by that solmization syllable. This terminological adjustment yields the trio of *cordes-mères* re, mi, and fa—not adjacencies in an imagined background pentatonic, not fixed pitches D E F, but perceived tonal qualities corresponding respectively to protus, deuterus, and tritus in the *Musica Enchiriadis* tetrachord.¹²⁸ (The fourth element of that tetrachord, tetrardus, at this very basic level shares intervallic and qualitative identity with the protus.)

¹²⁷ Cf. Cristle Collins Judd, "Modal Types and 'Ut, Re, Mi Tonalities': Tonal Coherence in Sacred Vocal Polyphony from about 1500," *JAMS* 45, no. 3 (Autumn 1992), 428–67.

¹²⁸ See §2.3 above.

Claire's focus is on the history of chant modality—the diachronic approach. Archaic modality of a single element evolves historically (during the period of oral transmission) into later modes, in some instances through the upward separation of the melodic tenor from the *corde-mère* final, in others through the downward separation of the final from the *corde-mère* reciting note, many of these stages leaving traces in the paleographic record and even in the surviving repertoire with antiphons such as this *Clamavi*.¹²⁹ Melodic-functional analysis, on the other hand, although offered with the hope of its being useful to historical inquiry, is principally concerned with the grammar of chant modality—the synchronic approach. The question here is not how did the chant melody get from one modal form to another over historical time, but how at each stage of that historical development it unfolds in musical time a governing sonority, that is to say, a harmony—something altogether beyond time.

In the analysis of Example 3.14 the Antiphon as a whole projects the qualitative sonority solmized mi, both final and tenor inhabiting the deuterus *Urpunkt*. This is prolonged and decorated first by stepwise descent, in the voice of final function, to the major third below: *E D C* or *a G F*, depending on the notated pitch-level. This motion enacts in miniature the modal process of Mode 6, “la sol fa,” and thus unfolds the Mode-6 dyad of final fa below tenor la (cf. Example 3.7, Antiphon *Miserere mei deus*). From the voice of final function now at its lowest point there follows an ascent through the space of the diatessaron (perfect fourth). This motion unfolds the Mode-8 dyad of final ut below tenor fa, which in the Klosterneuburg version takes the form of the psalm-tone intonation common to modes 2 and 8 (ut re fa). In the twentieth-century edition—a synthesis of several historical sources—the rising motion includes *pien*-tone mi; the analysis places parentheses around this note not because of its *pien* status but because it

¹²⁹ Claire, “Modality in western chant,” 114–16; Maître, “La modalité du plain-chant,” 37–42.

appears here in one variant and not the other. The diatessaron ascent, even if filled in with intermediate degrees, represents an unfolding through arpeggiation: the lower note belongs to the voice of final function, and the upper note to that of tenor function. Here the latter voice rises to the *Urpunkt*'s upper-neighbor fa. Following the Mode-8 ut-fa arpeggiation, there is alternation between tenor fa and final re—the dyad of Mode 2—before final-voice re is drawn back, like a satellite by force of gravity, to *Urpunkt* mi. A decision for the analyst is whether to interpret this ascending re as a passing note between final mi and the preceding ut, or whether to regard it as a lower neighbor to the final, in which case the earlier third-descent mi-re-ut occurs on a level less fundamental. I have chosen the latter, partly because I hear the Klosterneuburg variant's ut-re-fa ascent as the conventional intonation for Mode 2 when followed so immediately by alternation between re and fa, the two poles of that dyad. Also, I hear a stronger connection between final mi and lower-neighbor re than between final mi and lower-third ut with this ascent that features the characteristic final-function re in combination with tenor-function fa looping like a lasso around final mi, and to some extent I find the idea of the final-functioning voice plodding down the third and up again aesthetically dissatisfying. Reasonable persons could disagree on this instance of multivalence. Whatever the details, the principal motion is clearly orbital around corde-mère mi, out of which the melody expands and into which it contracts again at the close.

Finn Egeland Hansen incorporates the idea of pentatonic tones connected by *pien* in what he proposes as an account of Gregorian tonal grammar: his interpretation of his own complete transcription and computer-assisted analysis of the repertoire inscribed in the Dijon Gradual-Tonary, which transmits a complete annual cycle of Mass chants in neumatic and pitch-specific

letter notations.¹³⁰ Hansen musters vast amounts of data on the incidence of pitches and pitch-combinations, and he provides astute observations on melodic surfaces—initial and cadential patterns, for example—with regard to related groups of melodies.

There is in this proposed grammar no long-term structure, however, nor functions analogous to subject and predicate. What we find are accounts of individual pitch-symbols (musical letters analogous to verbal letters), of three-note sequences (analogous to verbal syllables), of stock melodic segments belonging to the compositional process that chant scholars call centonization—segments analogous to proverbs, classic turns of phrase—and most of all, accounts of selective pitch-groups within the gamut. Hansen proposes several referential collections, some with identity at the octave and generated by fifth—the ‘ce-pentatonic’ (C G D A E), for example—others with identity at the fifth generated by the octave (!), still others made from alternating chains of thirds, and others yet that alternate between pentatonic sets. The obligation of chant melody, it would appear from Hansen’s treatment, is to display such grouping or groupings by striking member-pitches more often and more freely than non-members. Hansen calls each of these constellations a “system”; in very few cases does any such collection succeed in covering all the pitches required for the melody at hand—what medieval theorists refer to by the term *systema*. Tones foreign to the governing system are constantly nosing in, these alone producing “tonal tension” and “tonal information,” which for Hansen are absent so long as the melody moves among members of the system. Hansen rejects historical notions of mode and melodic function, for example generally treating final *E* as a *pien*—in other words, as a dissonance.

¹³⁰ Finn Egeland Hansen, *The Grammar of Gregorian Tonality: An Investigation Based on the Repertory in Codex H 159, Montpellier*. Two vols. (Copenhagen: Dan Fog Musikforlag, 1979).

Hansen's analysis consists primarily of identifying which of his systems appears to be the one ruling a particular chant or chant passage, and marking the incidence and relative strength of tonal tension produced by foreign intrusions. **Example 3.11** reproduces Hansen's analysis of the Communion *Pacem meam*, which appears in the Dijon tonary (as in others) under the category of tritus authentic (Mode 5). Hansen marks the tone-system for the beginning and end of this chant as fa-pentatonic ("fa" not for the solmization syllable but for the fifth-related group F C G D A), and marks the extent of its reign by the wavy line following the indication "fa" placed above the staff. In the middle of this chant Hansen reads modulation to the pentatonic collection at the fifth below (B-flat F C G D). This is not because *b* replaces $\flat$ in this melodic segment—both accidentals have already been *prien* visitors, their low-tensity stepwise connection to the fa-pentatonic indicated by nodes in its wavy line—but because *b* now begins to receive rhythmic repercussion and here participates in extended arpeggiation, behaviors normally displayed only by the main tones of Hansen's systems. Even so there remains discord in the higher-tensity third-leap from now-foreign *a*, marked with an inverted caret over the setting of the second syllable of *relinquo*. The fa system returns at the end; vertical lines mark cadences of various weights.

Example 3.15 Hansen's analysis of Communion *Pacem meam*¹³¹

The image shows a musical score for the Communion chant 'Pacem meam'. It consists of two staves. The top staff features a wavy line representing a melodic contour, with solmization syllables 'fa' and 'b b d' written above it. Below the staff, the lyrics are written in a Gothic script. The bottom staff shows the same melody with different solmization syllables. The lyrics are: 'Pa- cem me- am do vo- bis, al- le- lu- ia: pa- cem re- lin- quo vo- bis, al- le- lu- ia, al- le- lu- ia.' The number '522' is written in the left margin.

Contrast this analysis of Hansen's with the melodic-functional analysis of the same chant given as **Example 3.16**. The latter demonstrates not only how the melody may be recognized as belonging to Mode 5 from its letter-notation ending on *F*, but how it intones and enacts that mode and thus may be recognized as such even before or without notation. This is the process, I propose, of tenor function initially inhabiting a tone of tritus quality (*fa* as solmization syllable), eventually descending by pentatonic modal degrees toward unification with a heretofore separate voice of final function located at the diapente below, and thus unfolding the Mode-5 dyad traditionally solmized "fa fa." Shifts between $\flat$ and b are not seen as symptoms of modulation between idiosyncratic systems contrary to all historical testimony, but as part of a unified tonal process in agreement with descriptions and prototypes handed down by generations of musicians for whom this repertoire was daily bread.

¹³¹ Hansen, *The Grammar*, 156; cf. *LU* 895. Translation: "My peace I give you, alleluia: peace I bequeath to you, alleluia, alleluia."

Example 3.16 Melodic-functional analysis of Communion *Pacem meam*

The image displays a musical score for the Communion chant "Pacem meam" across four levels of analysis, labeled A through D.

- Level A:** Shows the text in modern transcription: "Pacem meam do vo - bis, al - lelu - ia: pa - cem re - lin - quo vo - bis, al - le - lu - ia, al - le - lu - ia." The melody is written on a single staff in 8/8 time.
- Level B:** A foreground analysis of the melody. It features solfège syllables "fa/sol", "fa", "mi/la", and "sol fa" above the notes. Arrows and "ii" markings indicate specific rhythmic and melodic intervals.
- Level C:** A middleground view of the melody, showing the same notes as Level B but with different phrasing and connections, emphasizing the underlying structure.
- Level D:** The harmonic background, labeled "Mode 5". It shows a single staff with two notes, "fa" and "fa", indicating the modal framework.

Level A gives the text in modern transcription, level B a foreground analysis, level C a middleground view, and level D the harmonic background. The chant begins with recitation on the modal tenor solmized *fa*, notated here on *c*. Level B reflects the rhythm of the initial as it might be interpreted by a native speaker of Italian, German, Spanish, or English, the accent falling on the first syllable of the second word, *meam*. The intoning of the first word, *Pacem*, is therefore noted as an anticipation. (A French speaker might well deliver the phrase more evenly, thus with a slight accent on the initial syllable.) For the moment the final is silent, but its governing function is soon made apparent in further action.

The first motion of voice leading, notated as descent from *c* through $\flat$ to *a*, briefly enacts the *fa-mi-re* process of Mode 2, and is immediately repeated. As the phrase continues, its

cadence on *F* at last brings the chant's final into the realm of the audible. Structural functions of final and tenor continue to occupy separate degrees, however—here we may recognize an ancestor of triadic tonality's imperfect authentic cadence (IAC).

The second phrase begins with the same word as the first, *pacem* (peace), to which the melody responds with a kind of sequential imitation: as the first phrase has unfolded Mode 2 (re fa) with repercussion of tenor *c*-fa in relation to *a*-re, now the second phrase unfolds the same mode down one step, with repercussion of tenor *b*-fa in relation to *G*-re. To melodic-functional analysis this has meaning not as a modulation of tone-system (the difference between $\natural$ and *b* being accidental) but as an artistic engagement with the verbal text by means of voice-leading: Mode 2 on *G* is achieved with tenor function's transfer from *c* to *b*, in coordination with the voice of final function ascending from *Urpunkt F* to its upper-neighbor *G*. Thus begins the long-term modal process of tenor function toward unification with the final. We have not yet heard the last of *c*, but already its role as structural tenor has reached its termination.

The transfer of tenor function from *c* to *b* is prepared, in part, by the first appearance of *b* as upper neighbor to *a* in the setting of the first *alleluia*. This not only exerts terminal pressure on tenor *c* but also alters its tonal quality from fa to sol, a mutation familiar from medieval pedagogy. In Example 3.16, this is noted on levels B and C with the identification of the prolonged structural tenor *c* as instantiating the tonal quality fa with mutation to sol: “fa/sol.” This mutation is not strictly necessary for the descent of Mode 5, but $\natural$ -mi, so long as it remains active, tends to give leading-tone support for tenor function remaining aloft on *c*-fa. The latter sometimes descends to *a*-re directly by pentatonic step, or it may pass through $\natural$ -mi as *pien*, but often the Mode-5 descent toward the final begins with the lowering of the mobile fourth degree, as here. This may come after a brief prolongation of the modal tenor as in this chant, or as part of

a more protracted melody as in the Mode-5 Graduals, which often feature $\sharp$ -mi and b -fa in alternation.

The second phrase of *Pacem meam* continues with a third-progression upward from Mode-2 tenor b through c to d , the highest point of the melody. This d might have been developed as tenor of Mode-1-over- G (note the ascent from G to d with the text *vobis, alleluia*), but ascent to the tenor of the authentic does not always effect such modulation. Here d is followed by a leap down to a , the tension of which goes unremarked in Hansen's analysis. Melodic-functional analysis recognizes this bold leap as one to functional dissonance. Example 3.16 notes this a as the incomplete lower neighbor to the following b , resolution to which completes a larger prolongation that encompasses the ascent to d and thus confines the Mode-1 dyad G - d to a very local level indeed. To experience the effect of this dissonant leap, sing the chant (without instrumental accompaniment, naturally) and note the necessity of imagining the following b in order to place this leap to a in good tune. As an alternate reading, one might attribute this a to passing motion from final-voice G ; in any case this leap from d to a requires a conceptual shift, from a stable tone in one strand of voice leading, to an unstable tone—a tone on its way elsewhere—in another strand. The tension of this a reflects the energy of the text: the choir may take a breath after the first of these two concluding alleluias, but the wave of tonal motion continues through the caesura and through the final alleluia like a cup overflowing.

Following the prolongation of b -fa, tenor function moves through a -mi, which levels B and C show as mutating to la, after which modal descent continues through G -sol to F -fa. Two alternative solmizations are possible: a -mi could be heard descending to G -re/sol in preparation for F -fa, or these last three structural tones could simply be solmized mi-re-ut. There is little

difference among these choices; I prefer *mi/la-sol-fa* to highlight the Mode-6 descent *la-sol-fa* within the final *alleluia*.

The extent to which the *pīen* fourth-degree *b* is prolonged in this chant is remarkable, given the modest proportions of the melody as a whole. Again this may be seen as related to the text, in this case even more so to the context. For the peace this chant speaks of is that of Christ: “peace,” the Gospel source-sentence (but not the chanted text) continues, “not such as the world gives.”¹³² The melody’s extended tenorization of *pīen b* lends this chant a particularly suspended, otherworldly quality—that is, even more so than that of the repertoire in general—which may be heard to restore some of the transcendence lost in the textual edit. Here the question of modal ethos may also be relevant. As part of the larger Mode-5 process of this chant, tenorized *b* participates in two local, in-process modes: Mode 2 on *G*, as marked in level B of the graph, but also to some extent Mode 8, the diatessaron-spanning nucleus of which is realized (with ascending leap following the first *alleluia*, and with stepwise descent at the beginning of the last *alleluia*) in the relation of tenor *b* over final *F*, a dyad which may be solmized “*ut fa*.” Both in-process modes are described in historical sources as having mild and peaceful qualities, whereas Mode 5 is generally seen as joyful. This is not the place to explore in detail the extent to which these perceived ethical qualities may derive from the structural size and quality of the modal dyad; for now it is enough to note that, in this setting, the ‘mild’ plagal modes deliver the words of peace, and the ‘joyful’ authentic mode the interpolated *alleluias*.

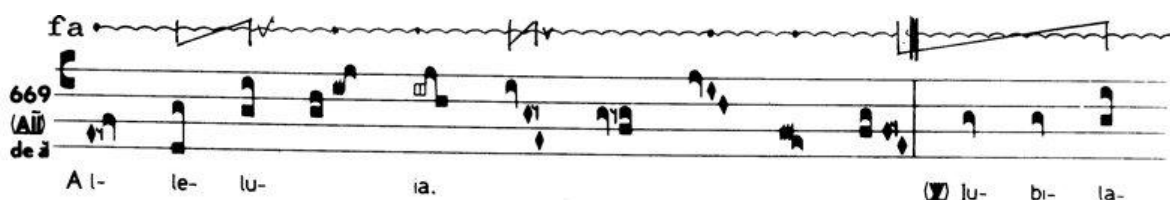
Melodic-functional analysis reads more tonal information in this melody than Hansen does, notably by accounting for tensions inherent in the disparity among its tones—even those related by fifth—and by showing how its cadences are not mere conventional signs dependent on

¹³² “*Pacem relinquo vobis pacem meam do vobis non quomodo mundus dat ...*” (John 14:27). The chant preserves the first two clauses only, and in reverse order; cf. §1.1.

the syntactic events of the text they set, but musical actions that fulfill structural tasks within an uninterrupted whole, even as they are disposed rhythmically in coordination with the articulations of verbal syntax. The greatest difference, however, is the idea that the principal notes of Gregorian melody are not mere conventions, tinkling cymbals, but part of a long-term process toward a tonal goal, the becoming-realized of which is the formal cause of its motions.

Example 3.17 shows the first line of Hansen's analysis of the Alleluia chant with verse beginning *Iubilare deo*, which the tonary identifies as belonging to the deuterus authentic (Mode 3). After the verse, the chant closes with a repeat of the *Alleluia* and its melisma, so the cadence notated on *E* just before the bar line in Example 3.17 is heard again as the final cadence. Despite its opening and closing on *E*, Hansen interprets this chant as displaying the fa-pentatonic tone-system (F C G D A), and thus treats final *E* not as the goal of motion but as a dissonant hanger-on to the principal harmony. This flies in the face of all historical witness. Hansen analyzes the Dijon tonary, a monument to the eight-mode system, as if that system was mere convention, and without reference to the modal sub-groupings by which that document organizes its contents.

Example 3.17 From Hansen's analysis of *Alleluia ... Iubilare* (Hansen 1979, 264)



Example 3.18 offers melodic-functional analysis of the same Alleluia antiphon (that is, the setting of the word *Alleluia* and following melisma ending on the final, not including the solo verse), which is here interpreted as an artistic realization of the voice-leading process of Mode 3,

known to the author of the Dijon Tonary as *deuterus authentic*, under which category this chant appears in that source.

Example 3.18 *Alleluia ... Iubilare* (Dijon 669): melodic-functional analysis

The musical score is presented in four staves, labeled A, B, C, and D. Staff A shows the beginning of the chant with the text "Al - le - lu - ia." Staff B shows a melodic ascent with labels "viii", "fa", "mi re/la", "sol fa mi", and "Mode-3 int." Staff C shows a continuation of the ascent with labels "fa", "mi re/la", "sol fa mi", and "vi". Staff D shows the end of the chant with labels "Mode 3" and "mi fa".

The melodic setting begins with tenor and final functions united on the deuterus final *E*, from which the voice of tenor function separates by rising on the first three syllables of the word *Alleluia* to the authentic tenor *c*, which it reaches on the last note of the syllable *-lu-*. Such achievement of the modal tenor within the syllabic span of the first principal word-accent is so typical in Gregorian text-setting as to constitute a general rule.

This elaborate initial ascent displays intonational function without explicit imitation of the psalmodic intonation formula (in Mode 3 typically *G-a-c*). Here the ascent is more gradual, moving by heptatonic step through the minor sixth. The *G* at the semitone above final *E* does receive emphasis within this broad upward sweep, however, with leaps from repeated *G* to *a* and

back again delaying stepwise ascent through *a* and $\flat$ to tenor *c*. In Mode 3 this semiditone over the final is particularly apt to function as a consonant dividing-point of the large diapente-plus-semitone interval between final and tenor, either *E*-(*G*)-*c* in regular position with final *E*, or by transposition *a*-(*c*)-*f*. The foreground graph, level B of Example 3.18, shows how this harmonic division plays out in the melodic ascent of this Alleluia.

The consonance of the semiditone over the final may be seen as the functional basis for this mode's initial formula considered as an intonation in the Asaf'yevian sense: *G*, being consonant in relation to both final and tenor (semitone above final *E*, diatessaron below tenor *c*) is particularly apt for the function of launching-point for Mode-3 recitation because it provides a node of consonance from which the voice may quickly rise to the tenor, whereas final *E* at the sixth below is perhaps too far away for the smooth and direct approach to the reciting note that psalmody requires. The psalmodic formula passes from *G* through *a* (which is also consonant with both final and tenor), and thence up to the tenor itself, in two quick steps. This Mass chant, on the other hand, can afford to be more prolix in approaching the tenor, and does so by beginning all the way down on the modal final, and by prolonging each of its three initial syllables with two or more notes.

Tenor *c* is reached with the last note of the normally stressed syllable *—lu—*, but this functions as an anticipation of the onset of the following jubilus (the long melisma on the final syllable *—ia*), which receives a strong timbral accent. In the Dijon source tenor *c* is inflected with its microtonal lower neighbor. The heptatonic lower neighbor $\flat$ performs a similar function: in deuterus authentic, it is accidental in the Aristotelian sense whether the modal tenor is located at the diapente above the final ($\flat$ over *E*) or at the diapente-plus-semitone (*c*).

The voice of tenor function plunges through the Mode-3 reciting note's lower inflection $\natural$ through *G* to final *E*, then regains the upper inflection *c* by rising in pentatonic steps through the *G-a-c* of the conventional intonation formula (Mode 3 int.). The modal process of tenor function toward unity with the final begins immediately thereafter, the pentatonic steps *c-a* and *G-E* filled in with *piens* $\natural$ and *F*, respectively.

These are some of the things that melodic-functional analysis reveals in this melody; others the reader may find inscribed in the example. Hansen's analyses, on the other hand, reveal nothing about motions within what he reads as the prevailing tone-system, and little about motions beyond it. There are long passages of music about which Hansen has nothing to say simply because there are no non-pentatonic notes in them, for example. So why are there all those notes, and why in that order? Hansen derives a level of meaning from notes and note-groups that corresponds to linguistic analysis of phoneme and syllable. He reports how many times *C* appears, for example, and in what immediate context. We could do the same for the Latin text, and this would tell us something about the language, but not how it conveys meaning. Hansen promises a grammar of Gregorian chant, but what he delivers is a phonology.

§3.6 Schenkerian and Schenker-influenced proposals

The present proposal is not the first to apply Schenker-influenced graphic analysis to Gregorian chant, but it is the first to do so by taking account of medieval modal theory and the repertoire's pentatonic basis as well as Schenkerian principles properly speaking, and so the first to reconcile these three elements in a theory of Gregorian tonality that is historically informed, theoretically coherent, and in good accord with the actual melodic behavior of the repertoire.

This section examines previous analyses that feature Schenkerian and quasi-Schenkerian analytical techniques.

Saul Novack has proposed a quasi-Schenkerian reading of the Gregorian *Alleluia ... Pascha nostrum* from the Easter liturgy with a graphic analysis reproduced here as **Example 3.19**.¹³³ Having derived from Apel a rudimentary understanding of mode as the diatonic division of the octave, Novack asks the logical question “Is it only the *finalis* that creates tonality?”¹³⁴ As with Salzer’s studies in medieval polyphony, Novack seeks tonal order in Gregorian melody primarily in the extent to which it behaves like music based on triads.¹³⁵ The assumption of triadic tonality in Gregorian chant is unsustainable on historical grounds, as Schulenberg has noted.¹³⁶ Novack, to his credit, never asserts that all Gregorian chant has a triadic basis, only that some items of the repertoire exhibit the hallmarks of “tonal structure” in the prolongation of triadic structures and thus may be heard to cohere musically under standards generally recognized by Schenkerian analysis.¹³⁷

Novack’s analysis can be read to demonstrate how a modal dyad—in this case the ut-sol diapente of Mode 7 over final G—may allow for triadic development. I characterize Novack’s reading as “quasi-Schenkerian” because it incorporates neither a Schenkerian *Bassbrechung* nor any explanation of how the immobile G of the lower register relates to Schenkerian ideas of the

¹³³ Saul Novack, “The Analysis of Pre-Baroque Music,” in *Aspects of Schenkerian Theory*, ed. David Beach (New Haven: Yale University Press, 1983), 114–16; cf. LU 779.

¹³⁴ Novack, “The Analysis of Pre-Baroque Music,” 114; cf. Apel, *Gregorian Chant*, 133.

¹³⁵ See Felix Salzer, “The Historical Development of Tonal Coherence,” in *Structural Hearing: Tonal Coherence in Music*, 264–81 (New York: Dover repr., 1982); also his “Tonality in Early Medieval Polyphony: Towards a History of Tonality,” *The Music Forum I* (New York: Columbia University Press, 1967), 35–98.

¹³⁶ David Schulenberg, “Modes, Prolongations, and Analysis,” *The Journal of Musicology* 4, no. 3 (Summer, 1985–Summer, 1986), 315–16.

¹³⁷ Novack, “Pre-Baroque Music,” 114–16.

bass and its requisite motions. It is easy to see how the immobile *G* represents the *Urpunkt* as defined in this chapter, but no such theoretical basis is offered by Novack.

Example 3.19 Novack's analysis of *Alleluia ... Pascha nostrum*¹³⁸

(a)

Al-le-lu - ia

3rd

♯ Pascha nostrum

immola-

-tus est Christus

(b)

The musical score consists of two systems, (a) and (b). System (a) contains eight staves. The first staff is a vocal line with the lyrics 'Al-le-lu - ia'. The second staff is an instrumental line with a '3rd' marking. The third staff has a '♯' marking and the lyrics 'Pascha nostrum'. The fourth staff continues the vocal line. The fifth staff has the lyrics 'immola-'. The sixth staff continues the instrumental line. The seventh staff has the lyrics '-tus est Christus'. The eighth staff continues the instrumental line. System (b) contains a single staff with a vocal line.

¹³⁸ Novack, "Pre-Baroque Music," 115.

Example 3.20 presents the same Alleluia chant in melodic-functional analysis. The main difference from Novack's analysis is the shift in emphasis from proto-triadic, heptatonic elements striving toward (and yet not quite reaching) tonal coherence in the expression of the octave-divided-by-fifth and the inchoate G-major triad, to the self-sufficient modal-pentatonic structure of Mode 7. Novack's analysis reflects the hearing of an ear accustomed to triadic tonality and recognizing points of contact with the Gregorian Alleluia, whereas mine reflects the hearing of an ear accustomed to Gregorian melody and trained in the *cantus* tradition to recognize the categories of modality through which the melody moves in realizing the concinnity that reaches perfection in the unity of tenor and final.

Level A of the graph is a foreground analysis of this chant in liturgical practice, which begins with the cantor intoning the word *Alleluia*. The choir repeats after the cantor, continuing with a long melisma (the *jubilus*) on that word's final syllable. This particular *jubilus* prolongs tenor *d*-sol by means of its upper neighbor *e*-la, followed by three descents to final *G*-ut. The last of these is the most emphatic, closing off the Alleluia antiphon. It features finalization of *G*'s lower neighbor *F*-fa supporting tenor *c*-fa—and so prolongs the Mode-5 dyad solmized fa fa (thus the lower-case numeral *v*); the graph depicts in its folded state this in-process harmony which is unfolded on the melodic surface with the ascent *F*-*a*-*c* as in the Mode-5 psalm intonation (see Novack's transcription in Example 3.19 for details). Such Mode-5 moments are common in tetrardus modes (7 and 8); melodic-functional analysis reveals their contrapuntal origin.

Example 3.20 Melodic-functional analysis of *Alleluia ... Pascha nostrum* (LU 779)

The image displays a musical score for the chant *Alleluia ... Pascha nostrum* (LU 779), featuring melodic-functional analysis. The score is divided into two main sections, A and B, each with a treble clef and a key signature of one sharp (F#).

Section A: The first system shows the beginning of the chant, starting with a treble clef and a key signature of one sharp. The melody is written on a staff with a treble clef and a key signature of one sharp. The lyrics are "Allelu - ia." followed by "Pas - cha nos - trum immola -". The analysis includes a box labeled "A" with a "sol" label above it, indicating the final. The melody is marked with "N" (Neumes) and "P!" (Psalms). The second system continues the melody with the lyrics "tus est Chri - stus." and is marked with "N" and "i".

Section B: The third system shows the end of the chant, starting with a treble clef and a key signature of one sharp. The melody is written on a staff with a treble clef and a key signature of one sharp. The lyrics are "Allelu - ia." followed by "fa mi re ut". The analysis includes a box labeled "B" with a "sol" label above it, indicating the final. The melody is marked with "N" and "v". The fourth system continues the melody with the lyrics "ut sol" and is marked with "N" and "v".

The virtuosic solo verse rises to the octave above the final, which is decorated with upper-neighbor *aa*. This I analyze as a prolongation of tenor *d* which takes the tonal quality *sol* in relation to final *G-ut*. It is remarkable how often and how firmly this chant articulates this *ut-sol* dyad, which is that of Mode 7. Melodic-functional analysis reveals a contrapuntal virtuosity at play here in the voice-leading strands below the high notes. The verse *Pascha nostrum immolatus est Christum* (Christ our Passover is sacrificed) begins after the double bar on *c-fa*. This may seem an odd choice, especially as it immediately falls to $\natural$ (B natural), a surprising candidate for prolongation in this mode (the *pien* third degree over the final is not obligated to take part in the structural descent of tetrardus modes). Melodic-functional analysis shows this $\natural$ -

mi to have a double function: in the short term it is finalized in relation to tenor *e-la* (itself passing toward high *g*), thus prolonging the Mode-4 dyad solmized *mi la* (thus *iv*), but it also participates in a remarkably long-term unfolding of the principal mode through the fifth-progression *d-c-b-a-G*: this spans from the prolonged *d* of the opening antiphon to the triumphant onset of the solo verse's final word *Christus*. That emphatic moment of arrival is delayed with a prolongation of Mode 1 (noted on Level A at the beginning of the second system) articulated by *e-la* over *a-re* (thus the notation *i* with the unfolding of that mode). The word *Christus* is set to an abbreviated version of the *Alleluia* antiphon, which is then repeated in full to close off the musico-liturgical utterance. Level B offers a middleground reading, in which the interior fifth-descent unfolding is depicted with a doubly curved slur. The example concludes with the deep-background Mode-7 dyad of final *G-ut* and tenor *d-sol*.

A 1992 article employs “neo-Schenkerian” graphic techniques to the analysis of Gregorian phrases (but not whole pieces); the stated concern of the authors is not voice leading strictly speaking, but rather how “the Gregorian melody respects the textual structure, verbal intonation and natural accentuation of the Latin language.”¹³⁹ Here the traditional modes are accepted at face value; no attention is given to how they are constructed through voice leading.

Vijayasree Mokkaṭṭi's 1997 dissertation approaches the question of Gregorian modality from an “Indo-European perspective” and supplies the felicitous term “modal action” for the constructive principle shared by western plainchant and Karnatic repertoires.¹⁴⁰ Mokkaṭṭi proposes a generative and general theory of mode, by which a note less stable seeks another

¹³⁹ Ramón Sobrino and Maria Encina Cortizo, “Relationships between Verbal Intonation and Gregorian Melody in the First Mode Introiti,” in *Secondo Convegno Europeo di Analisi Musicale*, ed. Rossana Dalmonte and Mario Baroni, Studi e Testi 1 (Trent: Università degli Studi di Trento, 1992), 200, 189.

¹⁴⁰ Vijayasree Mokkaṭṭi, “Modal Action: An Indo-European Perspective in Gregorian Chant” (PhD diss., Wesleyan University, 1997).

more stable, the resulting motion creating a gesture (in Karnatak music called *gamaka*); such gestures lead to phrases; the corpus of such phrases is proposed to be the essence of mode.¹⁴¹ At the same time, Mokkapati asserts, “scalar arrangements form a skeletal basis for mode and modality.”¹⁴² Mokkapati employs a quasi-Schenkerian graphing technique (on a four-line staff) that appears to assign to the notes of chant relative voice-leading weights, this by means of stemmed and unstemmed noteheads open and closed; also grouping structures, this by means of nested stems (all upward; there is no implied counterpoint) and beams.¹⁴³ This system is never explained, however, nor am I able to understand it from studying the examples. What is clear, however, is that Mokkapati’s focus on characteristic motions of the modes leads her to analyze phrases, not pieces. There is no over-arching modal structure in her readings, no counterpoint of tenor and final, only concatenations of characteristic gestures.

More recently, the New Zealand musicologist Fiona McAlpine has proposed a theory and method of analysis of Gregorian chant that, based like mine on a combination of Schenkerian and *cantus*-tradition principles, posits a two-voice structure as well as obligatory linear descent to the final.¹⁴⁴ McAlpine’s principal concern is reading signs by which the chant declares its allegiance to one mode or another. The final may be predicted at the beginning of a chant; in **Example 3.21** McAlpine observes this signification in melodic leaps from final to tenor.

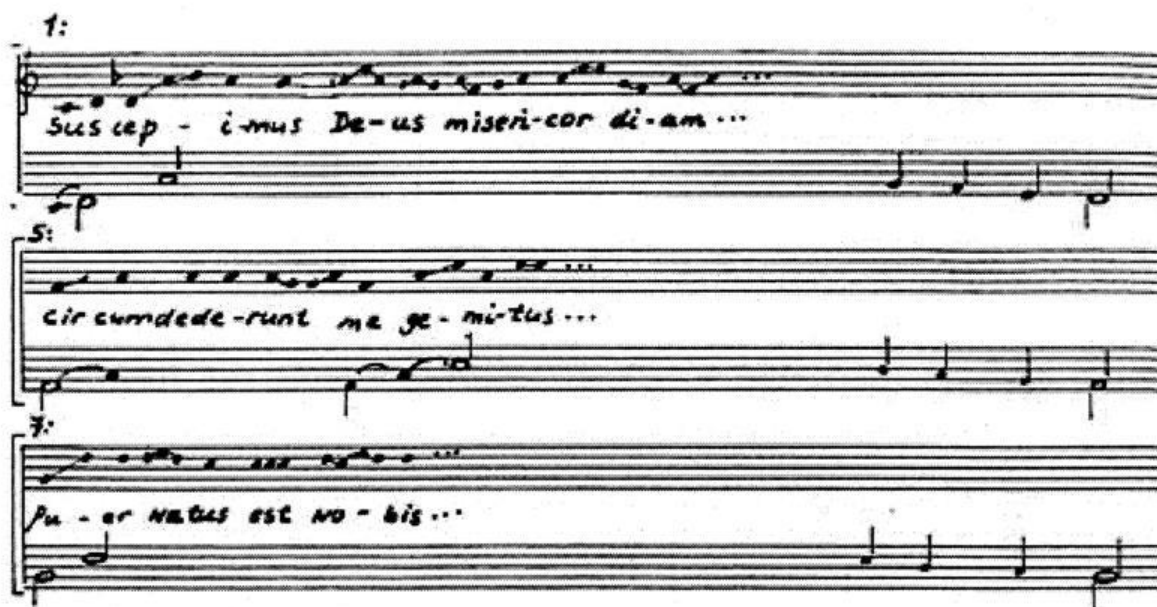
¹⁴¹ Mokkapati, “Modal Action,” 51–53.

¹⁴² Mokkapati, “Modal Action,” 98.

¹⁴³ Mokkapati, “Modal Action,” 141, 145, and *passim*.

¹⁴⁴ Fiona McAlpine, “Beginnings and Endings: Defining the Mode in a Medieval Chant,” *Studia Musicologica Academiae Scientiarum Hungaricae* 45, nos. 1–2 (2004), 165–177; also *Tonal Consciousness and the Medieval West*. *Varia Musicologica* 10 (Berne: Peter Lang, 2008).

Example 3.21 McAlpine's analysis of introits cited by Aurelian¹⁴⁵



The Mode-1 leap from *D* to *a* in the Introit *Suscepimus* provides a clue, McAlpine observes, as does the Mode-5 *F* moving through *a* to *c* in *Circumdederunt me gemitus mortis*, and Mode-7 *G* rising immediately to tenor *d* in *Puer natus est*. This is a valuable tool for which I am grateful as an analyst. The melodic leap between voices of final and tenor function represents an alternation of the spotlight, as it were, from one protagonist to the other in the tonal drama. McAlpine, however, takes this motion of the musical surface as essential. The initial leap from the final, McAlpine writes, “acts as a springboard into musical space, and ... musical gravity will bring the melody eddying back down to it again in order to round off the gesture at the last cadence.”¹⁴⁶ This asymmetrical mirror-form, this rounding-off, is based on gestural repetition and not harmonic relation; thus it describes a rhythmic structure, not a tonal one. And this entropic model, the melody stopping where it does because that is where it runs out of gas, is foreign to my experience: I hear the arrival at the final as a desired goal, a consummation

¹⁴⁵ McAlpine, “Beginnings and Endings,” 168.

¹⁴⁶ McAlpine, “Beginnings and Endings,” 170.

devoutly to be wished. And although the undecorated leap between final and tenor is indeed a common feature of Gregorian melody, it is by no means universal. Among the chants discussed in this chapter, for example, it is found in the Sequence *Dies irae* and the *Alleluia ... Pascha nostrum*, but in none of the antiphons *Inclinavit dominus*, *Lauda Ierusalem*, *Miserere mei*, or *Clamavi*, nor in the respond of the Responsory *Subvenite* (it does appear in the join between the respond and the following verse, but this only after tenor and final have already been confirmed by other means), nor in the Communio *Pacem meam*, nor in the *Alleluia ... Iubilate*.

McAlpine acknowledges a debt to Schenker,¹⁴⁷ and her examples and discussion are generally sensitive to voice leading as it relates to events on or near the musical surface. McAlpine radically departs from the Schenkerian tradition, however, by treating voice leading as a matter of semiotics, not structure: as in Example 3.21, the beginning sends a signal as to what mode will rule in the end.¹⁴⁸ And indeed it often does, but just as *cantus*-tradition theorists describe mode as governing the whole of the melody, beginning, middle, and end, so Schenkerian tradition perceives tonality as the government of the whole piece by the governing sonority, and through the motion of structural functions. The final is the primary consideration in McAlpine's model, but modality for her is not the prolongation of the final, it is a "subtle signal" that telegraphs which pitch is to be prolonged as final.¹⁴⁹ "A piece with tonal focus will differentiate between the pitches it contains so that one is set up as a satisfactory stopping-point for that piece. Modes in practice were a way of sign-posting or differentiating a final."¹⁵⁰ As with so many analysts, McAlpine takes the scale or gamut as *a priori*, into which each of the modes

¹⁴⁷ McAlpine, *Tonal Consciousness*, 79–81, 88.

¹⁴⁸ McAlpine, "Beginnings and Endings," title, 167, 170 (leaps identify finals), 169 ("leaps from D to F ... do not impart enough information"), 171 (intonation's "tonal information" requires confirmation), *etc.*

¹⁴⁹ McAlpine, *Tonal Consciousness*, 94.

¹⁵⁰ McAlpine, *Tonal Consciousness*, 29.

must find a way to carve out its own niche. Melodic-functional analysis, by contrast, demonstrates how tones of the gamut are carved out of an infinite pitch spectrum by and for the action of the modal process.

In her graphs, McAlpine generally connects with a beam the statements of modal tenor and modal final, with other tones assigned less weight throughout, including those of the final descent, as in Example 3.21. This follows from her thesis that it is the early leap from final to tenor that differentiates these two tones from the others in a pre-existing gamut. “Leaps upwards from a final were the means by which a single pitch could be projected through time,” she writes.¹⁵¹ “They are the means by which that final is established and put into relationship with a tenor.”¹⁵² In McAlpine’s proposal, final and tenor are static signs, not active and mobile functions, and so in her graphs the final obligatory descent is represented not as a motion of structural function but as a motion to an inner voice that acts as a signal; again see Example 3.21. It is as if Gabriel simply announced the Incarnation to Mary and no further action were taken. Regarding endings of Mode-7 introits with pentatonic final descents *d c a G*, McAlpine writes: “A tenor-final descent may well sound artificial, in the sense of tacked on at the end, but it is supposed to be tacked on at the end: this is how the final is projected through time.”¹⁵³ From the point of view of melodic-functional analysis, this is like saying that Romeo and Juliet on their wedding night go to bed together out of respect for marital obligation.

Melodic-functional analysis proposes more compelling reasons for melodic motions, and stronger bonds among the tones of modal chant, than does McAlpine; the motions and ties that it proposes are not symbolic but structural, reconciling differences among tones with actions of

¹⁵¹ McAlpine, *Tonal Consciousness*, 441.

¹⁵² McAlpine, *Tonal Consciousness*, 317.

¹⁵³ Ibid.

voice leading that bind both beginning and end to the middle. It also proposes that, as with every member of a well-regulated monastic house, every note of Gregorian melody performs a vital function, not just some of them.

§3.7 Harmonic-contrapuntal government of the modal process

Example 3.22 sketches the background and first layer of middleground for all Gregorian modes according to this proposal. For the dyadic modes, the level to the left of the double bar line traces the dynamic progression of tenor-function *Urlinie* from a state of harmonicity with a stable underlying tone of final function, the *Urpunkt*, to a state of unity with it. Each of these *Ursätze* composes-out the abstract harmonic sonority, or *Klang*, of its own modal dyad, depicted as an unfolded harmony on the more fundamental level to the right of the double bar. These dyads correspond precisely with those of historic sources, including those of the “Re-la, re-fa” Rule to be treated extensively in Chapter Four of this dissertation. Multiple clefs give the conventional placement and transpositions of each mode as they are found in the repertoire of Gregorian chant.

These, I propose, are the modes that govern and give grammatical meaning to the melodic motions of Gregorian chant. Special characteristics of each are seen in the analyses offered in this chapter and in the next. Consideration of their general process, that is to say, what they all have in common, is put on hold for the moment. Suffice it to say that melodic-function theory bridges the gaps in previous proposals, not only at the note-to-note level, but also between historical models and Schenkerian principles often assumed tacitly.¹⁵⁴

¹⁵⁴ See Schulenberg, “Modes, Prolongations, and Analysis,” 305, 315–16, 321.

Example 3.22 The Modes of Gregorian Chant

PROTUS
Authentic

la sol fa (mi) re *Mode 1*
re - la

Plagal

fa (mi) re *Mode 2*
re - fa

DEUTERUS
Authentic, "more recent practice"

fa (mi) re/la sol (fa) mi *Mode 3 - fa*
mi - fa

Authentic, "ancient practice"

mi re/la sol (fa) mi *Mode 3 - mi*
mi - mi

Plagal, "more recent practice"

la sol (fa) mi *Mode 4 - la*
mi - la

Plagal, "ancient practice"

sol (fa) mi *Mode 4 - sol*
mi - sol

TRITUS
Authentic

fa / sol (fa) mi/la sol fa *Mode 5*
fa - fa

Plagal

la sol fa *Mode 6*
fa - la

TETRARDUS
Authentic

sol fa (mi) re ut *Mode 7*
ut - sol

Plagal

fa (mi) re ut *Mode 8*
ut - fa

"MODES OF A SINGLE ELEMENT" (cf. Claire 1975)

corde-mère re/sol
re (sol)

corde-mère mi
mi

corde-mère fa/ut
fa (ut)

Prolongation, for example, has here been demonstrated as the interaction of historically recognized melodic functions and their auxiliaries; mental retention has been experienced in the

harmonic dissonance of tones heard in melodic sequence. In the modal process, furthermore, we may find a rational basis for the obligatory linear descent which Schenker discerned in triadic tonality. The hypothesis, in short, is this: tone, disintegrated by rhetorical forces, remains unsettled, disparate, unresolved in its dis-sonance until the modal process reunites it in the gradual drawing-near and eventual Hollywood kiss of functional voices. The origin and destination of this functional motion are bound to one another by consonance, by modal agreement as Benedict's abbot and prior must be in spiritual agreement.

So Gregorian melody doesn't tell us in advance where it's going, Gregorian melody performs an action of tonal reconciliation. So long as that action leads through an ordered process from one tone to another that we hear as connected (for which criterion the pentatonic step is sufficient) and directed (for which linear motion is apt in dyadic modes, orbital motion in monadic structures), then this motion is not disorganized, even if it may be unclear to us at the beginning just how things will end up. As Guido says, "at the beginning of a song you know not what will follow; at the end, surely, you perceive what has gone before."¹⁵⁵

I conclude this chapter with examples of chants in modes not yet shown in action.

Example 3.23 shows the voice-leading structure of the Mode-8 Antiphon *Ego principium*;

Example 3.24 gives the promised analysis of the Mode-4 Responsory *Subvenite*. These are the plagal modes with tenors at the diatessaron (perfect fourth) over the final. I shall let these examples speak for themselves.

¹⁵⁵ *Guidonis micrologus*, 144; cf. Babb, *Hucbald, Guido, and John*, 67.

Example 3.23 Antiphon *Ego principium* (Lucca 601, 144)¹⁵⁶



This chapter has proposed an analytic paradigm in which historically recognized melodic functions prolong the contrapuntal process of structural voices unfolding an underlying and governing sonority. This sonority consists either of a single tone defined qualitatively in relation to surrounding dissonances (Claire’s ‘Modes of a single element’), or the consonant dyad of such a tone with another in a higher register. Such dyads are identified with the eight traditional modes according to the solmized tonal qualities of their boundary-tones, these historically recognized as structural functions of final and tenor. Thus ‘mode’ may be defined as a concord of functional voices, each voice projecting a tonal quality.

Although the precise verbal and graphic language adopted here is new, its constitutive elements are well established in the historical record. The identification of mode in the interval and tonal qualities of final and tenor is of particular antiquity, distribution, and significance in music theory of the Latin West. The following chapter recovers the long and distinguished history of this concept. It shows how musicians over the centuries have recognized and described this dyad: some only as an index of modal assignment, others as the mode’s unique property and definitive voice, others yet as the basis of mode itself.

¹⁵⁶ PM IX; cf. *LU* 1085. Translation: “I am the beginning, I who speak to you.” (cf. John 8:25).

And what of those chants that do not easily fit within the eight-mode system? In the Middle Ages these were sometimes called *parapteres* (modes somewhere between authentic and plagal) or *nothi* (modal degenerates, products of error); do they demonstrate that the eight-mode system is inadequate to describe the tonal variety of the Gregorian repertoire?¹⁵⁷ Melodic-functional analysis cannot be expected to clear up a thousand years of modal controversy all at once, but this introduction has adequately demonstrated its applicability to the vast majority of the Gregorian repertoire. Some controversies are easily resolved, however. Consider for example the Antiphon *Nos qui vivimus*, which begins on *C* and rises through *D*, *F*, and *G* to *a*; this is decorated with its upper neighbor *b*, and ends on *G*. One can easily perceive the structural correspondence between this antiphon and its psalm tone, the peregrinus, which in its first hemistich recites on *a* decorated with its upper neighbor *b*, and in its second hemistich recites on *G*; the formula terminates on low *D*. To what mode, then, shall we assign the antiphon?

The answer, it seems to me, is that this ancient antiphon displays a mode of a single element: corde-mère *re* on *G*. Tenor *a* does not rise far enough above the final to be heard as anything but a neighbor to that final. The tonus peregrinus by itself certainly prolongs Mode 1 (*D-re* as final, *a-la* as tenor, with stepwise descent). But the tonus peregrinus is not heard by itself in this case, it is heard in connection with the Antiphon *Nos qui vivimus*. Therefore as a whole the musico-liturgical utterance is unified and governed by a plagal form of the protus, a species of Mode 2, at a stage where it is indistinguishable from the corresponding species of tetrardus plagal, Mode 8; it is to the latter that the antiphon is traditionally assigned. Thus the eight-mode system accounts for the melody in two ways, which is by no means a failure.

¹⁵⁷ See Charles M. Atkinson, "The 'Parapteres: Nothi' or Not?" *The Musical Quarterly* 68, no. 2 (1982), 32–59; also Atkinson, *The Critical Nexus*, 98, 168, 219, 235.

Example 3.24 Responsory *Subvenite* (respond only) LU 1765; cf. Example 3.13 (p. 150)

The musical score is written in bass clef and consists of six systems, each with a vocal line and a corresponding Latin text line. The text is: "Sub - ve - ni - te sanc - ti de - i, oc - cur - ri - te an - ge - li do - mi - ni: su - sci - pi - en - tes an - i - mae e - ius; of - fer - en - tes e - am in con - spec - tu al - tis - si - mi."

System A: Labeled "Mode 4". The vocal line begins with a whole note "mi" followed by a half note "la". Above the staff, the letters "A", "B", "C", and "D" are placed over the notes "la", "sol", "fa", and "mi" respectively.

System B: Continues the vocal line with notes "la", "sol", "fa", and "mi".

System C: Continues the vocal line with notes "la", "sol", "fa", and "mi".

System D: Continues the vocal line with notes "la", "sol", "fa", and "mi".

System E: Labeled "Mode-1 int.". The vocal line features a long melisma with many sixteenth notes. Above the staff, the letters "E" and "F" are placed over the notes "la" and "iv" respectively. Below the staff, the letters "ii" and "i" are placed over the notes "ii" and "i" respectively.

System F: Labeled "Mode-8 int.". The vocal line features a long melisma with many sixteenth notes. Above the staff, the letters "F" and "G" are placed over the notes "viii" and "v" respectively. Below the staff, the letters "viii" and "iv" are placed over the notes "viii" and "iv" respectively.

CHAPTER FOUR: THE MODAL DYAD AND THE “RE-LA, RE-FA” RULE IN HISTORICAL SOURCES

§4.1 A song for the eight modes

Chapter Three has proposed a structural basis for Gregorian melody in the linear unfolding, through modal degrees, of the qualitative interval by which a voice of tenor function is directed toward unity with a voice that sustains the tone of the final. Such degrees are identified in analysis by solmization syllables (ut, re, mi, fa, sol, la), thus as tonal qualities; structural intervals so unfolded are identified as solmized pairings of final and tenor (re la, re fa, ... ut fa) said to instantiate the eight modes traditional to the repertoire. As Chapters One and Two have established historical and theoretical foundations for the structural analysis of melodic function, this chapter—in conjunction with an Appendix of source-texts—establishes further foundations for mode conceived as a relationship of dyadic harmony.

The reader may already be familiar with the relationship of final and tenor as a means of modal recognition called ‘repercussio,’ a term widely employed in the sixteenth century for an interval belonging in particular to one mode or another. That usage makes its first appearance in the 1517 *Musice Active Micrologus* of Andreas Ornithoparchus:

De repercussionibus Tonorum.

Unde repercussio: que et Tropus a Guidone dicitur: est cuiuslibet toni propria et adequata melodia. Vel est proprium cuiusque toni intervallum, ut in sequentibus patet exemplis.¹

John Dowland nearly a century later translates this into English:

¹ Andreas Ornithoparchus, *Musice Active Micrologus liber primus* (Leipzig, 1517), f.Bijr; TML ORNMUS1 TEXT http://www.chmtl.indiana.edu/tml/16th/ORMUS1_TEXT.html (accessed November 30, 2013).

Of the Repercussions of Tones.

Whereupon the *Repercussion*, which by *Guido* is also called a *Trope*, and the proper and fit melodie of each *Tone*. Or it is the proper intervall of each *Tone*, as in the Examples following appeareth.²

Example 4.1 The Renaissance *Repercussio*

4.1a. Powers, after Ornithoparchus³

mode 1 mode 2

re la sit pri - mi re fa dat noi - ma se - cun - di

mode 3 mode 4

mi mi dat ter - ti - us mi la pos - cit si - bi quar - tus

mode 5 mode 6

ut sol quin - tus pe - tit sex - tus fa la si - bi que - tit

mode 7 mode 8

ut sol im - pat te - trat - dus ut fa pos - tie - mus ha - be - bit.

² John Dowland, *Andreas Ornithoparcus His Micrologus, or Introduction: Containing the Art of Singing* (London, 1609), 12. *Ornithoparchus/Dowland: A Compendium of Musical Practice*, ed. Gustave Reese and Steven Ledbetter (New York: Dover, 1973) gives facsimiles of the November 1517 edition of Ornithoparchus, and Dowland's 1609 translation.

³ Harold S. Powers et al., "Mode" in *Grove Music Online*, §II/4/ii. Much of the material quoted in this chapter remains unchanged from the 1980 *New Grove* entry attributed to Powers alone.

4.1b. Translation:

Protus:	Let re la belong to the first; the rule of the second gives re fa.
Deuterus:	The third gives mi mi; the fourth demands for itself mi la.
Tritus:	The fifth wants ut sol; the sixth seeks for itself fa la.
Tetrardus:	Ut sol the odd-number tetrardus; the last shall have ut fa.

Example 4.1a reproduces a transcription by Harold S. Powers from Ornithoparchus's examples, a facsimile of which appears in item 30 of the Appendix. Like the ninth-century *Noanoeane* formulas and the somewhat later *Primum querite* antiphons introduced in Chapter Two, these examples represent modal identity not by scale but in melodic prototype. Instead of eight individual antiphons each achieving a final cadence, however, Ornithoparchus presents eight paradigmatic modal phrases each headed by a solmized leap from final to tenor, the authentic phrases ending on the tenor, and only their plagal complements reaching the cadence to the final. Each authentic-plagal pair of phrases thus combines to form an antiphon that occupies one line of printed music, sets one line of verse, and takes its beginning and ending on one of the four regular finals.⁴ Here, then, are eight modes within four *maneria*, knit together as a system in a single didactic quatrain. **Example 4.1b** gives my own translation of the original text, which Powers calls "a mnemonic verse found in several 16th-century German works."⁵

Actually, sixteenth-century Germany is only the tip of the iceberg for such verses memorializing the relationship of final and tenor in each of the eight modes as an ordered set of solmized dyads (re la, re fa, ... ut fa). Ornithoparchus was the first, however, to apply the generic

⁴ In the original example by Ornithoparchus (Appendix 30) the first antiphon occupying the first line is titled "Protus," the second antiphon "Deuterus," etc.; Powers suppresses these markers of *maneria*, substituting numerical modal titles for each phrase.

⁵ Powers et al., "Mode" §II/4/ii.

term ‘repercussio’ to the members of that set, a name that enjoyed immediate, widespread, and longstanding acceptance.⁶ Before 1517, these dyads most often appeared without generic title, although they were sometimes called ‘reverberatio’ or ‘tenor.’⁷ It is a distinctly modern error, however, to describe ‘repercussio’ as a medieval synonym for the tenor of the recitation-tone, a mistake that Peter Cahn charges Hugo Riemann with originating.⁸ Riemann’s 1887 *Musik-lexicon* does list ‘repercussio’ as synonymous in this sense with the related ‘repercussa’ (which in some medieval documents does indeed refer to the reciting-note), but he also refers to this usage as ‘Gregorian,’ not ‘medieval’; the two are not necessarily the same.⁹ Attributable to Riemann or not, the mistake still turns up like a bad penny in recent textbooks.¹⁰

Although these usages of *repercussio*, *reverberatio*, and *tenor* are of Renaissance vintage and not medieval, they do proceed from a much older idea of modal identity. Over and over it is the functional dyad of final and tenor that medieval sources put forward as essential to modal

⁶ Within ten months of its introduction in January 1517 in Leipzig, the Ornithoparchian ‘repercussio’ appears in the *Opusculum musicae compilatum noviter* of Sebastian z Felsztyna (Felstin) in Krakow, only slightly befuddled as if by the rapid transit: see Appendix no. 31; see also nos. 32, 33, 37, 38. On fixing the date of Ornithoparchus’s first edition see *Ornithoparchus/Dowland*, ix; on Felsztyna’s *Opusculum* see Elżbieta Witkowska-Zaremba, “Sebastian z Felsztyna” in *Grove Music Online* (accessed November 27, 2013). On ‘repercussio’ in fugal theory after 1600 see Dietrich Bartel, *Musica Poetica: Musical-rhetorical figures in German Baroque Music* (University of Nebraska Press, 1997).

⁷ Stefan Monetarius, *Epitoma utriusque musicae practicae* (Krakow: Florian Ungler, 1515); facsimile: Jerzy Morawski, ed., *Monumenta Musicae in Polonia: Bibliotheca Antiqua*, Vol. I (Krakow: Insytut Sztuki Polskiej Akademii Nauk, 1975), 22–23 (pages unmarked). See Appendix no. 29. For tenor-final interval termed ‘tenor,’ see Appendix no. 11 and no. 24, column 3; for a singular instance of the reciting-note itself termed ‘reverberatio’ see Coussemaker’s Anonymous XI, *Tractatus de musica plana et mensurabili*, CS 3:446; TML ANO11TRA TEXT http://www.chmtl.indiana.edu/tml/15th/ANO11TRA_TEXT.html (accessed November 27, 2013).

⁸ Peter Cahn, “Repercussio,” in Eggebrecht, *Handwörterbuch*, 1–2, 8–9.

⁹ Hugo Riemann, *Musik-lexicon* 3rd edition (Leipzig: Max Hesse, 1887), 813. See below for text.

¹⁰ Donald Jay Grout and Claude V. Palisca, *A History of Western Music*, 5th ed. (W.W. Norton & Company, 1990), 55.

comprehension, sometimes as the very basis of modal construction. Late-medieval and more recent authors do so especially through the ordered set of these dyads, which they most often identify with solmization syllables beginning “re la, re fa,” and which I therefore call the “Re-la, re-fa” Rule. This pedagogical device is first documented in the thirteenth century and afterwards “widespread even without formal definition.”¹¹ The song-and-definition that Ornithoparchus provides is but one example and species of this Rule, which takes many forms and interpretations but always presents ordered pairings of final and tenor in modal order 1–8. The Appendix to this dissertation supplies texts and examples from over 40 sources dating from the thirteenth century to the present era.

The bulk of this chapter examines evidence gathered in that Appendix, along with the historical vocabulary necessary for its interpretation. Further extending the length and breadth of the chapter are critical excurses interrogating logical, terminological, analytical, and text-critical issues as they arise. The restless reader may skip over these prolongations; the more patient may reap from them a fuller harvest. Near chapter’s end, comparison of the late-medieval “Re-la, re-fa” Rule with the more ancient *Noanoeane* and *Primum querite* formulas demonstrates how those pre-millennial prototypes likewise communicate the underlying structural concept that the Renaissance term ‘repercussio’ ultimately proves inadequate to describe, and for which I therefore propose a new and more accurate name: *modal dyad*.¹² The final section of the chapter

¹¹ Bernhard Meier, *The Modes of Classical Vocal Polyphony* [*Die Tonarten der klassischen Vokalpolyphonie*, 1974] trans. Ellen S. Beebe (Broude Brothers Limited, 1988), 40 fn.

¹² See §2.6. Harold S. Powers speaks of a “‘Phrygian’ modal dyad” in reference to Mode-4 cadential goals as given in organ treatises of the seventeenth century (whereas in other modes cadences are assigned to a triad of pitches); see his “From Psalmody to Tonality,” in Judd, *Tonal Structures*, 304–5. What I am proposing by ‘modal dyad’ is not only such a pairing of cadential

surveys the historical development of this concept, from its first surviving appearances as intuited holistic archetype to the analytical measure of the later “Re-la, re-fa” Rule. All told, this chapter completes a comprehensive history of the modal dyad and its identifying Rule, a history until now related in isolated fragments.¹³

§4.2 Rhetoric and distribution of the “Re-la, re-fa” Rule

This section introduces some of the earliest and most common expressions of the “Re-la, re-fa” Rule, its invariance under transposition within the gamut, its temporal and geographical distribution, and the two principal schools of its interpretation.

goals, but a more fundamental harmonic structure analogous to the tonic triad of later music; see §§2.6 and 3.3–7 above.

¹³ On the Rule in the tonaries see Huglo, *Les tonaires*, 373–74, 414–15, 425, 428; Oliver B. Ellsworth notes the Rule and related mnemonics for psalmody in works of Petrus, Lambertus, Heinricus de Zelandia, in the treatise of Coussemaker’s “anonymous Carthusian monk” (Appendix no. 22) and in Vatican lat. 5129 (Appendix no. 13): see his “Introduction” to *The Berkeley Manuscript*, Greek and Latin Music Theory, vol. 2 (Lincoln: University of Nebraska Press, 1984), 2 fn.; for the Rule in that source see Appendix no. 5 and §4.9 below. On the cryptic “Pri re la” quatrain in the treatise of Guilielmus Monachus see Michael Bernhard, “Didaktische Verse zur Musiktheorie des Mittelalters,” *International Musicological Society Study Group Cantus Planus: Papers read at the Third Meeting, Tihany, Hungary, 19–24 September 1988* (Budapest: Hungarian Academy of Sciences Institute for Musicology, 1990), 229; also Maria Busse Berger, *Medieval Music and the Art of Memory* (University of California Press, 2006), 98—with the caution that the translation of “Pri re la” offered there is both uninformed by other versions of the Rule and at odds with Guilielmus’s own explanation (for which see Appendix no. 17). On the Rule in the sixteenth century see Powers et al., “Mode” §II/4/ii (cited in fn. 3 above), also §III/4/ii/b, especially that article’s Ex. 21 comparing Wollick’s and Cochleaus’s *melodia* with Glarean’s *phrasis* (both discussed below); also Meier, *The Modes*, 40 fn. (cited in fn. 11 above), also 41 fn., as well as his “Bemerkungen zu Lechners ‘Motectae Sacrae’ von 1575,” *Archiv für Musikwissenschaft* 14/2 (1957), 97 fn.; also Cristle Collins Judd, “Renaissance modal theory,” in *The Cambridge History of Western Music Theory*, 373 fn. Judd analyzes local and mid-level events in Renaissance motets with reference to the final–tenor pairings of the “Re-la, re-fa” Rule as “modal types”: see her “Tonal Coherence in Sacred Vocal Polyphony from about 1500,” *JAMS* 45, no. 3 (1992), 428–467. On the Rule after 1600 see §§4.3 and 4.12 below.

The earliest documents of the “Re-la, re-fa” Rule that I have found mention of in musicological literature date from the latter part of the thirteenth century. The brief treatise on the modes by the composer Petrus de Cruce, who was active in Paris and Amiens perhaps as early as 1260, includes the following quatrain:

Primus re, la, secundus re, fa,
Tertius mi, fa, quartus mi, la,
Quintus fa, fa, dico, sextus fa, la,
Septimus ut, sol, octavus ut, fa, duo dura.¹⁴

This may be translated:

The first re la, the second re fa,
The third mi fa, the fourth mi la,
The fifth fa fa, say I, the sixth fa la,
Seventh ut sol, eighth ut fa, pairings certain.

Petrus introduces these lines with the extraordinary claim that they enable us to know the mode of any antiphon whatsoever.¹⁵

The verses list solmized qualities of final and tenor for each of the eight modes in order, but without any verb save the magisterial *dico* (“I declare,” or “thus say I”); the quatrain concludes with the summary *duo dura*. Here Petrus tells us that these pairings are solid, durable, something you can count on. The Latin word *duo* as an adjective meaning ‘two’ takes the gender of the noun it modifies; as a noun meaning ‘a pair,’ it is always neuter. *Duo dura* is neuter plural,

¹⁴ Petrus de Cruce Ambianensi, *Tractatus de tonis* edited by Denis Harbinson. CSM 29 (1976), VII; TML PETTRAC TEXT http://www.chmtl.indiana.edu/tml/13th/PETTRAC_TEXT.html (accessed November 30, 2013); Appendix no. 1. The biography of Petrus remains sketchy and the exact date of the treatise even more obscure; see Ernest H. Sanders and Peter M. Lefferts, “Petrus de Cruce,” in *Grove Music Online* (accessed November 27, 2013).

¹⁵ “Per hos versus scitur cuius toni est quaelibet antiphona.” Petrus de Cruce, *Tractatus*, VII; see Appendix no. 1.

so it is clear that what Petrus is calling “certain” are the syllabic pairings, not the two notes or syllables that make up each pair (*notae* or *syllabae*, either of which would require the feminine plural *duo durae*), and not the authentic-plagal pairs of enumerated modes (*toni* in Petrus’s usage, which would take the masculine plural *duo duri*).¹⁶ Where there is no explicit verb we generally take “to be” as understood, as at the beginning of Psalm 27: *Dominus illuminatio mea et salus mea* (The Lord [is] my light and my salvation); therefore Petrus would appear to be declaring that these dyadic relationships *are* the modes.

But on this Petrus is not entirely clear, nor does he say how precisely we are to apply these verses in determining the mode of a piece of music. It appears he expects his audience to know this already, the aphoristic style of the casually introduced quatrain suggesting reference to an oral pedagogy already familiar. From such a “Re-la, re-fa” Rule, Sebaldu Heyden later attests, “children easily learn by heart” these dyads and the mode to which each especially pertains.¹⁷ Thus the Rule may be seen as a modal analogue to the song by which we as children learn our alphabet. In grammatical construction, however, it usually resembles the couplet by which we learn the way of the world: “Finders keepers, losers weepers.”

In the late fourteenth century, the “Re-la, re-fa” Rule begins to be transmitted most commonly in a form even more condensed and cryptic:

¹⁶ “Duo dura” here might refer to the last two pairs being located in *cantus durus* at the level of their regular final (G), but so located also are the tenors of Modes 3 and 5 (both *c-fa*), and so by transposition might any dyadic voice or pair of the Rule. Also the same tetrardus ut–sol and ut–fa operate not in *cantus durus* but in *naturalis* when located on c a fourth above the regular final: see Example 4.2 and discussion below.

¹⁷ “At quae ea sint, et quod quemque Tonum adtineat, ex subscriptis uersibus facilime ediscent pueri.” Sebaldu Heyden, *De arte canendi, ac vero signorum in cantibus usu, libri duo* (Nuremburg: Ioh. Petreium, 1540), 136; Appendix no. 34.

Pri re la, se re fa,	
Ter mi fa, quar quoque mi la,	[<i>quoque</i> : also]
Quin fa fa, sex fa la,	
Sep ut sol, oc tenet ut fa. ¹⁸	[<i>tenet</i> : holds, sustains]

To solve this riddle we expand its abbreviations of the ordinal numbers: “pri” stands for *primus* (first), “se” for *secundus* (second), “ter” for *tertius* (third), etc. The only verb in this quatrain, *tenet*, is the third-person-singular indicative of *tenere*, “to hold or sustain,” from which (as Johannes tells us) the term *tenor* derives. Thus this quatrain’s last phrase could well be translated “the eighth prolongs ut fa.” We should furthermore consider the grammatical possibility that this single verb at the end of the quatrain might govern all of the foregoing clauses, as in Tennyson’s lines “Cannon to right of them,/ Cannon to left of them,/ Cannon in front of them/ Volleyed and thundered.” Thus we might resolve the “Pri re la” riddle-quatrain as “The first [sustains] re la, the second [sustains] re fa,” and so on.

We might also read the Petrus quatrain similarly, with a pun on *dico*, which can mean “I declare” but also “I pronounce,” or in this context “I solmize.” But if we take *dico* (I say) as the governing verb here instead of the more usual elided *est* (it is), then who is the first-person subject that is speaking? The masculine ordinals (*primus*, *secundus*, etc.) appear here in the nominative case reserved for subjects, not the accusative (*primum*, *secundum*, etc.) which they would take as direct object. Therefore it could not be the singer that is solmizing (“I pronounce the first ‘re la,’”), but instead must be each mode in its turn: “I, the First say ‘re la’; I, the Second say ‘re fa,’” and so on. One can imagine a game in which eight young choristers form a ring around the singing-master, each impersonating a mode by singing its interval according to

¹⁸ See Appendix nos. 6, 7, 9, 13, 14, 17, 18, 24–28, 35, 36, 38, 41, 43.

position in the circle; perhaps the whole chorus chimes in unison the summary “duo dura!” In any case the brevity, simplicity, and cryptic challenge of these quatrains suggest robust processes of oral transmission.

For the solmization syllables they employ are *voces*, audible melodic qualities, not *litterae*, notated pitches. It is not until the fifteenth century that examples of the “Re-la, re-fa” Rule appear in staff notation, which requires tying the solmized *vox* to a particular *littera* of the gamut, and even there they are recognized as invariant under transposition. For example, Adrian Petit Coclicus in the sixteenth century demonstrates the Rule in notation at three transposition levels: first he gives the dyads over the regular finals (protus re on *D*, deuterus mi on *E*, tritus fa on *F*, tetrardus ut on *G*), then transposed a fourth higher with *b* key signature (protus re on *G*, deuterus mi on *a*, tritus fa on *b*, tetrardus ut on *c*), and finally transposed up by fifth with $\natural$ (protus *a*, deuterus $\natural$, tritus *c*, the unused tetrardus on *d* being omitted).¹⁹ **Example 4.2**

compresses Adrian’s three-system musical example into a single system by means of multiple clefs; compare this with the original reproduced in the Appendix at number 36, and with the background-level modal paradigms proposed in Example 3.7 above.

¹⁹ Adrian Petit Coclicus, *Compendium musices descriptum ab Adriano Petit Coclico, discipulo Josquini de Pres* (Nuremberg: Johann Berg, Ulrich Neuber, 1552; reprint edition Kassel: Bärenreiter, 1954), D1jr.
http://www.chmtl.indiana.edu/tml/16th/COCCOM_07GF.gif (accessed November 27, 2013); Appendix no. 36.

Example 4.2 Modal Dyads and their transpositions, after Coclicus 1552

[re la] [re fa] [mi fa] [mi la] [fa fa] [fa la] [ut sol] [ut fa]

1st. 2nd. 3rd. 4th. 5th. 6th. 7th. 8th.

The seventh and eighth [modes] are rarely transposed [up by fifth].

Under the notes of each dyad Coclicus places the beginning of the corresponding verbal phrase from the riddle-quatrain, leaving the reader to derive the solmization syllables from the notes themselves: his *Pri* under the *D–a* dyad stands for *Pri[mus] re la*, and so forth. Adrian’s examples locate the finals of modes 1–6 on each of the natural, soft, and hard hexachordal systems, those of modes 7–8 on the hard and natural only. The Rule itself is bound to no one hexachord even at a single level of transposition, however. Within its dyadic pairings, the Mode-3 *mi–fa* and Mode-5 *fa–fa* both require mutation at the fifth. As for the Rule’s comprehensive system of interrelated finals, positioning the *ut* of tetrardus modes 7 and 8 (*ut sol*, *ut fa*) located above the protus *re* (*G–ut* above protus *D–re*, for example), again requires hexachordal mutation, a nearly frictionless process for the experienced cantor.

An overview of the Appendix reveals that by the middle of the fourteenth century the Rule was widely known to musicians in French-speaking lands and in Italy, and that by the end of the fifteenth century it was taught throughout Western Europe. It remained part of chant pedagogy through the seventeenth century, by which time it resounded as far eastward as Hungary. In the nineteenth and twentieth centuries it was restored after a fashion, along with the chant repertoire itself, and spread worldwide through musicological scholarship and in the

practical pedagogy of the Benedictines of Solesmes. Most often expressed in solmized tonal qualities, the Rule is also given in terms of intervals, locations of the gamut, or as with Coclicus, in the graphic shapes of musical notation. Thus the expression of the “Re-la, re-fa” Rule in one source may lack so much as a word in common with its expression in another. This may at least partially explain why it has until now received such limited attention in musicological literature.

Over the centuries, this eightfold series has been interpreted in two ways, weak and strong. The weaker interpretation recommends the relationship of final and tenor as the one and only reliable measure of notated modal representation—this in itself challenging the received notion that musicians historically conceived of mode primarily in terms of scale and octave-species. The stronger interpretation, explicit in some sources and suggested in others, goes further still: it takes the relationship of final and tenor as the essential structure of the modal archetype.²⁰

§4.3 The *repercussio*: more than “characteristic”

Again as in Chapter Two we must take historical vocabulary into account in order to understand and fairly represent what these sources have to say. The next three sections examine how sources define, use, and exemplify the “Re-la, re-fa” Rule in its species as the Renaissance *repercussio*. Widely described in musicological literature as the mode’s “characteristic interval,” the *repercussio* functions in the sources more specifically as the modal *proprium*, that is as the mode’s singularly identifying and definitive voice.

²⁰ Cf. Meier, *The Modes*, 37–41.

‘Characteristic interval’ answers well to the definition Johannes Cochlaeus offers in 1511 for the interval circumscribed by the solmized dyad: he calls it the ‘melodia,’ an interval “more familiar” in a given mode than in any other.²¹ The question is whether we are justified in conflating these terms ‘melodia’ and ‘repercussio.’ Nicholas Wollick in 1512 uses *melodia* for the “Re-la, re-fa” pairs Ornithoparchus calls *repercussio* only five years later.²² Is there an appreciable difference?

Actually there is. Note that Ornithoparchus incorporates the by-then established technical term ‘melodia’ in his formal definition of ‘repercussio,’ adding to it the qualifying phrase *propria et adequata*. Thus ‘melodia’ as described by Cochlaeus and Wollick is necessary but not sufficient for ‘repercussio,’ which Ornithoparchus proposes as not only characteristic of a given mode but belonging to it particularly (*propria*) and corresponding with precision to its dimensions (*adequata*, fitting, from *adequare*, to equal or make of equal size). “Proper and fit,” as Dowland has it. Ornithoparchus adds further that his ‘repercussio’ is none other than Guido’s ‘tropus,’ which we have seen Guido to define in his *Micrologus* as a species of melody (*species cantionis*), and to describe as a well-tailored fit declaring ownership or identity:²³ *propria et adequata*, in other words.

Inadequate separation of ‘repercussio’ from ‘melodia’ contributes to the rhetorical caution that Bernhard Meier must use in reviewing the testimony of sixteenth-century theorists: where he speaks of implication there was actually a broad consensus.

²¹ “Uni tonorum magis quam alteri familiaris,” Johannes Cochlaeus, *Tetrachordum Musices* (Nuremberg, 1511), Tractatus tertius, Ciiir; Appendix no. 27.

²² Nicholas Wollick, *Enchiridion Musices* (Paris: 1512, repr. Geneva: Minkoff. 1972), dviiv; Appendix no. 28.

²³ See §2.5 above.

All this clearly implies that the repercussion is a structural interval of melodic composition: a kind of foundation that, invisible in itself, still confers concretely perceptible dimension and proportion to everything, or – if we may use an expression used similarly by Glarean – that basically determines the diction (phrasis) of each mode.²⁴

Here Meier is careful to note a relationship between *repercussio* and *phrasis* without confusing the two. ‘Phrasis’ remains undefined by Glarean, but we shall see from his usage and examples that it too describes an interval of structural significance, not “characteristic melodic intervals.”²⁵

‘Characteristic interval’ is a legacy not of the Renaissance but of the nineteenth century. August Wilhelm Ambros, who in 1880 transcribes the song of Figure 4.1 in Hermann Finck’s 1556 version,²⁶ writes “The repercussion is the characteristic interval, which in any mode is struck the most.”²⁷ Riemann subsequently defines ‘repercussio/repercussa’ as “In Gregorian chant the term for the tones which are particularly often repeated and characteristic of a mode.”²⁸

Thus Ambros and Riemann. But Renaissance writers never call the *repercussio* “characteristic” of a mode,²⁹ they call it peculiar, certain to identify, and above all *proprium*. Ornithoparchus establishes the Latin adjective *proprius*, -a, -um as definitive of ‘repercussio’ by

²⁴ Meier, *The Modes*, 40.

²⁵ *Heinrich Glarean: Dodecachordon*. Translation, transcription and commentary by Clement A. Miller. 2 vols. Musical Studies and Documents 6 (American Institute of Musicology, 1965), 21.

²⁶ Ambros also quotes the Rule as cited in 1618 by Giovanni Battista Rossi with the quatrain “Re la vult primus,” cf. Appendix nos. 16 and 42.

²⁷ “Die Repercussion ist das charakteristische Intervall, das in jeder Tonart zumeist angeschlagen wird.” August Wilhelm Ambros, *Geschichte der Musik* vol. 2, 2nd edition (Leipzig: F.E.C. Leuckart, 1880), 54; Ambros considers the “Pri re la” abbreviation “monstrous” (*monströsen*), 502–3.

²⁸ “Im Gregorianischen Gesang Bezeichnung der Töne einer Tonart, welche besonders häufig wiederkehren und für dieselbe charakteristisch sind.” Riemann, *Musik-lexicon*, 813.

²⁹ *Character* in Latin is a sign or figure, in Renaissance music an arabic numeral indicating proportion; sixteenth-century authors call *clavis characteristica* the clef-sign, either *F*, *c*, soft *b*, hard *♮*, or *g*.

twice employing it in introducing and defining the term (*propria et adequata melodia, proprium ... intervallum*); later theorists echo this usage into the seventeenth century.³⁰ Although “characteristic” certainly lies within its range of possible meanings, the Latin *proprium* primarily denotes a more exclusive relation. What is *proprium* belongs particularly to one and to no other: in law, to represent oneself in court is to appear *in propria persona* (and to have a fool for a client, so the saying goes); in literature, the word or phrase that gives definitive expression to an idea is its *vox propria*. In the liturgy, prayers and chants belonging to a particular occasion are its *propria*, “propers.” These usages stem from the employment of *proprium* as a term of art in the Latin tradition of logic based on Aristotle.

§4.4 *Proprium*: the unique property

We saw in §2.4 that Aristotelian dialectic was revived in the Carolingian era and further developed in the “new logic” of the twelfth century. In the Renaissance, Aristotle’s logic along with his moral and natural philosophy “not only continued to form the basis of instruction in arts faculties in universities throughout Europe,” but was “also adopted in the new humanist schools, in the reformed universities, and in Jesuit colleges.”³¹ Peter of Spain’s Aristotelian *Tractatus*,

³⁰ See Appendix nos. 32 (Spangenberg 1536: “cuiuslibet toni **propria** et certa melodia”), 34 (Heyden 1540: “species Tonorum ... ex certis intervallis, quorum quisque aliquod peculiare, et ceu **proprium** habet, discernuntur”), 37 (Finck 1556: “Repercussio autem est illud **proprium** intervallum, quod saepe repetit quilibet tonus”), 40 (Denis 1650: “*L’ordre des Tons, et leurs propres touches. Le premier ré, la ...*”).

³¹ Luca Bianchi, “Continuity and change in the Aristotelian tradition” in *The Cambridge Companion to Renaissance Philosophy*, ed. James Hankins (Cambridge University Press, 2007), 49 – 71, 50. See also Joseph S. Freedman, “Aristotle and the Content of Philosophy Instruction at Central European Schools and Universities during the Reformation Era (1500–1650),” *Proceedings of the American Philosophical Society* 137/2 (1993), description of the Logic

composed sometime before 1245 and later known as the *Summulae logicales*, remained “the standard logical text into the seventeenth century.”³² As for Ornithoparchus’s native Germany, a 1473 commentary on Peter of Spain “was reprinted in Cologne as late as 1622.”³³ In logic both old and new, the *proprium* occupies a specific niche among the predicables, basic tools of definition:

The definition of A should apply to whatever A applies to and nothing else: in Aristotle’s word, A and its definition must “counterpredicate” with one another. This is a necessary but not sufficient condition for being a definition, since some counterpredicating terms do not give the nature of that which they counterpredicate (“able to laugh,” for instance, does not define “human”). Aristotle therefore distinguishes between a thing’s definition, which not only counterpredicates but also explains its nature, and its *proprium* or *unique property* (*idion*), which merely counterpredicates.³⁴

It is the singularity of the *proprium* that sets it apart from the less-strict criterion that is the *differentia*. The categories ‘terrestrial’, ‘aquatic’, and ‘aerial’ which establish divisions within the genus ‘animal’, for example, do not qualify as *propria* since there also exist on land, in water, and in the air things belonging to other genera.³⁵ Marchetto of Padua in the c. 1319 *Pomerium* invokes Boethius’s translation of Porphyry to define *proprium* in its strict sense (*proprie*

textbook composed by Glarean, 242; list of authors in the 1519 Logic curriculum at the University of Leipzig, 243.

³² Edward Grant, *God and Reason in the Middle Ages* (Cambridge: Cambridge University Press, 2001), 116.

³³ E. J. Ashworth, “The eclipse of medieval logic,” in *The Cambridge History of Later Medieval Philosophy*, eds. Norman Kretzmann, Anthony Kenny, and Jan Pinborg (Cambridge University Press, 1982), 788.

³⁴ Robin Smith, “Logic,” in *The Cambridge Companion to Aristotle*, ed. Jonathan Barnes (Cambridge University Press, 1995), 54.

³⁵ On the predicables *genus*, *species*, and *differentia*, see §2.5.

proprium) as “what holds in every case and only in such cases, and at all times.”³⁶ Ugolino of Orvieto, writing more than a century after Marchetto, follows suit.³⁷

This strict definition is worthy of mention because Porphyry—as translated by Boethius—allows four species of *proprium*, the second of which might indeed be called “characteristic”:

1. The attribute uniquely of the species, but not of all the species, as man the physician, man the geometer;
2. The attribute belonging to all the species, yet not unique to the species, as man ‘having two feet’;
3. The attribute of all the species, and only the species, but not at all times, as man becoming grey-headed in old age; and
4. *Proprium* in its strict sense of ‘unique property’ valid for all the species, only the species, and always: as ‘apt to laugh’ of man, and ‘apt to whinny’ of horse (reckoning, it must be noted, by the natural inclination, not the act itself). Such strict-sense *propria* predominate [in philosophical discourse], because they counterpredicate: whatever is horse is naturally apt to whinny, and whatever apt to whinny, horse.³⁸

³⁶ “Illud est proprie proprium alicuius quod convenit omni et soli et semper (per Porphyrium), sicut risibile convenit omni homini et soli homini et semper homini.” *Marcheti de Padua Pomerium*, ed. Ioseph Vecchi (CSM 6, 1961), 95.

³⁷ “Proprie proprium est quod omni et soli et semper convenit.” *Ugolini Urbevetanis Declaratio musicae disciplinae*, ed. Albert Seay, Book 3 (CSM 7/2, 1960), 223. TML UGODEC3B TEXT http://www.chmtl.indiana.edu/tml/15th/UGODEC3B_TEXT.html (accessed November 28, 2013).

³⁸ “Proprium vero quadrifariam dividunt. Nam et id quod soli alicui speciei accidit, etsi non omni (ut homini medicum esse vel geometrem), et quod omni accidit, etsi non soli (quemadmodum homini esse bipedem), et quod soli et omni et aliquando (ut homini in senectute canescere), quartum vero in quo concurrat et soli et omni et semper (quemadmodum homini esse risibile; nam, etsi non ridet, tamen risibile dicitur, non quod iam rideat, sed quod aptus natus sit; hoc autem ei semper est naturale; et equo hinnibile). Haec autem proprie dominanter propria perhibent, quoniam etiam convertuntur; quicquid enim equus, et hinnibile, et quicquid hinnibile, equus.” Lorenzo Minio-Paluello and B.G. Dod, eds., *Aristoteles latinus* I 6–7. *Categoriarum supplementa Porphyrii Isagoge, Translatio Boethii, et Anonymi Fragmentum vulgo vocatum “Liber sex principiorum”* (Paris-Bruxelles: Desclée, DeBrouwer, 1966), 12; IntraText Digital Library, http://www.intratext.com/IXT/LAT0917/_P5.HTM (accessed November 29, 2013).

It is this fourth kind of *proprium*, says Peter of Spain, that qualifies as a predicable, or general tool of definition.³⁹

Therefore in the context of a formal definition one may assume ‘*proprie proprium*’ by default, as in this passage from Ugolino, which Gaffurius later copies verbatim:

‘*Proprium*,’ as Aristotle says, is what inheres only within and is counterpredicated by a thing yet does not indicate what it is for the thing to be, as ‘apt to laugh’ [*risibile*] describes man yet does not communicate his essence; thus ‘*proprium*’ defines its object on a contingent basis [*per modum accidentalis*]. But ‘*proprietas*’ defines its object on the substantive or essential level, because it is counterpredicated by the thing and also indicates its essence, as ‘rational’ does indeed communicate about man the essence of him.

It is instructive to compare, phrase by phrase, Ugolino’s text with its apparent model:

Ugolino/Gaffurius:

Proprium enim, ut dicit Aristoteles,
est quod soli inest
et conversim praedicatur de re
et non indicat quid est esse rei,
ut risibile inest homini
et non indicat eius esse,
ergo proprium rem suam dicit

per modum accidentalis.

Sed proprietas
rem suam dicit
per modum substantialis sive essentialis
quia praedicatur conversim de re

Peter of Spain:

Diffinitur etiam sic ab Aristotile:
“*proprium est quod soli speciei inest
et conversim praedicatur de re,
et non indicat quid est esse,*”
ut risibile inest homini.
‘Non indicare quid est esse,’
ponitur in descriptione proprii
ad differentiam diffinitionis.

Diffinitio enim

conversim predicatur de re

³⁹ “Et hoc quarto modo dicitur ‘*proprium*’ unum de quinque predicabilibus.” Peter of Spain (Petrus Hispanus Portugalsensis), *Tractatus called afterwards Summule logicales*. First Critical Edition from the Manuscripts with an Introduction by L. M. De Rijk (Assen, Netherlands: Van Gorcum & Comp. B.V., 1972), 22.

et indicat eius esse
 ut rationale
 de homine
 et indicat esse eius.⁴⁰

et indicat quid est esse,
 ut '*substantia animata sensibilis*'
 convertitur cum '*animali*'
 et indicat esse eius.⁴¹

Both texts underscore the uniqueness-to-the-species of the proprium, *quod soli (speciei) inest*, “what inheres solely within (the species).” Thus the predicable proprium is narrowly circumscribed within the species, not a characteristic shared among species such as the two-footedness that man shares with birds.

At the beginning of the second sentence, Ugolino, perhaps following an intervening logician I have yet to identify, replaces Peter of Spain’s *diffinitio* (definition) with *proprietas*, a word that in the old logic signifies a property or characteristic of a thing, any given thing having potentially any number of properties that it shares in common with any number of others. Boethius in his music treatise, for example, assigns to three melodic genera two *proprietas* in binary opposition (compact and not-compact); it follows that two or more genera must share the same *proprietas*.⁴² *Proprietas* in the old logic is descriptive, not definitive: in Aristotelian

⁴⁰ Ugolini *Declaratio* Book 1 (CSM 7/1), 35; *Franchini Gafurii Extractus parvus musicae*, ed. F. Alberto Gallo, *Antiquae musicae italicae scriptores*, vol. 4 (Bologna: Università degli Studi de Bologna, Istituto di Studi Musicali e Teatrali - Sez. Musicologia, 1969), 55–6. TML UGDEC1A TEXT http://www.chmtl.indiana.edu/tml/15th/UGODEC1A_TEXT.html; TML GAFEXT TEXT http://www.chmtl.indiana.edu/tml/15th/GAFEXT_TEXT.html (both accessed November 29, 2013).

⁴¹ Peter of Spain, *Tractatus*, 22: “It is thus defined by Aristotle: ‘proprium is what inheres only within the species and is counterpredicated by a thing yet does not indicate what it is to be, as ‘apt to laugh’ describes man. ‘Not communicating the essence’ belongs to the description of ‘proprium,’ as distinct from ‘definition.’ For the definition is counterpredicated by the thing and also indicates what it is to be, as ‘animate sensate substance’ substitutes for ‘animal’ and communicates its essence.”

⁴² “Having set out the three genera – enharmonic, chromatic, and diatonic ... Aristoxenus thought that they shared certain properties [*proprietas*] such that some were compact and

tradition the raven, ebony, charcoal, and the Ethiopian all partake of the *proprietas* ‘black,’ which describes all and defines none. So when the ninth-century *Commemoratio brevis* speaks of modal “*differentias* and *proprietates*” we should understand the first of these as “definitive traits of individual modes” and the second as “descriptive properties of one mode or several.” Ugolino’s singular *proprietas*, now signifying a definitive property both distinctive and essential, reflects the more recent usage of the new logic.

As for Ornithoparchus, “Master of Arts,” “Master of the Liberal Sciences,” and lecturer “at the universities of Tübingen, Heidelberg, and Mainz,” the first word of whose music treatise’s dedicatory epistle is the name of Socrates,⁴³ his references to Aristotelian tradition in general, and to its logic in particular, are legion. Twice he cites the Philosopher by name, as for example in Book I, Chapter 7: “Aristoteles musicam mere mathematicam esse neget,” which Dowland renders as “*Aristotle doth deny Musick to be meere Mathematically.*”⁴⁴ Chapter 1 of the same book invokes the sainted logician Thomas Aquinas (*beatus Thomas*) on the importance of beginning the discussion of a subject with its definition.⁴⁵ In Chapter 3 we find thematized explicitly the first three

others were not.” (His ... constitutis tria genera, enarmonium, chromaticum, diatonicum, has Aristoxeno videntur habere proprietates, ut alia eorum dicantur spissa, alia minime.) *Boetii De institutione musica libri quinque*, ed. Godofredus Friedlein (Leipzig: B. G. Teubner, 1867), 366; http://www.chmtl.indiana.edu/tml/6th-8th/BOEMUS5_TEXT.html (accessed March 6, 2009). Translation: Anicius Manlius Severinus Boethius, *Fundamentals of Music* Translated, with Introduction and Notes, by Calvin M. Bower, Edited by Claude V. Palisca (New Haven: Yale University Press, 1989), 175. The enharmonic and chromatic are both compact, as it turns out, the diatonic not-compact, 176.

⁴³ *Ornithoparchus/Dowland*, 3 (*Micrologus* frontispiece: “Artium magister”), 5 (dedication: “Liberalium disciplinarum Magister”), vii, 6 (universities); 5 (Socrates).

⁴⁴ *Ornithoparchus/Dowland*, 28, 142.

⁴⁵ *Ornithoparchus/Dowland*, 7. Dowland’s translation omits this reference to Thomas, 120; probably for political reasons, xi.

predicables *genus*, *species*, and *differentia*, their functions illustrated in Aristotle's own definition of man, the 'rational animal':

Clavis, therefore, is a joining-together of letter-named step [*littera*] and solmized melodic quality [*vox*] ... I say 'of quality' and not 'of qualities,' both because all *claves* admit no plurality of quality; and also on account that the genera, species, and *differentiae*, from which the definition is construed, are unable as such to be expressed in the plural. For 'animal' is the genus, not 'animals'; 'man' the species, not 'men'; 'rational' the *differentia*, not 'rationals.'⁴⁶

The Logical orientation of Ornithoparchus's treatise reaches beyond words. Its illustration of the *claves*, reproduced here as Figure 4.3, features on the left-hand side a Porphyrian tree which divides the genus *littera* into species (the lowest, noted with capital letters, are *Capitales*; directly above them are those marked with lower-case letters, *Minute*; higher still, marked with "twinning" lower-case letters, are the *Geminate*); these divide further into sub-species (tetrachords), which divide again into the individual *litterae*, positions of the gamut.⁴⁷ Even the plan of the treatise itself follows Aristotelian models: Chapter 4 treats the modes "in genere," Chapter 12 treats them "in specie," and so on.⁴⁸

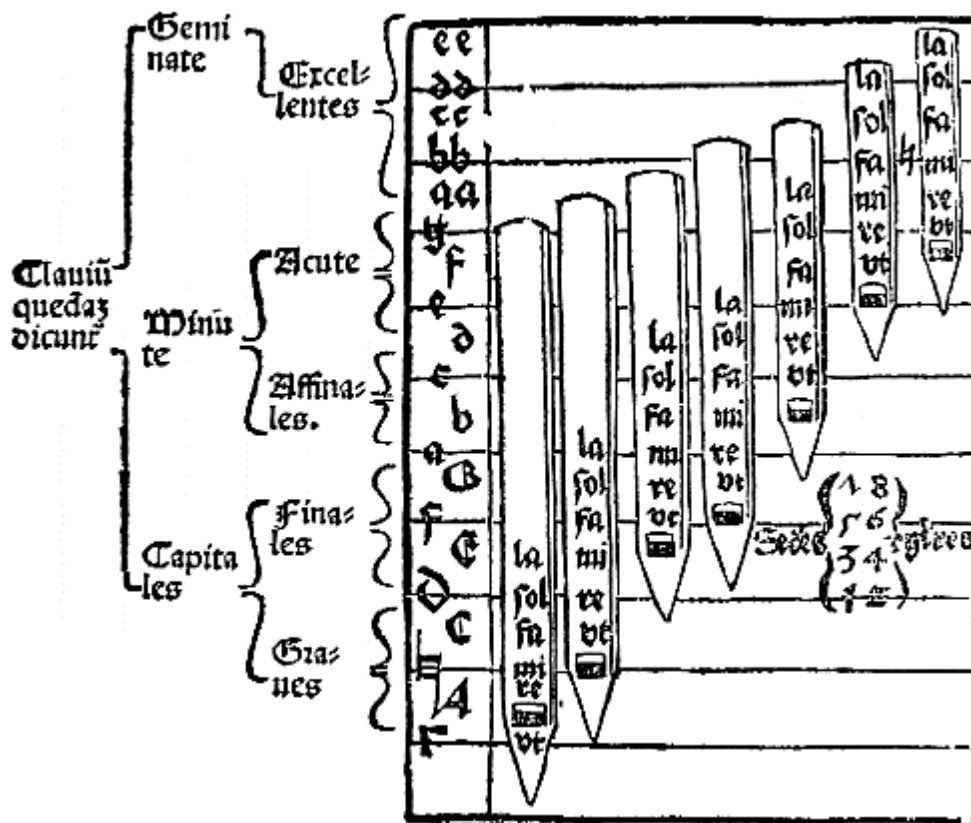
⁴⁶ "Est igitur Clavis: aggregatum ex littera et voce ... Voce dico, non vocibus, Tum quod omnes claves vocum pluralitatem non habeant, Tum quod generum, specierum, ac differentiarum: ex quibus diffinitio constituitur: nomina, pluraliter exprimi nequeant: animal enim, non animalia genus est: Homo species, non homines, Rationale differentia non rationales."

Ornithoparchus/Dowland, 13.

⁴⁷ *Ornithoparchus/Dowland*, 14.

⁴⁸ *Ornithoparchus/Dowland*, 16, 35.

Figure 4.3 Ornithoparchus's *Claves*, with Porphyrian Tree⁴⁹



Thus far we have observed Ornithoparchus to engage with four of the five predicables: 1) the *genus* or general kind, as ‘*animal*’; 2) the *species* or type within the genus, as ‘*homo*’; 3) the *differentia* or criterion for division which is shared by no other species within the genus, as ‘*rationale*’; and 4) the *proprium* or unique property, to which are disposed at all times all members of the species, and to which is disposed no other species within or without the genus, as ‘*risibile*’ of man and ‘*hinnibile*’ of horse. The fifth preicable is the *accidens*, which Peter of Spain (following Porphyry) defines as

that which is present or absent at remove from destruction of the subject, such as ‘being white,’ ‘being black,’ ‘being seated’; ... what is neither genus nor species

⁴⁹ http://www.chmtl.indiana.edu/tml/16th/ORN MUS1_02GF.gif (accessed November 29, 2013).

nor differentia nor proprium, yet inheres to the thing. Or thus: *accidens* is what happens to inhere and not to inhere with the same subject of definition, as of a man being white, or being seated.⁵⁰

From the Aristotelian *accidens* music theory derives its term ‘accidental,’ as witnessed in that usage’s earliest surviving document, from St. Martial:

Among the Greeks the round *b* is called *synemennon*, that is *accidens* or accidental, for whatever is accidental is not *proprium*, and whatever is not *proprium* is not natural. For the round *b* is contrived in order to temper the tritone, which is found by nature over F. For where the melody sounds harsh, round *b* is stealthily interposed in place of hard *♮*, but ought to be taken away immediately where the melody will flow back to its own nature. Therefore [it is called] round *b*, because it is *accidens* or accidental, and *accidens* can be present or absent without destruction of the subject.⁵¹

The musical ‘accidental’ was not always limited to semitonal relations: Ornithoparchus refers to rhythmic inflection as a kind of accidental in Book II of his treatise. Regarding the duration of notes bound by a ligature, he writes, in Dowland’s translation: “the Accidents of simple Notes,

⁵⁰ “Accidens est quod adest et abest preter subiecti corruptionem, ut *album*, *nigrum*, *sedere* ... quod neque est genus neque species neque differentia, neque proprium, inest autem rei. Vel sic: accidens est quod contingit eidem inesse et non inesse, ut *album*, *sedere* homini.” Peter of Spain, *Tractatus*, 23.

⁵¹ “Vocatur apud Graecos *b* rotundum *sinemenon*, hoc est *accidens* vel *accidentale*, quod est enim *accidentale* non est *proprium*, et quod non *proprium* est non est *naturale*. Inventum est autem *b* rotundum ad temperandum tritonum, qui super F naturaliter invenitur. Ubi enim cantus asperius sonat, *b* rotundum in loco *♮* quadrati ad temperandum tritonum furtim interponitur, sed ubi cantus ad suam naturam recurrerit statim debet auferri. Igitur *b* rotundum, quia *accidens* est vel *accidentale* et *accidens*, potest adesse et abesse sine corruptione subiecti.” Albert Seay, “An Anonymous Treatise from St. Martial,” *Annales musicologiques* 5 (1957), 32–33. TML ANOLAF TEXT http://www.chmtl.indiana.edu/tml/12th/ANOLAF_TEXT.html. This passage quasi verbatim in Anonymous (15th Century), *Quaestiones et solutiones [advidendum tam mensurabilis cantus quam immensurabilis musica]*, ed. Albert Seay, Critical Texts, no. 2 (Colorado College Music Press, 1977), 3. TML ANOQS TEXT http://www.chmtl.indiana.edu/tml/15th/ANOQS_TEXT.html (accessed November 29, 2013).

say for example, *alteration*, *imperfection*, and the like (as *Franchinus* [Gaffurius] witnesseth) are also the Accidents of the bounded Notes.”⁵² Here, as in so many instances, Ornithoparchus demonstrates mastery of Aristotelian concepts and discourse.

CRITICAL EXCURSUS I: LOGIC AND FACT

This is not to suggest that the mouthing of logical terminology guarantees sound logical argument. The St.-Martial statement quoted above, for example, displays a rather casual approach to fact and logic. As a matter of fact, *synemmenon* in no way derives from *symbebekos* (συμβεβηκός), the Porphyrian term Boethius translates as *accidens*. As a matter of logic, the statement “whatever is accidental is not *proprium*” contradicts not only Ugolino’s opinion stated further above, but also—according to Ugolino’s source Bonaventura—Boethius himself, who “declares that every *proprium* remains a kind of *accidens*.”⁵³ And from the proposition “whatever is not *proprium* is not natural” follows logically that whoever laughs is by nature neither animal nor two-footed, these being properties man shares with other species and therefore not *propria*.

Driving this descent into illogic is the claim of “nature” in the octave species of the harmonics tradition: if the species with hard *h* is natural, then soft *b* must somehow represent a deviation from that nature. The approach of the *cantus* tradition, wherein hard *h* and soft *b* share

⁵² “Simplicium notarum accidentia puta alteratio, imperfectio, et huiusmodi (Franchino teste) ipsis quoque ligatis solent accidere.” *Ornithoparchus/Dowland*, 50, 160.

⁵³ “Boetius dicit quod omne proprium manat de genere accidentium.” Bonaventura, *Commentaria in secundum librum sententiarum Petri Lombardi*, 3.2.2. Cf. “Unde Boetius manat proprium de genere accidentium.” *Ugolini Declaratio* Book 3 (CSM 7/2), 223.

without prejudice equal claim to the degree above *a*, corresponds more closely to the Aristotelian concept of the ‘accidental’: the *littera* may be expressed either as *b* or $\flat$ and still occupy the same degree of the mode—as it takes the same line or space of the staff even today—just as a horse may be black or white, male or female, waking or sleeping, and yet remain a horse.⁵⁴ This suggests to inductive reasoning that a now-lost *cantus*-tradition description of the $\flat/b$ accidental may have been the point of departure for the more tortured harmonics-tradition usage we inherit from the St.-Martial treatise.

§4.5 Logical conclusions

What does all this philosophical background tell us about the *repercussio* and whether we should accept “characteristic interval” as its description in English? What “characteristic” corresponds to most closely, among the terms we have discovered here, is the old-logic *proprietas*, the attribute or property associated with a thing but not necessarily unique to it. ‘Being black’ is characteristic of the raven, but also of the ibis: it represents one of many *proprietas* these birds share with other species. In the new logic, where *proprietas* comes to mean the essential property of a thing, what is characteristic but not definitive remains *accidens*, the attribute present or absent without changing the subject of definition into another subject entirely. “Characteristic” certainly expresses poorly the concept of *differentia*, the attribute shared with no other species of the same genus. And it definitely falls short of the *proprium*, the unique property. The phrase “characteristic interval” suggests a mark or token whose

⁵⁴ Smith, “Logic,” in *The Cambridge Companion to Aristotle*, 53–4. For a Gregorian melody that displays this property of $\flat/b$ see Chapter One, “A Simple Office Antiphon.”

prolongation may or may not announce the arrival of its associated mode, and in whose absence that mode would still sound like itself. This may be not only a poor choice, but an impossible one, to describe ‘repercussio’ as defined, illustrated, and used by Ornithoparchus.

First, in regard to definition: for Ornithoparchus to define the *repercussio* as “cuiuslibet toni propria ... melodia” and “proprium cuiusque toni intervallum” was to declare its qualitative and intervallic relation the mode’s *unique and identifying property*. That is to say, the *repercussio* is operative wherever the mode is in play, and remains inoperative where the mode is not. Granted, Ornithoparchus never states specifically that he intends ‘proprie proprium,’ but in the context of formal definition he doesn’t need to. Had he been inclined to communicate the sense carried by the English phrase “characteristic interval” he could hardly have discovered a worse choice of Latin adjective than *proprium*, with its counterpredicative connotations.

Second, it is such a one-to-one correspondence as ‘proprie proprium’ would signify that his examples illustrate both in words and in music. In the verses of the paradigmatic song “Re la sit primi” (Figure 4.1) as in the definition, mode and interval go together hand in glove, the former desiring the latter as a lover the beloved: “The fifth wants ut sol; the sixth seeks for itself fa la.” From the definition we learn that mode and interval are commensurate (“proper and fit”); in the song we find them colloquacious (“the rule of the second gives re fa”), even synonymous (“Ut sol the odd-number tetrardus”). Mode and interval counterpredicate. This does not make them necessarily consubstantial, to borrow a word from the Creed: had Ornithoparchus considered the “Re-la, re-fa” interval and its mode substantively identical, he might have described the former not as *proprium* but as *proprietas*.

The song-melody itself demonstrates the singular power of these sounding *propria* to conjure their respective modes. Considering that this composition's pedagogical success depends on each of its phrases sounding firmly and unmistakably of its own modal type, it is remarkable that it does so in the absence not only of the full complement of notes within the customary ambitus but also, in the odd-numbered authentic phrases, without the cadence to the final. Nor do we find imbedded in these brief modal phrases much that can be said to imitate the formulas for intonation, mediation, or termination of their associated recitation-tones. Thus scale, ambitus, cadence, and characteristic turn of phrase are all dispensable to modal cognition—accidental, then—if only the *proprium* sound clearly enough.

Nevertheless, the melody demonstrates how the *proprium* interval of one mode may play a role in the expression of another: the Mode-2 re fa, for example, appears in ascent within the paradigmatic phrases for Mode 1 (*a-c* on the syllable “la”), Mode 3 (the same notes on “ti” of “tertius”), and Mode 5 (over the word “quintus”); it also appears in descent within the phrases for Modes 6 and 8. The Mode-4 mi la is outlined in ascent within the Mode-7 phrase (♮-*d-e*), the Mode-5 fa fa in descent within Mode 8 (*c-a-G-F*), and so on. Unless we imagine this point to have escaped the notice of Ornithoparchus, we must conclude that he understood these intervals to function in some manner subordinate to the solmized dyad at the head of each modal phrase.

As for usage: at the end of his treatise Ornithoparchus offers a summary “Ten Commandments necessary to every singer”; we would be remiss to ignore its Aristotelian content as much as if we failed to note the scriptural reference. Consider then his first commandment, which compares singing in ignorance of mode to arguing a proposition without

regard for the basic Aristotelian rules of logical engagement.⁵⁵ In Dowland's translation: "When you desire to sing any thing, above all things marke the *Tone*, and his *Repercussion*. For he that sings a Song without knowing the *Tone*, doth like him that makes a syllogisme without *Moode* and *Figure*."⁵⁶ Here mode (*tonus*) and uniquely identifying interval (*repercussio*) remain two distinct entities, the latter a means of recognizing the former. Had Ornithoparchus been willing to take the further step of regarding the *repercussio* as the mode's substantive essence—what this dissertation argues for the modal dyad that the *repercussio* only imperfectly represents—he might counsel us to "mark the tone *in* its repercussion"; in any case the two could not logically be described as separate entities. But if the *repercussio* were simply an accidental property, "characteristic," although it might be modally suggestive it could not be determinative, and would therefore have no logical place in this first and great commandment. As *propria melodia* and *proprium intervallum*, however, the *repercussio* gives unique voice to the mode just as surely as the sound of laughter does man, and whinnying does horse. Many if not all the classic Aristotelian examples of *propria* are vocal signatures: man alone is apt to laugh (*risibile*), horse alone to whinny (*hinnibile*), dog alone to bark (*latrabile*), cattle alone to moo (*mugibile*). Much as the cow says "moo," Ornithoparchus tells us, Mode 1 says "re la," Mode 2 says "re fa," and so on. To the extent that it would be an absurd understatement to call "uncharacteristic" the sound of a barking cow or of a horse that goes "moo," so the phrase "characteristic interval" understates the function and significance of the *repercussio* of Ornithoparchus.

⁵⁵ "De decem mandatis omni canenti necessariis . . . Primum, Cupiens quicquam decantare, pre omnibus tonum ac repercussionem eius diligenter animadvertat. Nam qui cantum citra toni cognitionem canit, idem facit quod is: qui syllogismum extra modum ac figuram componit." *Ornithoparchus/Dowland*, 105–06.

⁵⁶ *Ornithoparchus/Dowland*, 209.

It also misrepresents the reception of this concept in the sixteenth century. Sebaldus Heyden, for example, accepts the dyads of the “Re-la, re-fa” Rule as modal analogues to the Aristotelian *proprium* even without employing the term ‘repercussio.’

How many species of mode are there? Eight. These species are discerned from certain intervals, of which each mode has one in particular, indeed as it were its *proprium*. Moreover, what those intervals might be, and which of them must adhere to what mode, children easily learn by heart from the following verses:

On the intervals peculiar to each mode.

The first gives re la: the second re fa,
The third mi fa, mi-and-la the fourth;
The fifth fa fa, the sixth fa la,
Seventh ut sol, the eighth sounds ut fa.⁵⁷

Thus “characteristic interval” is an unhistorical, inadequate, and ultimately misleading description for the Renaissance ‘repercussio.’ Neither does it accurately describe Glarean’s ‘phrasis,’ as we shall soon discover. It does fit Cochlaeus’s 1511 ‘melodia’ very well, but that usage became obsolete already in 1517 when Ornithoparchus proposed—and musicians generally accepted—‘repercussio’ as the generic term for the modal dyad which was traditionally expressed in its several species through the “Re-la, re-fa” Rule.

⁵⁷ “Quot sunt species Tonorum? / Octo. Quae ex certis interuallis, quorum quisque aliquod peculiare, et ceu proprium habet, discernuntur. At quae ea sint, et quod quemque Tonum adtineat, ex subscriptis uersibus facillime ediscunt pueri. / De interuallis, cuique Tono peculiaribus. / Primus Re, La, dat: Secundus Re, Fa: Tertius Mi, Fa: Mi, Laque Quartus Quintus Fa, Fa: Sextus Fa, La: Septimus Vt, Sol: Octauus sonat Vt, Fa.” Heyden, *De arte canendi*, 136. TML HEYDAC2 TEXT http://www.chmtl.indiana.edu/tml/16th/HEYDAC2_TEXT.html (accessed November 29, 2013); Appendix no. 34. Translator’s note: I have here expanded relative pronouns that unambiguously identify their noun antecedents by gender: *quae* agrees with and thus refers to the feminine *species*, *quisque* the masculine *tonus*; *aliquod*, *quod*, and the plural *quae* of the phrase *quae ea* agree with the neuter *intervallum*.

CRITICAL EXCURSUS II: 'REPERCUSSIO' BEFORE 1517

Later sections of this chapter will argue for the modal dyad, of which the Renaissance *repercussio* is a species, as a fundamental element of modal theory in the *cantus* tradition from as early as the first millennium. This excursus is to show that the term 'repercussio' was not itself employed in the sense of 'modal interval,' however, until Ornithoparchus coined that usage in 1517. Until then the term had nothing to do with harmony and all to do with rhythm.

In pre-1517 discourse about sound and music, the noun form *repercussio* refers to an immediate resounding or re-sounding, not to degrees or intervals of modal function. In the early Middle Ages, *repercussio* ("re-striker") and the related *repercussa* ("thing re-struck," past participle of the verb *repercutere*) signify physical vibration and/or reverberation, such as that of percussion instruments,⁵⁸ of the voice,⁵⁹ or of speech-sounds made with vibrating lips.⁶⁰ In the second millennium, 'repercussio' broadens in meaning to include the metaphorical re-striking of a melodic element, still considered only in cases of immediate repetition. Such repetition is at first limited to the monotonic: Aribo, paraphrasing Guido, notes that "neumes are often made of the *repercussio* of a single pitch."⁶¹

⁵⁸ Isidore of Seville: "Tympanum quoque, cymbalum, sistrum, ... vel alia, quae metallico rigore *repercussa* (*percussa*) reddunt." Isidori Hispalensis *Sententiae de musica*, GS 1:23.

⁵⁹ Remi of Auxerre: "Paracterica est *repercussio* vocis, serum tardum grave." Remigius Altisiodorensis *Musica*, GS 1:69–70. Charles M. Atkinson, in "The 'Parapteres: Nothi' or Not?" *The Musical Quarterly* 68, no. 2 (1982), 52–54 suggests that "*repercussio* vocis" might be read here as "repetition of a pitch"; if so then this is the earliest instance of such a metaphorical usage.

⁶⁰ Regino of Prüm: "Omnis enim sermo his novem rebus formatur. Primo appulsu quatuor dentium, *repercussione* duorum labrorum, plectro linguae, cavo gutturis, respiratione pulmonis. Si enim ex his aliquid defuerit, vox perfecta non erit." Edna Marie Le Roux, RSM, "The De harmonica and Tonarius of Regino of Pruem" (PhD dissertation, Catholic University of America, 1965), 77.

⁶¹ Aribo: "Neumae nempe unius soni fiunt *repercussione*, cum simplices sunt, id est, vel una virgula, vel una iacens, vel cum duplices aut triplices in eiusdem sunt soni *repercussione*."

By the twelfth century, *repercussio* could also refer to the immediate repetition of a melodic figure moving through several constituent pitches: Johannes criticizes the “piled-upon repercussion of a single podatus” in the tract *Qui habitat*, which at the words *et refugium meum Deus meus*⁶² sets six syllables in a row to the same ascending whole tone *D–E*.⁶³ Lori Kruckenberg reports that the word *repercussio* also appears with some frequency in the poetry of the medieval sequence: a reflection, she suggests, of the musical genre’s immediate repetition of entire melodic stanzas.⁶⁴

These are the established medieval usages of ‘repercussio’ as related to music,⁶⁵ a far cry from what Ornithoparchus later proposes. Perhaps Dowland’s formulation “which by *Guido* is also called a *Trope*” bears some responsibility for leading commentators to assume a Guidonian precedent for the Ornithoparchian sense of ‘repercussio’: by rendering the emphatic “et” of *que et Tropus* as the adverbial “also,” Dowland’s translation might suggest to the incautious that Guido uses the terms ‘repercussio’ and ‘tropus’ interchangeably.

Aribonis De Musica ed. J. Smits van Waesberghe, CSM 2 (1951), 49. For Guido’s actual usage of *repercussio* see below.

⁶² Cf. *LU* 533–34.

⁶³ Ch. 18: “Similiter in Tractu illo Qui habitat vitiosa est unius podati crebra repercussio in eo loco ubi est et refugium meum Deus meus.” *Johannis De musica*, 119. The Old Roman repertoire abounds with such repetitive figures, which Michel Huglo similarly characterizes as faulty, see his “The Diagrams Interpolated into the *Musica Isidori* and the Scale of Old Hispanic Chant” in *Western Plainchant in the First Millennium: Studies in the Medieval Liturgy and its Music*, ed. Sean Gallagher et al. (Burlington, VT: Ashgate, 2003): 243–259, 244–45.

⁶⁴ Kruckenberg “Neumatizing the Sequence: Special Performances of Sequences in the Central Middle Ages,” *JAMS* 59/2 (2006): 243–318, 243 fn.

⁶⁵ An anonymous *De consonantia et dissonantia* substitutes ‘repercussio’ for the traditional ‘percussio’ in an otherwise unremarkable paraphrase of Boethius (cf. *De institutione musica* I/viii): “Dissonantia est duorum sonorum sibimet inpermixtorum ad aurem veniens dura et aspera repercussio.” *Anonymi Tractatus de cantu figurativo et de contrapuncto* (c. 1430–1520), ed. Christian Meyer, CSM 41 (1997), 78.

But this is not the case. Forms of ‘repercussio’ and the related ‘repercussa’ appear exactly four times in the works of Guido, in each case referring to immediate repetition, and in no case to the constitution or determination of mode. In Chapter 16 of his *Micrologus* Guido remarks that every neume is formed by rising or falling motion of the voice “except for *repercussas* and *simples*.”⁶⁶ Glosses by Aribio and Johannes confirm that by “simples” (*simplices*) we are to understand neumes notated with a simple *virga* (/) or *punctum* (•)—figures of one note per syllable, in other words—and these glosses furthermore confirm that ‘repercussas’ are the *distrophe* (the double stroke, notated //), and *tristrophe* (the triple-stroke ///),⁶⁷ now commonly called “repercussive neumes.”⁶⁸ Some choirs perform these as legato lengthenings, others render them as staccato reiterations; in any case the net effect is the rhythmic prolongation of a single pitch.

In Chapter 15 of the same work Guido compares durational proportions to the mathematical ratios of interval theory.⁶⁹ He writes: “Special care should be taken that neumes, whether made by repeating one note [*eiusdem soni repercussione*] or joining two or more, be always arranged to correspond to each other either in the number of notes or in the relationship of the durations.”⁷⁰ The analogy drawn here between rhythmic and melodic interval ought not to

⁶⁶ “Igitur motus vocum ... fit arsis et thesis, id est elevatio et depositio; quorum ... omnis neuma formatur praeter *repercussas* aut *simplices*.” *Guidonis Micrologus*, 180.

⁶⁷ Johannes, Ch. 23: “Simplicem autem neumam dicimus virgulam vel punctum, *repercussam* vero quam Berno *distropham* vel *tristropham* vocat,” *Johannis De musica*, 158; for Aribio’s gloss see note 70 above.

⁶⁸ But see Hiley, *Western Plainchant*, 345–46 on the modern misuse of ‘neume’ for ‘notational sign;’ a better translation of *neuma* is ‘melodic figure.’

⁶⁹ Cf. Justin London, “Rhythm in twentieth-century theory,” in *The Cambridge History of Western Music Theory*, 717–18.

⁷⁰ “Ac summopere caveatur talis neumarum distributio, ut cum neumae tum eiusdem soni *repercussione*, tum duorum aut plurium *connexione* fiant, semper tamen aut in numero vocum

cloud the sense of ‘repercussio’ that Guido clearly intends: the rhythmic and uninterrupted prolongation of a single pitch, whether over the course of successive syllables as in a reciting tone, or through the lengthening of a single syllable by repercussive neume. This is also what Guido describes toward the end of his metered treatise *Regulae rhythmicae*:

Rursus qualibet in forma magna fit varietas:
 si vox quelibet in cantu modo simplex resonat,
 modo semet percussa duplicat vel triplicat.⁷¹

That is to say:

And yet however widely intervals may vary,
 If any simple note in well-tuned song resound,
 Re-struck in tune it duplicates itself, or triples.

(I take *modo* in these lines as referring to tuning, intonation in good measure: the *percussa* contrasts in its simplicity with the variety of possible melodic intervals, yet even on the repeated note the singer must take pains to remain true to pitch. Pesce, who translates these lines somewhat differently, nevertheless agrees that *modo* does not refer here to ‘mode’ in the sense of scale or melody-type.)

Finally, Guido remarks in Chapter 18 of the *Micrologus* that *voces* of tritus tetrachordal quality (that is pitch-classes F, C, and B-flat) are especially prominent in the Gregorian repertoire (“loved with passion by Gregory,” as he puts it), beginning many melodies and receiving the

aut in ratione tenorum neumae alterutrum conferantur.” *Guidonis Micrologus*, 164–65; tr. Babb, Hucbald, Guido, and John, 70.

⁷¹ Dolores Pesce, *Guido D’Arezzo’s Regule Rithmice, Prologus in Antiphonarium, and Epistola ad Michaelem: A Critical Text and Translation* (Ottawa: The Institute of Mediaeval Music, 1999), 392. See also *Regulae Rhythmicae*, ed. Joseph Smits van Waesberghe and Eduard Vetter, *Divitiae musicae artis*, A/IV (Buren: Knuf, 1985), 126.

plurality of *repercussiones*.⁷² The immediate context is a description of polyphonic techniques in which the organal voice often repeats a single note while the plainsong voice rises or falls. Guido's Chapter 19 contains eleven polyphonic examples; within the ten that demonstrate this oblique-motion style of counterpoint, the organal voice displays repercussion of tritus pitches in fifteen separate instances, in phrases of various modes.⁷³ Thus for Guido, as with other authors of his epoch, *repercussio* is a matter of rhythemics and not of mode: it refers to a sounding repetition mediated either by brief silence or nothing at all.⁷⁴

§4.6 'Repercutere' and 'repercussa' in the *Dialogus de musica*

Although medieval authors do not employ the noun *repercussio* for a particular modal interval, some do employ the verb *repercutere* for the action of emphasizing a modally significant tone or interval by means of rhythmic repetition. This section and the two following trace the history of that usage which contributed to the widespread acceptance in the sixteenth

⁷² "Videmus [tritus] a Gregorio non immerito plus caeteris vocibus admatum. Ei enim multa melorum principia et plurimas repercussiones dedit." *Guidonis Micrologus*, 207–08; see David G. Hughes, "Guido's Tritus: An Aspect of Chant Style" in *The Study of Medieval Chant: Paths and Bridges, East and West in Honor of Kenneth Levy*, ed. Peter Jeffery (Rochester, NY: The Boydell Press, 2002) 211. Hughes samples Mass Propers and concludes that *tritus* notes are indeed the most common, 211–13.

⁷³ *Guidonis Micrologus* 209–13; Babb, *Hucbald, Guido and John*, 79–82.

⁷⁴ Pace Cahn, "Repercussio" 3–4, which takes Guido's *repercussiones* as the repetition of the constitutive interval-relation of a mode ("WIEDERHOLUNG DER FÜR EINEN MODUS KONSTITUTIVEN INTERVALLBEZIEHUNG"), a usage that must in fact wait for theorists misreading Ornithoparchus in the latter part of the sixteenth century; see §4.8 below. Jacques de Liège reports Guido's usage correctly: see F. Joseph Smith, "Jacques de Liège: the Modes as Musical Patterns," *Revue belge de Musicologie/Belgisch Tijdschrift voor Muziekwetenschap* 34 (1980–81), 26 (Smith: "we either learn a new meaning here or correct an error"). For Marchetto of Padua's usage of 'repercutere' and 'repercussa' in connection with criteria of modal constitution quite foreign to those described by Guido, see §4.7 below.

century of the generic term ‘repercussio’ for the dyadic modal indicators of the “Re-la, re-fa” Rule.

The *Dialogus de musica* lays down the rule that a protus melody—the final understood as located on the monochord’s *D*—is of the first mode (protus authentic, that is, and not plagal) if that melody meets any of the following three conditions:

- 1) if the melody tarries on *a* or *b*/ $\flat$,
- 2) if it repeats (*repercutiat*) these tones three or four times, or
- 3) if the melody begins on *a*, regardless of whatever else may follow.⁷⁵

Does the second condition require immediate repetition, or might a tone that returns in discrete instances over the course of a melody also be considered *repercutere*? The latter seems most likely, since the first condition, namely that the melody remain on a note “for a long time,” already requires immediate repetition, given the nearly equal rhythmic values of chant. The author of the *Dialogus* would have no reason to waste parchment by listing the second condition if he did not consider it also *repercutere* to accumulate the temporal weight of a returning tone in discrete stages, other notes sounding between. Thus whereas the noun ‘repercussio’ in pre-Ornithoparchian theory always refers to the product of immediate repetition, the verb ‘repercutere’ can be used to evoke repetition as a mediated and cumulative process.⁷⁶

⁷⁵ “Furthermore there will be common [to modes 1 and 2] the eighth and ninth [degrees above the monochord’s open-string *I*], to which when the chant ascends, if it firmly remains thereupon for a long time, or repeats them three or four times, or otherwise if it should begin on the eighth [*a*], it will be of the first mode” (Erunt itaque octava et nona utriusque communes, ad quas dum cantus ascendit, si diu in eis permaneat, sive tertio vel quarto eas repercutiat, aut si in octava incipiat, modi erit primi). GS 1:260; the fifth mode in similar terms, GS 1:262.

⁷⁶ The reader who doubts whether a real difference exists between the verb forms *repercutere* and *repercussa* on the one hand, and the noun form *repercussio* on the other, might consider by

Before leaving the *Dialogus* let us observe that its third condition, which trumps all others for establishing the protus authentic (Mode 1), has the melody begin on the reciting note of protus-authentic psalmody, what later *cantus*-tradition authors call the Mode-1 tenor. We shall hereafter consider what it is about a melodic opening on the tenor of the authentic that leads to such positive modal identification, even when that note is touched on only once as in the type-melody “Noanoeane.” Here let us simply note that in this passage, as well as in the numerous glosses and paraphrases it inspires,⁷⁷ ‘repercutere’ the rhythmic process may aid in the determination of mode, but is in itself neither the measure of mode nor the strongest indicator thereof.

§4.7 Marchetto’s *repercussa* and species doctrine

It is Marchetto of Padua who first extends modal significance from the repetition of a tone to the repetition of an interval, which he describes not in *cantus*-tradition functional terms as in the *Dialogus*, but in the harmonics-tradition terms of interval species. Rejecting the *cantus*-tradition doctrine of the final’s modal authority, Marchetto in the c. 1317 *Lucidarium in arte musice plane* defines “trope or mode” as “a harmonious species created from whole tones and semitones.”⁷⁸ Following Berno he theorizes the commonality of modes paired in authentic-plagal

analogy the verb and noun forms of the English word “love”: it is one thing to say “he loves me” or “I am loved by him” and quite another to say “he’s my lover.”

⁷⁷ See for example *Johannis De Musica*, 92–93; *Ameri Practica artis musice* [1271], ed. Cesarino Ruini, CSM 25 (1977), 92–94; and *Jacobi Leodiensis* [Jacques de Liège] *Speculum musicae*, ed. Roger Bragard, CSM 3/VI (1973), 112.

⁷⁸ “Item tropus sive modus est species modulata ex tonis et semitoniis prodiens generata.” Jan W. Herlinger, *The Lucidarium of Marchetto of Padua: A Critical Edition, Translation, and Commentary* (University of Chicago Press, 1985), 11.1.3, Herlinger 370–73 (translation Herlinger). Dating the treatise, 3.

relationship to reside in the tone-and-semitone patterns of their constitutive diapente (perfect fifth) and diatessaron (perfect fourth). In Mode 1, for example, the first species of diapente TSTT ($D-E-F-G-a$) combines with the first species of diatessaron TST above ($a-\flat-c-d$); together these complete or “perfect” the authentic modal octave.⁷⁹ That same first species of diapente in combination with the first species of diatessaron placed below it ($A-B-C-D$) creates the plagal Mode 2, by Marchetto’s account.⁸⁰

Example 4.4 gives three examples of Mode 1 from the *Lucidarium*. In 4.4a the melody begins by outlining the first-species diapente above the final ($D-a-G-a$); it then fills in the higher diatessaron of first species ($d-c-\flat-a$), perfecting the mode in its ascent. After the bar line the melody returns to the first-species fifth, which it fills in by touching upon the previously passed-over notes F and E . Composed especially for purposes of theoretical demonstration, Marchetto’s melodies touch every heptatonic degree within their ambitus at least once, a courtesy to the harmonics tradition that Gregorian antiphons of comparable length don’t always observe. Furthermore all of Marchetto’s examples— whether actual repertoire or contrived tone-puppets⁸¹ like these—end with stepwise motion to the final, a feature of plainsong melody that Marchetto nevertheless rejects as modally determining.⁸²

⁷⁹ *Lucidarium* 11.4, Herlinger 394–397.

⁸⁰ *Lucidarium* 11.4.88, Herlinger 432.

⁸¹ In the Introduction to his *Kontrapunkt*, Schenker calls such made-up examples *Tonpuppen*, “tonal dolls”; “puppet” emphasizes the ventriloquistic aspect, see *Counterpoint*, xxx–xxxii.

⁸² “Were a melody to be composed of the species of the third mode, and were we to add one lower whole tone to it at the end, that is, on the final of the first mode, the mode would [still] be the third, not the first: for if it were said to be the first mode, the added whole tone would seem to be of greater moment in determining the mode than the initial notes, phrase endings, and species of those modes; this is erroneous and false.” *Lucidarium* 11.3.7–9, Herlinger 392–393 (tr. Herlinger).

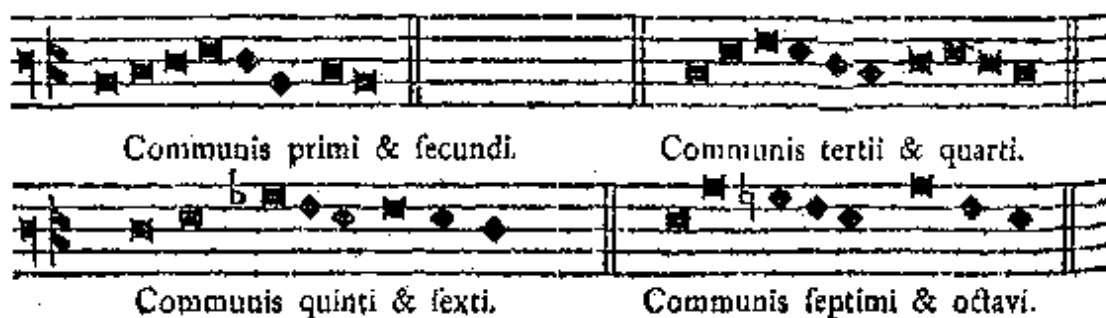
What does Marchetto mean by common species? Not the fifth-spanning intersection of authentic and plagal ranges Johannes borrows from Aribo, nor necessarily the segment of the modal diapente whose tone-and-semitone pattern matches that of the diatessaron. The common species is to be sought always in the narrow and low-lying space between the common final and the fourth degree above, as demonstrated in **Example 4.5**, again from Marchetto's *Lucidarium*. Common here to Modes 1 and 2 (on their regular final *D*) is the TST diatessaron *D–G*, common to Modes 3 and 4 is the STT species *E–a*, common to Modes 5 and 6 is *F–b*,⁸⁵ and common to Modes 7 and 8 is the fourth-span *G–c*, never mind that its TTS pattern lacks commonality with either of the two modal diatessarons Marchetto proposes for the tetrardus, TST (*d–e–f–g* above for Mode 7 or *D–E–F–G* below for Mode 8) and STT (*c–b–a–G* for Mode 8, figured in descent).⁸⁶

pluries reperiussa et cantus a fine non ultra sextam ascendat etiam si nichil descendat, tonus ille iudicabitur subiugalis.” *Lucidarium* 11.4.89–91, Herlinger 434.

⁸⁵ Marchetto proposes special rules to accommodate the tritus in descent with round *b*, as well as the tetrardus plagal Mode 8: *Lucidarium* 11.4.139, Herlinger 454; 11.4.175, Herlinger 472; 11.4.198–200, Herlinger 482–84.

⁸⁶ *Lucidarium* 11.4.198–200, Herlinger 482–84.

Example 4.5 Marchetto's four *species communes* over regular finals *D, E, F, and G*⁸⁷



Johannes Tinctoris in his 1476 *Liber de natura et proprietate tonorum* similarly employs both ‘repercutsa’ and ‘repercutere’ (again not ‘repercussio’), illustrating with melodies that are more complete than Marchetto’s.⁸⁸ **Example 4.6** reproduces the translation, transcription, and analytic notation of Harold S. Powers for relevant text and examples. The two deuterus melodies—transcribed by Powers as example 11(a) and (b)—have the same ambitus exactly (*D–c*), but Tinctoris represents the first as being of Mode 3 (deuterus authentic) and the second as Mode 4 (deuterus plagal). Likewise the two tetrardus melodies 11(c) and (d) share a common range (*G–d*), with the first of these sounding authentic Mode 7, the second in plagal Mode 8.

⁸⁷ *Lucidarium* 11.4.218; Herlinger 492;

http://www.chmtl.indiana.edu/tml/14th/MARLU11_06GF.gif (accessed June 5, 2009).

⁸⁸ *Johannis Tinctoris Opera theoretica*, ed. Albert Seay. CSM 22 (1975–78), 1:65–104, 90: “Et si tonus ipse supra finem suum usque ad diapente cum semitonio aut tono ascendat ac infra usque ad semitonium aut tonum descendat, dicetur etiam autenticus, ut hic probatur: [Powers Ex. 11(a)] ... tamen ... species communis diatessaron plures repercutiatur, plagalis erit judicandus, ut in sequenti probatur exemplo: [Powers Ex. 11(b)]; see also TML TINLDN TEXT http://www.chmtl.indiana.edu/tml/15th/TINLDN_TEXT.html (accessed November 29, 2013).

Example 4.6 Powers, translating and transcribing Tinctoris 1476⁸⁹

If the tone rises above its final to the 5th plus a tone or semitone and descends a tone or semitone below, it will still be called authentic, as is proven here [ex.11a] ... [but if] common species of 4th are struck [*repercutiantur*] several times, it will be judged plagal, as appears here [ex.11b]. If a tone not descending beneath its final does not rise above the 5th, and [if it] frequents the 5th as much or more than the common 4th, it is authentic; otherwise, [it is] plagal, as is proven here [ex.11c, d].

Ex.11

(a) mode 3

(b) mode 4

final ambitus species

(c) mode 7

final ambitus species

(d) mode 8

The deuterus examples 11(a) and 11(b) each touch upon the Mode-4 tenor *a* five times exactly; in 11(a) the Mode-3 tenor *c* appears twice, that is just once more than in the plagal

⁸⁹ Powers et al., “Mode” §II/4/ii, in *Grove Music Online*. Powers bases his reading on the Coussemaker edition (CS 4:16–41); see TML TINNAT TEXT http://www.chmtl.indiana.edu/tml/15th/TINNAT_TEXT.html.

11(b). Clearly Tinctoris does not intend to demonstrate the ‘repercutere’ of reciting note that the *Dialogus* speaks of. The deuterus authentic melody of 11(a), however, foregrounds the second species of diatessaron STT (*E–F–G–a*) once only, in the leaping descent from *a* to *E* (in Powers’s transcription notes 4–5 of the third brace), whereas the plagal melody 11(b) repeats it six times, twice under the first brace and four times toward the end of the second.

CRITICAL EXCURSUS III: LOGIC AND ANALYSIS

How successful are these demonstrations by Tinctoris of Marchetto’s doctrine? Even with so many repetitions of deuterus *species communis*, this last melody that includes a stepwise ascent from the final *E* up to *c* (the tenor of the authentic) hardly sounds unambiguously plagal. To make it so requires placing some kind of accent on the *a* at the beginning of the second brace (the brace itself indicating a change of syllable, which would provide timbral accent). Accent on this *a* allows the subsequent *a–b–c* motion to be heard not as the end of an extended intonational ascent to the Mode-3 tenor *c* but as a medial prolongation of an already-established Mode-4 tenor *a*, in which case the melody could dispense with the following *species communis* repetitions and still sound distinctly plagal.

The tetrardus melodies [Powers’s 11(c) and 11(d)] sound more definitely authentic and plagal, respectively. Yet so perfectly is the Mode-7 tenor *d* established in the first nine notes of 11(c) that even if we eliminate the last three notes *G–a–G*, thereby losing a repetition of the species of fifth in the descent *d–G*, adding in place of that neighboring figure the entire second brace of 11(d), the melody as a whole still sounds authentic despite the additional *species communis* leap from *c* down to *G* that Marchetto says favors the plagal. Likewise if we change

just two notes of plagal 11(d) so that the last four notes of the first brace no longer read $d-a-c-\text{c}^\flat$, but $d-c-d-\text{c}^\flat$ instead, the whole melody suddenly sounds authentic, without our eliminating a single tetrardus species of diatessaron or adding a new species of diapente. What has changed? The tessitura is slightly higher, to be sure, but consider also that in the Tinctoris version of 11(d) the note d functions medially, as an upper neighbor prolonging the Mode-8 tenor c . The proposed emendation prolongs the d instead, investing it with tenor function so that the entire first brace is heard as an extended intonational ascent to that initial goal. Then under the second brace the modal process is enacted in the linear descent of tenor function by pentatonic step toward the final, $d-c-\text{c}^\flat-a-G$, that is sol-fa-(pien-tone mi)-re-ut, sounding Mode 7 (tetrardus authentic).

Marchetto's species doctrine had enormous influence on late-medieval theory, as Tinctoris's embrace of it demonstrates, and so deserves our attention as a historical phenomenon. As theory, however, it can neither account for the repertoire's traditional classification nor withstand logical scrutiny as a system. Consider once again Figure 4.4c, which Marchetto calls 'imperfect' Mode 1 because it only goes so high as the sixth degree above the final D . That sixth degree appears here as round b , which creates over a the second species of diatessaron STT belonging properly to deuterus (modes 3 and 4), not to the protus authentic Mode 1, as Marchetto himself acknowledges. He explains this transformation of the Mode-1 species of diatessaron as a commixture with Mode 6, which in practice does indeed often make use of round b —although it

shouldn't, were it to follow Marchetto's own species doctrine!⁹⁰ By every theoretical measure Marchetto offers, then, the melody of Figure 4.4c is not, cannot be of Mode 1, and yet he must acknowledge it as Mode 1. Why? Because to the practiced ear it is most certainly Mode 1, indeed paradigmatically so: in fact, its first phrase conforms almost precisely to the Mode-1 phrase of Ornithoparchus's paradigmatic song (Figure 4.1), the setting of the words *Re la sit primi*. The only difference in pitch is a well known national distinction: Marchetto's Italian tradition prefers *b* as the upper neighbor to the tenor *a*, whereas Ornithoparchus's tradition, sometimes called the 'German chant dialect,' prefers *c*.⁹¹ Otherwise the two phrases are melodically uniform: *D–a–(b/c)–a–G–F–G–a*. Compare these also with the opening notes of the traditional "Primum querite" type-melody for Mode 1.

From the perspective of the *cantus* tradition there is little wonder that repetition of Marchetto's *species communis* would tend to favor the plagal, for the degree located at the diatessaron over the final is the tenor of plagal modes 4 and 8, and upper neighbor of the tenor in plagal modes 2 and 6. In no *maneria* does the *species communis* ever achieve the pitch of the authentic tenor. Marchetto might as well have observed that boys in short pants can't reach tall shelves.

Marchetto never considers the effect of beginning on the tenor of the authentic, which the *Dialogus* declares to render the entire melody authentic no matter what other tones and intervals receive emphasis later. Marchetto considers the *cantus*-tradition *tenor* hardly at all: in his

⁹⁰ *Lucidarium* 11.4.9–11, 398. Compare Marchetto's stated goal, that "all musicians and singers might rationally understand what they sing in plainchant" (*Lucidarium* Epistola 5, tr. Herlinger at 71).

⁹¹ Hiley, *Western Plainchant*, 573; see also Ina Lohr, *Solmisation und Kirchentonarten* 4th ed. (Zürich: Hug, 1981), 11.

Lucidarium ‘tenor’ is strictly the lower voice in two-part counterpoint, and ‘tuba’ a trumpet.⁹²

Yet once the Mode-1 tenor *la* is established over final *re* as in the first phrase of Marchetto’s melody of Figure 4.4c, no subsequent repetition of the *species communis* will make it sound as plagal Mode 2; once the Mode-7 tenor *sol* is established over final *ut*, as *d* is established over *G* in the opening phrase of the Tinctoris/Powers 11(c) of Figure 4.6, then no subsequent repetition of the *species communis* will make the melody sound as plagal Mode 8. The *Dialogus* is not only correct on this point, but overly cautious: not only when the melody begins immediately on the authentic tenor, but where it proceeds to establish it securely, even following a lengthy passage of intonational melodic function, the melody as a whole is heard as authentic.

§4.8 Theoretical weakness of the term ‘repercussio’

It seems but a moderate step, historically and logically, from Tinctoris’s ‘repercussa’ of 1476 to Ornithoparcus’s ‘repercussio’ of 1517, yet it represents a significant leap: from a rhythmic aspect of surface design to a harmonic aspect of background structure. An ill-advised leap, as it turns out, for although the rhythmic repetition of a note (the ‘repercutere’ described by the *Dialogus*) or of an interval (the ‘repercutere/repercussa’ of Marchetto and Tinctoris) may certainly aid in the establishment of structural melodic function and in modal cognition, it is ultimately accidental to modal construction: the type-melody *Noanoeane*, for example, establishes Mode 1 without help from either.⁹³ However significant it may have been for the history of musical thought in the Renaissance, as a tool of music-theoretical discourse Ornithoparchus’s assignment of the generic term ‘repercussio’ to the dyads of the “Re-la, re-fa”

⁹² *Lucidarium* 5.6.16–18, 8.1.7 (tenor); 1.3.6, 1.12.2, 1.13.3–4 (tuba).

⁹³ See Example 2.3; also Example 4.9 below.

Rule carries a fatal flaw: it connotes a rhythmic basis for the recognition of a harmonic relation. To be fair, Ornithoparchus never says that rhythmic repetition is necessary to the structural operation or the aural cognition of what he defines as the unique-property interval. But by assigning to that interval a name so close to that of Marchetto's concept he makes such implication unavoidable. Wittingly or not he sets a trap, into which Hermann Finck falls nearly 40 years later. "*Repercussio*," writes Finck, "is that proper interval which whatever mode often repeats."⁹⁴ Thus 'repercussio' proves to be a slippery handle for the dyadic pairing, a sixteenth-century mask obscuring the theoretical and historical significance of the more ancient concept which it only partially and imperfectly expresses.

Medieval theory offers no generic name for this intertextual, arhythmic, structural relationship between tenor and final. Its roles in melodic construction and modal cognition are traditionally expressed, however, in the eightfold series of *voces* (re la, re fa, ... ut fa) that I call the "Re-la, Re-fa" Rule.

§4.9 The "Re-la, re-fa" Rule in the thirteenth century

The following sections survey the source-texts for this historic Rule, which are ordered chronologically in the Appendix. Having completed our preliminary exercises, we shall now be able to read these with adequate understanding.

The *Tractatus de tonis* of Petrus de Cruce, which first commits the Rule to writing in verse, is a brief compilation of *cantus*-tradition modal wisdom. Petrus appends the "Re-la, re-fa"

⁹⁴ "Repercussio autem est illud proprium interuallum, quod saepe repetit quilibet tonus." *Practica musica Hermannii Finckii* (Wittenburg, 1556), f.Ppijr; Appendix no. 37. TML FINPRA TEXT http://www.chmtl.indiana.edu/tml/16th/FINPRA_TEXT.html (accessed November 29, 2013).

Rule to a pair of verse mnemonics already well established, the first a quatrain for the intonations of the psalm tones, and the second a tercet memorializing their mediations.⁹⁵ The first of these, the quatrain for psalm-tone intonations *Primum cum sexto cantu fa sol la*, appears in conjunction with the “Re-la, re-fa” Rule in many subsequent sources as well.⁹⁶

In a subtle way this older quatrain already recognizes the modal dyad, since the last syllable of the intonation is always the *vox* of the modal tenor, and the tonal quality of the corresponding final is already defined by the number of the mode (1 and 2 ending on re, 3 and 4 on mi, 5 and 6 on fa, 7 and 8 on ut).⁹⁷ Meanwhile the tercet for medial cadences *Septimus et sextus dant* exemplifies the *cantus*-tradition preference for sounding relationships over notational distinctions, *voces* over *litterae*. Its first line, for example, translates “Seventh and sixth give fa mi re mi, as does the first.” To the *cantus*-trained ear, the mediations of tones 1, 6, and 7 all sound “fa mi re mi,” whether notated *b–a–G–a* in the case of tones 1 and 6 over their regular finals; or *f–e–d–e* as in Mode 7 over its regular final *G*.

Indeed the *Tractatus* exemplifies the late-medieval continuation of the *cantus* tradition in every respect. Petrus, who consistently employs the term ‘tonus’ for mode (never ‘modus’), begins the treatise with the *omnis cantus* definition, thus announcing that the work is concerned not only with the exemplified recitation tones and chant genres containing the same, but also with mode itself, that which regulates all song (*omnis cantus*).⁹⁸ There is not a word in the treatise on the arrangement of tones and semitones, octave scale, interval species, or mathematical ratio.

⁹⁵ Petrus *Tractatus*, VII; see Appendix no. 1 for texts and translations.

⁹⁶ See Appendix nos. 4, 6, 8–10, 13–15, 22, 23, 25, 39.

⁹⁷ Cf. Judd, “Renaissance modal theory,” 373.

⁹⁸ Petrus *Tractatus*, VI.

Like Johannes before him,⁹⁹ Petrus observes no distinction in kind between mode and melodic formula. After discussing in general terms the distinction by ambitus of chants in authentic and plagal modes, he goes on immediately:

In regard to their *differentias* or to their incipits (*principia*), how many *differentias* or *principia* any one of them may have, no rule of musical discipline may declare with certainty. For the Uses of local establishments, which are various, assign to them *differentias* in diverse fashion, hence one more and another fewer.¹⁰⁰

Here the antecedent of the pronouns translated as “their” and “them” must be the modes, not the chants, for any individual chant has only one incipit and one *differentia* (in the musical-technical sense as ‘termination formula’) within a local Use. For Petrus to say that any mode might have any particular number of incipits or terminations—concrete melodic features—is an absurd solipsism if we insist on modes as scales, or as balloon-like containers of nine-note ambitus, within which the several thousand melodic features possible in any are possible in all. His statement makes perfect sense, however, if we consider mode as a melodic genus displaying local variety of species.

After a brief introductory chapter ending with the “Re-la, re-fa” Rule, the main body of Petrus’s treatise consists of what Huglo calls a teaching tonary: not a comprehensive list of chants but a brief index of paradigmatic examples.¹⁰¹ For each mode, Petrus gives the *Primum*

⁹⁹ See §2.6.

¹⁰⁰ “De differentiis seu principiis eorum, quot differentias seu principia unusquisque eorum habeat, nulla musicae regula numerum certum declaravit. Usus enim civitatum, qui diversi sunt, dant eis differentias diversimodo, tum quia unus plus, alter vero minus.” Petrus *Tractatus*, VII. Petrus no doubt encountered diversities of liturgical practice as he moved between the dioceses of Paris and Amiens.

¹⁰¹ Huglo, *Les Tonaires*, 29; also 337: “le tonaire d’enseignement—le tonaire bref.”

querite antiphon and *neuma* as prototype, followed by a series from Mass and Office.¹⁰² Here as in most tonaries the antiphons of various liturgical genres are not written in full but indexed by melodic incipit (*de principiis*).¹⁰³ Brevity, practicality, memorability, and copious musical example: these are the enduring hallmarks of *cantus*-tradition pedagogy. Petrus as a *cantus*-tradition pedagogue relies, finally, on the student's musical intuition to make the leap from modal prototype to the holistic comprehension of the modal archetype that resists rational explanation.

Petrus presents his tonary without further comment until the treatise's end, where he remarks only that regarding in what respect modes in authentic-plagal relationship converge within a genus (*conveniunt*) and in what respect they differ as species (*differunt*), "what has been said already shall suffice."¹⁰⁴ What has Petrus said about how two modes of the same *maneria* are similar and how different? Something about the regular finals and their co-finals (*affinales*), certainly, as well as general guidelines for possible authentic and plagal ranges above and below the final. Are the verse-formulas for memorizing psalmodic intonations (*Primum cum sexto cantu*) and mediations (*Septimus et sextus dant*) disposed to teach us how to distinguish an authentic mode from its plagal complement? Hardly. In these the modes are arranged not by *maneria* but according to accidental similarities of melodic elaboration. The tercet's first line, for example, translates "The Seventh and Sixth give fa, mi, re, mi, as well as the First." Here medial cadences in formulas of Modes 1, 6, and 7—each belonging to a different *maneria*—all happen

¹⁰² First selected Office antiphons with their *differentiae*, then the psalm-tone, two or more Introits (called *Officia* in Amiens Use), the Introit-tone, a Responsory, its Verse and Gloria, and finally an Invitatory with its Verse and Gloria: Petrus *Tractatus*, VIII–XXV.

¹⁰³ "Exemplum de neuma et de principiis primi toni," VIII.

¹⁰⁴ "Quomodo conveniunt et quomodo differunt isti toni, scilicet primus a secundo, tertius a quarto, [etc.] ... Et ea que dicta sunt de tonis sufficiant," XXV.

to sound “fa mi re mi.” Only the “Re-la, re-fa” Rule systematically compares the authentic and plagal of each *maneria* in turn. There what the members of any given authentic-plagal pair have in common is the melodic quality (*vox*) of their final; they differ in the melodic quality and interval of tenor above it.

For Petrus the tenor is thus the *differentia*, the species-defining distinction, between authentic and plagal modes of any given *maneria* considered as a genus. This is precisely how Amerus explains it also, in another early written expression of the “Re-la, re-fa” Rule. In a treatise of 1271 he speaks of the eight modes as differentiated by their tenors in respect to their regular finals:

Eight are the modes ... The first and second conclude on low *D* as re. The *differentia* of the first is on *a*, that of the second on *F*. Third and fourth conclude on *E* as mi. The *differentia* of the third is on *c*, that of the fourth on *a*. Fifth and sixth conclude on *F*. The *differentia* of the fifth is on *c*, that of the sixth on *a*. Seventh and eighth conclude on *G*. The *differentia* of the seventh is on *d*, that of the eighth on *c*.¹⁰⁵

Of course the reciting note is only the first of several pitches in the termination of a recitation tone, and nearly every recitation tone admits several such formulas. The entire passage therefore appears hopelessly garbled, fraught with careless errors, if we read *differentia* here in its narrow technical sense of melodic-formula termination. Shouldn't Amerus have written, for example, not that the singular *differentia* of the seventh mode is on *d*, but that its plural *differentiae* begin

¹⁰⁵ “Octo sunt toni ... Primus et secundus finiuntur in desolre gravi cum re. Differencia primi est in alamire, secundi in effaut. Tercii et quarti finiuntur in elami cum mi. Differencia tercii est in cesolfaut, quarti in alamire. Quinti et sexti finiuntur in effaut. Differencia quinti est in cesolfaut, sexti in alamire. Septimi et octavi finiuntur in gesolreut. Differencia septimi est in desolre, octavi in cesolfaut.” *Ameri Practica artis musice* ed. Ruini, 83; Appendix no. 2. On the biography of Amerus, an English cleric in the service of an Italian cardinal, see *Ameri Practica artis musice* ed. Ruini, 14–17.

there? Only by recognizing *differentia* here as the Aristotelian species-defining distinction do we discover a coherent and sensible argument, however surprising its substance: any mode may be defined, says Amerus, in the relationship of the tenor to its final.

CRITICAL EXCURSUS IV: AMERUS AND THE DIFFERENTIA

This claim deserves careful examination, for conventional wisdom holds Amerus and others to have defined mode primarily in terms of final and ambitus, not final and tenor. What else does Amerus say about the tenor, how else does he employ the term ‘*differentia*,’ and how does he treat the question of ambitus?

Already in his treatise’s first reference to the question of mode or tone, Amerus cites the first note of the *seculorum* as a determining modal indicator: having given in musical example one or two termination formulas for each mode, he writes, “By [the example of] these *seculorum* all other *seculorum* by [virtue of] their beginnings (*inceptiones*) can be comprehended, as well as to which mode they belong.”¹⁰⁶ Note the economical pun on *comprehendere*, employed both in the sense of the genus comprehending the species, and of the mind comprehending a distinction.

Later on, in the introduction to his tonary, Amerus admits the *seculorum* as a kind of *differentia*, although with some reservation regarding its position as an ending rather than a beginning: he would rather reserve the term ‘*differentia*’ for the “diverse beginning-notes

¹⁰⁶ “Per ista *seculorum* possunt omnia alia *seculorum* per *inceptiones* comprehendi, cuiuscumque sint toni.” *Ameri Practice musice*, 34.

(*inceptiones*) of antiphons, responsories, introits, and all chants, that is those beginnings which differentiate within and among these [genres of chant].”¹⁰⁷ This raises two questions.

First, since Amerus takes the opening pitch of the antiphon as his paradigmatic *differentia*, does he mean by the species of *differentia* he calls ‘seculorum’ the opening pitch of the termination formula, that is the reciting-note itself, as in the usage of Theogerus of Metz? Amerus nowhere defines ‘seculorum,’ but the musical example he provides as illustration gives complete formulas, one or two for each mode, in modal order 1–8, and not the four tenor pitches *F* (Mode 2), *a* (Modes 1, 4, and 6), *c* (Modes 3, 5, and 8), and *d* (Mode 7) that would logically illustrate ‘seculorum’ as first-note-of-termination. Clearly then, Amerus means by *seculorum* the entire termination formula, not just its first note.

The next question is more difficult. Earlier, Amerus called the tenor the *seculorum*’s ‘inceptio’; now he calls the opening of any chant the *inceptio* that constitutes a proper *differentia*. When he later calls the reciting-note the *differentia* in reference to the “Re-la, re-fa” Rule, is it so by virtue of its differentiating inception of the *seculorum*? Or is there no need to apply the specialized technical definition here, *differentia* as the attribute distinguishing species within the genus being a matter of common knowledge? The latter is more likely, since Amerus lists the tenors here as *differentia* in relation to modal finals to which the *seculorum*-examples of his tonary descend only rarely (*E* of Mode 3, *F* of Mode 5), or never at all (*G* of Mode 7).¹⁰⁸ Furthermore, his earlier definition of ‘differentia’ was for the purposes of the tonary that classes

¹⁰⁷ “Notandum quod differencecie vocantur diverse inceptiones antiphonarum, responsoriorum, officiorum et omnium cantuum, scilicet ipsa principia que inter se et a se differunt. Item seculorum improprie dicuntur differencecie, licet inter se differant, quia non sunt principia sed fines.” *Ameri Practica artis musice*, 38.

¹⁰⁸ *Ameri Practice musice*, 39–41.

chant items by mode, a subject now closed. He has moved on after the *explicit* of the tonary to the next chapter, which deals with mode not in practice but in theory.¹⁰⁹

And what of ambitus? Amerus does cite it, in remarks preparatory to his tonary, as a descriptive property of mode illustrated by familiar repertoire. He closes those remarks, however, by recommending as a governing ‘rule’ (*regula*) a quatrain, given at the treatise’s end, that commemorates the tenors.¹¹⁰ Elsewhere in the treatise he does define modes in terms of ambitus also, but it is first and last the tenor that Amerus cites as determining and definitive of modal identity.

§4.10 Weaker interpretations of the Rule; the role of notation

Not everyone laid such stock in the Modal Dyad of the “Re-la, re-fa” Rule, however: many saw the latter only as a beginner’s guide to liturgical practice. In the 1375 Parisian treatise attributed to Goscalchus, the earliest source I have found to memorialize the Rule with the dense and cryptic “Pri re la” quatrain,¹¹¹ the Rule has mainly to do with notation: Goscalchus interprets it as an index of the interval between the final note of the antiphon and the first note of the *seculorum*, for which he employs the abbreviation *Euouae*. This “is commonly placed,” he says, “at the ends of antiphons.”¹¹²

¹⁰⁹ The treatise is organized in seven chapters: §1 prologue, §§2–5 the gamut and solmization, §§6–8 fundamentals: diction, the *seculorum*, intervals, introduction to theory as a discipline; §§9–13 the tonary, §§14–23 on tonal theory, §§24–25 on mensuration, §26 on cantillation of sacred readings.

¹¹⁰ *Ameri Practice musice*, 37–38, 111.

¹¹¹ Appendix no. 6. Most likely this version of the quatrain was already widespread by the time Goscalchus discusses it, since he gives the solution first, and only then the riddle.

¹¹² *The Berkeley Manuscript*, 80–81 (trans. Ellsworth).

What Goscalchus has observed is that since the *Euouae* is customarily written immediately after the antiphon, its first note appears in notation directly after the final. One need therefore only analyze the *voces* of these two adjacent notations to discover the antiphon's modal classification. Goscalchus explains: "the first tone has from the final to the *Euouae* the fifth syllable going up (from re to la). The second tone has the third (re fa). The third tone has the sixth (mi fa)," and so on through the eight modal pairs.¹¹³ Thus the function of the Rule, for Goscalchus, is simply to lead from the notation of final and recitation-tone termination to the proper melodic formula for the verses of Psalm or Canticle.

Guilielmus Monachus agrees with Goscalchus as to the narrow application of the Rule, adding that it applies not only to Office antiphons but also to responsories and the introits of Mass, in other words to all chants that feature formulaic verses closing with the Doxology and the words *seculorum amen*.¹¹⁴ Jacques de Liège, Bonaventura, and others similarly explain the Rule strictly in relation to the literal *seculorum amen* or its abbreviation *Euouae*.¹¹⁵ Nevertheless, Goscalchus's explanation begs the question of modal classification, since whoever notated the antiphoner had to assign that particular *Euouae* to the antiphon in the first place. By what criteria?

What's brilliant about the solution Goscalchus offers is that the final of the antiphon and the first note of the *seculorum* appear on the page in immediate succession, allowing the student to gauge their intervallic and qualitative relationship at a single glance. This is an accident of notation, however: in performance these notes are separated by the intervention of others.

¹¹³ *The Berkeley Manuscript*, 81 (trans. Ellsworth).

¹¹⁴ *Guilielmi monachi De preceptis artis musicae*, ed. Albert Seay, CSM 11 (1965), 58; Appendix no. 18.

¹¹⁵ See Appendix nos. 3, 13, 16, 20, 21, 39.

In Example 3.2, for instance, having reached the final *D*-re of the opening *Inclinavit dominus* we have still to get through the intonation, tenor, mediation, caesura, and resumed tenor of the recitation tone before sounding the notated *a*-la on the first syllable of *Euouae*. Likewise after the Psalm, going from the end of the Doxology and tenor *la* beginning the words *seculorum amen*, we still have the body of the closing antiphon to sing through before we reach the cadence on the final. At this juncture, moreover, the *seculorum*-tenor comes before the final, whereas in notation and in the ordered pairs of the “Re-la, re-fa” Rule it is the final that always comes first. Also recall that in late-medieval practice the opening antiphon as a rule is not sung in its entirety before the psalm or canticle, but only its incipit intoned, except on double feasts. With many recitation tones never touching on the modal final, and with many antiphons withholding that final until the last cadence, the final may be heard never at all until the end of the closing antiphon. Such is the case, for example, at Vespers on an ordinary Monday when the choir recites Psalm 114 with Antiphon *Inclinavit dominus* (Example 3.2): only the first few notes of the antiphon are intoned before the Psalm. With the *D* final sounding only at the end of the antiphon and not at all within the psalm-tone, the Mode-1 final *re* is reached only after tenor *la* has sounded for the last time, and after intervening degrees have led to the closing antiphon’s final cadence. Here tenor and final have no direct melodic contact.

The “Re-la, re-fa” Rule therefore describes a relationship that may remain abstract in the sounding realization of monophonic chant. Its dyads have no rhythmic value, are not expressed harmonically in the sense of sounding simultaneously, and represent obligatory melodic succession neither within the antiphon, within the recitation tone, nor in the joins between. Although many Mode-1 antiphons (taken alone or in combination with their psalmody) do

contain some immediate re–la motion, the Antiphon *Inclinavit dominus* with Psalm 114 is one of many that do not. Thus the “Re-la, re-fa” Rule differs fundamentally from older mnemonics such as the quatrain for psalmodic intonations *Primum cum sexto cantu* and tercet for mediations *Septimus et sextus dant fa mi re mi*, which teach melodic progressions that are obligatory and immediate. Such formulas are descriptive, whereas the “Re-la, re-fa” Rule is analytical—and for some theorists, definitive.

§4.11 Stronger interpretations

For there is also a stream of sources that explicitly ascribe to the Rule’s dyadic relationships the power not only to recognize mode but also to construct it. The earliest exemplar comes from Avignon and dates from 1381, with a quatrain beginning *Est primus tonus re la*: in plain English, “Mode 1 is re la.”¹¹⁶ The same or similar quatrain appears in the British Library manuscript copied around 1450 by John Wylde, in the *Tractatus* of Coussemaker’s ‘Anonymous Carthusian Monk,’ and in the c. 1490 *Tractatus de octo tonis* in Salzburg; a Mantuan manuscript of the same era gives another version that includes the phrase *fit re fa rite secundus* (“re fa done right becomes the second [mode]”).¹¹⁷ All these make explicit the verb ‘to be’ implicit in the Rule’s more common *Pri[mus] re la* versions, thus declaring in terms clear and unambiguous that tenor and final are not only important for modal recognition, but that on some level the mode and the dyadic relationship of final and tenor are one and the same.

Here, for example, is the quatrain of the British Library manuscript:

Primus est tonus Re La. Re Fa. quoque secundus.

¹¹⁶ Florence, Biblioteca Riccardiana 688, f. 145v–146; Appendix no. 8.

¹¹⁷ Appendix nos. 12, 23, 24; 19.

Tercius est tonus Mi La. Mi Fa. quoque quartus.
 Quintus est tonus Fa Fa Fa La quoque sextus.
 Septimus est Vt Sol. Octauus dicitur Vt Fa.¹¹⁸

That is:

The first mode is re la, and re fa the second.
 The third mode is mi la, and mi fa the fourth.
 The fifth mode is fa fa, and fa la the sixth.
 The seventh is ut sol. The eighth is said ut fa.

Might these sources mean simply that re la is *of* Mode 1, belonging to it, and so on? No, for that would take the genitive case: instead of *est primus* we would read “est primi,” and instead of *secundus*, “secundi.” This is indeed how Ornithoparchus later construes the Rule: since he interprets “re la” as the uniquely identifying attribute (*proprium*) of Mode 1 and not its substantive essence (*proprietas*), he writes *Re la sit primi* (“Let re la be *of* the first”). These earlier sources, on the other hand, equate mode with tenor–final interval, plain as day.

The British Library quatrain uses in its last sentence another word, *dicitur*, in a clever and telling way: this form of *dico* literally means “it is said,” and of course solmizing is a manner of speaking as well as singing. Therefore I translate its *Octavus dicitur ut fa* as “the eighth is said ut fa.” But *dicitur* is also used in definitions to note etymologies. Johannes, for example, writes *Tenor ... a teneo ... dicitur*, that is to say the term ‘tenor’ derives from the verb *teneo*.¹¹⁹ *Octavus dicitur ut fa* tells us both “Mode 8 is solmized ut fa” and also “Mode 8 is derived from ut fa.”

Thus within the *cantus* tradition the dyadic relationships expressed in the “Re-la, re-fa”

¹¹⁸ TML ANOCTT TEXT

http://www.chmtl.indiana.edu/tml/14th/ANOCTT_MLBLL763.html (accessed November 29, 2013); Appendix no. 12.

¹¹⁹ *Johannis De musica*, 82; cf. Babb, *Hucbald, Guido, and John*, 117.

Rule may be interpreted as the very basis of mode. As such it appears in many treatises as the end of the beginning, the point where fundamentals have been established and real music can begin. This is illustrated beautifully in the Bodleian Library's Mantuan manuscript whose "Re-la, re-fa" Rule appears on the sleeve of the Guidonian hand (Appendix no. 19). The voice of man may be natural, this image suggests, but the understanding of mode is a matter of discipline and art.

The treatise of Coussemaker's 'Anonymous Carthusian Monk' is both unusual and perceptive in relating the "Re-la, re-fa" Rule not to the recitation tone but directly to the melodic structure of the antiphon, by way of long-established rules for the upper limit of beginning notes of chant (*principii cantus*) and for notes that begin medial phrases (*hemitonia*, sometimes transcribed by Coussemaker as *semitonia*).¹²⁰ Those rules are quite a bit older than the "Re-la, re-fa" Rule: Hucbald observes that no chant begins or cadences higher than the fifth degree above its final, the *Dialogus* remarks the exception of Mode-3 melodies on *E* beginning on *c*, and Guido gives rules that effectively place the upper limit for phrases to begin and end on the tenor of whatever mode, rules that Johannes also observes.¹²¹ It is from Johannes specifically that the Carthusian borrows heavily from in the passage below, adding the "Re-la, re-fa" Rule unknown to that earlier authority:

The first [rule] is that every authentic can wind up its beginning or medial phrase-beginning to the fifth degree from the final, and can relax it to the nearest degree below that final; but from this rule is excepted the authentic deuterus, that is the third mode, for the latter winds up its beginning so far as the sixth degree, as evidenced in many chants. The second rule is that certain plagals may wind up

¹²⁰ CS 2:451; TML CARTRA TEXT

http://www.chmtl.indiana.edu/tml/15th/CARTRA_TEXT.html (accessed November 29, 2013); Appendix no. 23.

¹²¹ See §2.6 above for the history of this rule.

their beginnings or even their phrase beginnings to the fourth degree—think here of modes four and eight—, others only to the third—think here of the second mode and the sixth—; and indeed of the same [plagals] it is possible to relax to the fourth degree [below the final], that is in the fourth [mode] one may relax to the fourth [below], and in the eighth [mode] to the fifth [below] ...

Thus the verses:

The first mode is re la, and re fa the second.

Third is the mode mi fa, and mi la the fourth.

But the fifth shall retain fa fa, the sixth fa la.

Ut sol is the seventh; thereafter the eighth upholds ut fa.¹²²

The Carthusian's application of the "Re-la, re-fa" Rule differs fundamentally from those of other authors, yet like theirs it agrees with the facts of the repertoire. This in itself suggests that these dyads occupy a very deep level of structure, from which they radiate influence in several directions.

The centrality of the "Re-la, re-fa" Rule to *cantus*-tradition theory by the end of the fifteenth century is summed up in the graphic synopsis of the Salzburg *Tractatus de octo tonis*:

¹²² "[Regula] prima est, quod omnis autentus potest suum principium vel etiam semitonium a suo finali ad quintum gradum et ad proximum gradum sub suo finali remittere; sed ab hac regula excipitur autentus deuterus, id est, tertius tonus, quia ipse intendit suum principium usque ad sextum gradum, sicut in pluribus cantibus invenitur. Secunda regula est quod quibusdam plagalibus, licet sua principia vel etiam semitonia ad quartum gradum intendere, puta quarto et octavo; quibusdam vero ad tertiam puta secundo et sexto; quibusdam vero etiam licet remittere ad quartum gradum, scilicet et quarto licet remittere ad quartum, octavo vero ad quintum. Unde versus:

Est primus tonus re la, re fa, que secundus.

Tertius est tonus mi fa, mi la, quoque quartus.

Sed quintus fa fa, sextus fa la, retinebit.

Septimus est ut sol; post octavus tenet ut fa." Appendix no. 23. Cf. *Johannis de musica*, 95–96; also Babb, *Hucbald, Guido, and John*, 124–25.

see its full-page reproduction in Appendix no. 24.¹²³ In the leftmost columns, the gamut's *litterae* are noted first by genus (Graves, Finales, etc.) and then by species (*I*, *A*, *B*, *C*, *D*, *E*, etc.), followed by the seven positions (*Proprietates*) of the ut-re-mi-fa-sol-la hexachord, of which each vox (ut, re, mi, fa, sol, or la) combines with a *littera* in one of several possible ways (*Reformationes*) to form a *clavis* (*I*-ut, *A*-la, *B*-mi, e.g.). The horizontal lines defined by positions of *littera* and vox project from left to right throughout the graphic system; selected *litterae* are noted again for reference in the right-hand columns.

The middle-left quadrant indicates which notes fall within the normal range of each of the eight modes. Here, in a bow to harmonics-tradition theory, square note-shapes mark the modal finals, superior fifths, superior octaves, and inferior plagal fourths; other degrees display the diamond-shape notes used in chant notation for linear melodic descent (see, for example, Figures 4.4 and 4.5). Note, however, the soft *b* marked as the fifth degree above the Mode-4 final *E*: this diminished fifth represents a *cantus*-tradition observation of melodic behavior and a rebuke to the species system.

The “Re-la, re-fa” Rule appears twice in words stacked above the middle right-hand quadrant of this page. At the top we find the quatrain beginning *Est primus tonus* (mode and dyad are thus equated here), and then on the fifth line begins the riddle-quatrain *Pri re la, se re fa*. It is in graphic form, however, that the Rule truly dominates the page: each of its dyads, here called *Tenor*, is marked with the ascending two-note neume known as the *podatus*, the wide-ranging authentic dyads alternating with plagal ones of smaller span. First these are noted in their “natural” locations with finals on *D*, *E*, *F*, and *G*. Then to the right of the page we have the

¹²³ TML ANOTOT 32GF http://www.chmtl.indiana.edu/tml/15th/ANOTOT_32GF.gif (accessed November 29, 2013).

protus, deuterus, and tritus transposed up by fifth to end on *a*, *b*, and *c*, respectively. There are four sets of pairs in the lower position and only three in the higher transposition, this document explains, because tetrardus modes always end on *G* and do not transpose: compare the examples by Coclicus in Appendix no. 36, along with their summary in Example 4.2.

CRITICAL EXCURSUS V: THE BODLEIAN QUATRAIN

The text on the sleeve of the Bodleian hand (Appendix no. 19) translates:

Franciscus:

The first has re–la; re–fa done right becomes the second.

Thirdly is mi–fa given; mi–la is mated with the fourth.

Fa–fa takes to the fifth; fa-and-la upholds the sixth.

Ut–sol *hepta tropos* [Greek: 7th trope]; ut–fa makes the eighth.

Here as always, each syllable-pair is taken not as a plurality but as a singular dyad: “thirdly *is* mi–fa given (*terno mi fa datur*),” not “thirdly *are* mi and fa given” (*dantur*), “mi–la is mated (*sociatur*),” not “are mated (*sociantur*),” and so on. Unlike most earlier versions, this quatrain is rich in action verbs that illuminate how musicians conceived of the tenor–final dyad and its relationship to mode. Also, whereas the mode is usually the subject acting upon the modal pairing of final and tenor, in lines 2–4 of this quatrain the modal dyad is the subject, and the mode the object being acted upon: “mi–la is mated with the fourth ... fa-and-la upholds the sixth ... ut–fa makes the eighth.”

Here is the quatrain's Latin text:

Re la primus habet: fit re fa rite secundus.
 Terno mi fa datur: mi la quarto sociatur.
 Ascit quintum fa fa: sextum fa vendicat et la.
 Ut sol epta tropos: octavum conficit ut fa.

In line 1 we find the Latin word *ritus*, from which English derives both the words “right” and “rite,” here in the ablative singular as *rite*, meaning “the proper ceremony having been observed,” that is “rightly” in the sense that a ritual must meet certain formal conditions in order to be effective. For example, the priest must say and do certain things in order to perform the mystery of the Eucharist. Indeed the quatrain's last clause, *octavum conficit ut fa*, employs the exact verb for what the priest does in the Eucharist: *conficit*, he performs, he makes it happen (that is his words and actions, which are those of Christ himself, make them happen). In Catholic theology, these accomplish, perform, *confect* the Body and Blood. Early in the 15th century those suspected of Lollard heresy were to be asked *An sacerdos rite consecrans conficit corpus Christi?*—whether the priest consecrating correctly, that is according to rite, makes (*conficit*) the body of Christ.¹²⁴ With or without these theological overtones, the lines of this Franciscan quatrain communicate the sense of the modes as action. Here, moreover, the singer is the efficient cause of that action, a vessel of music much as the consecrating priest is the vessel of Christ: the ut–fa dyad is the formal cause, the thing that makes the eighth mode happen.

The “Franciscus” that prefaces this version of the Rule is the conclusion of the traditional Franciscan benediction “Jesus Maria Franciscus” whose beginning we find inscribed on the palm

¹²⁴ Miri Rubin, *Corpus Christi: The Eucharist in Late-Medieval Culture* (Cambridge University Press, 1991), 331.

of the Guidonian hand; thus an attribution of the “Re-la, re-fa” Rule to Francis of Asissi is probably not meant here.¹²⁵ It should come as no surprise, however, if medieval authors do seek some high authority for such a widespread and powerful doctrine, as in the fifteenth-century southern Italian manuscript that credits the “Re-la, re-fa” Rule to Saint Gregory himself.¹²⁶ This may shed light on a curious remark by Petrus de Cruce’s contemporary and likely associate Franco of Cologne, who opens his *Ars cantus mensurabilis* by proposing to treat mensural music

Now that the philosophers have treated sufficiently of plainsong and have fully explained it to us both theoretically and practically (theoretically above all Boethius, practically Guido Monachus, and, as to the ecclesiastical tropes, especially the blessed Gregory).¹²⁷

Saint Gregory left no treatise on the modes, of course, and if the modality of the repertoire named for him were self-explanatory then perhaps none of this would be necessary. Although Franco does not quote the “Re-la, re-fa” Rule explicitly here, this passage does suggest that he knew it, attributed it to the authority of Gregory as others did later, and furthermore considered it both necessary and sufficient for modal understanding.

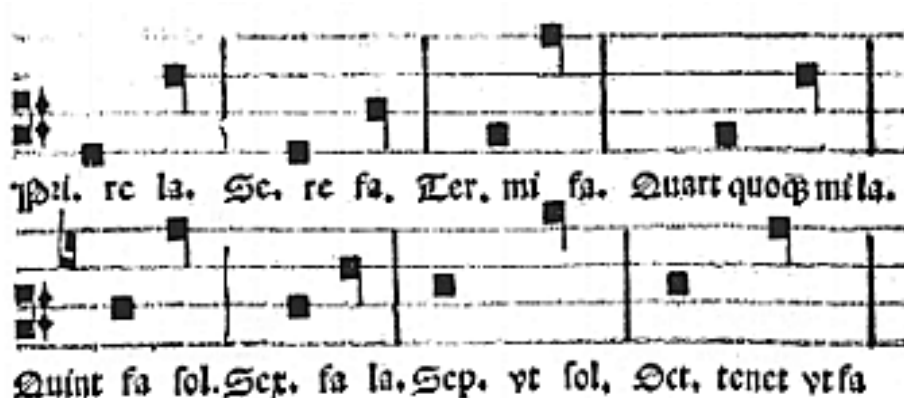
¹²⁵ On this point I am grateful to Matthew Cheung-Salisbury of the Bodleian Library.

¹²⁶ Catania, Biblioteche Riunite Civica e Antonio Ursino Recupero [1453–1473], 40r, ed. Christian Meyer. LmL <http://www.lml.badw.de/info/catD39e.htm> (accessed November 29, 2013); Appendix no. 13.

¹²⁷ “Cum de plana musica quidam philosophi sufficienter tractaverint, ipsamque nobis tam theorice quam practice efficaciter illucidaverint, theorice praecipue Boetius, practice vero Guido monachus, et maxime de tropis ecclesiasticis beatus Gregorius.” *Franconis de Colonia Ars Cantus Mensurabilis*, edited by Gilbert Reaney and André Gilles; CSM 18 (1974), 23; see TML FRAACM TEXT. Translation by Oliver Strunk, revised by James McKinnon, in *Source Readings in Music History*, 227.

§4.12 Dyadic *varia* in the Rule's representation

Example 4.7 Wollick, *Enchiridion Musices* (1512)¹²⁸



Among later authors, Nicholas Wollick participates squarely in the *cantus* tradition of modal theory when he defines the “Re-la, Re-fa” dyad as the *melodia* that “leads infallibly to modal cognition.”¹²⁹ In **Example 4.7** we see at the beginning of the second system, however, that he solmizes the final–tenor dyad of Mode 5 as “fa sol” which others have solmized “fa fa.” The upper note of the Mode-5 diapente might indeed be solmized either as “fa” or “sol”: it is certainly “fa” where that tenor’s *clavis* is *c-fa* with hard *♩-mi* below it, the upward tendency of *mi* aiding in the medial prolongation of tenor *fa*. We hear this clearly enough in the traditional Mode-5 psalm-tone termination *d-♩-c-a*, regularly solmized “sol mi fa re.” Elsewhere, however, the Mode-5 tenor might be pronounced “sol” where below *c* there lies soft *b-fa*. This is especially common in Mode-5 melodies at the approach to the cadence, soft *b* acting terminally upon tenor *c* and initiating the descent of Tenor function toward the final (*c-b-a-G-F*, solmized “sol fa mi re/sol fa”). With the Mode-5 tenor so often *fa* in its prolongation and *sol* in its

¹²⁸ http://www.chmtl.indiana.edu/tml/16th/WOLENC3_04GF.gif (accessed November 30, 2013).

¹²⁹ “Melodia inquam: que et ordinata tenorum contextura dignoscitur nos infallibiliter ducit in tonorum noticiam.” Wollick, *Enchiridion Musices*, dviiv; Appendix no. 28.

termination it is understandable that this syllable of the “Re-la, re-fa” Rule might vary from source to source. This it does generally as a function of the writer’s relation to scale-based theory: the academic Jacques de Liège is unusual among medieval writers for listing the Mode-5 tenor as *sol*; it becomes common during the sixteenth century among theorists who accept the *b* key signature as a sign of *tritus* with final on *F*, as in Figure 4.7.¹³⁰ Even with such variances in solmization, the Rule’s intervals were always the same, at least up until 1517: the mediated space between the modal final and the recitation-tone tenor.

Looking back to Figure 4.1 we see the unresolved dissonance between the *cantus* and harmonics traditions in Ornithoparchus’s treatment of Mode 3. In the liturgical practice of his time, that mode’s recitation-tone tenor generally lay a minor sixth above the final, that interval solmized “mi fa.” The modal song of Ornithoparchus nevertheless shifts the upper note of the Mode-3 dyad down a semitone to the perfect fifth above the final ($\natural$ -mi over *E*-mi), so that all the authentic pairs follow the pattern prescribed by Marchetto and the harmonics tradition as unique species of fifth. Some sixteenth-century theorists, but by no means all, follow Ornithoparchus in this shift of tenor from the *cantus* model of liturgical recitation-tone to the harmonics model of species diapente.¹³¹ Again, Ornithoparchus’s “repercussio” is a species or type, and not the essential archetype, of the “Re-la, re-fa” Rule. Note that the Mode-3 phrase of the *Re la sit primi* melody does however end on the recitation-tone tenor *c*-fa. In this didactic song whose authentic phrases consistently end on the tenor—which for every other mode is the same as the upper note of the solmized dyad given at the head of the phrase—we thus find a measure of ambiguity in the treatment of Mode 3.

¹³⁰ See Appendix nos. 3, 26–33, 35, 38.

¹³¹ See Appendix nos. 31, 32, 37.

Such ambiguity appears to be built into that mode, whose recitation-tone tenor is positioned at the fifth above the final also in the earliest detailed treatment of psalmodic practice, the ninth-century *Commemoratio brevis*; whereas nearly all second-millennium sources from the *De modorum formulis* to the *Liber Usualis* favor the reciting note at the sixth. Felstin is unusual among Renaissance authors for admitting a choice of Mode-3 *repercussio*, “from mi to mi by fifth or from mi to fa by sixth.”¹³² The 1934 *Antiphonale Monasticum* takes a similarly inclusive approach, describing the Mode-3 psalm tone with tenor at the diapente as the “tone with ancient tenor” and its counterpart with higher tenor as the “more recent tone, accepted everywhere and approved through daily use.”¹³³ The present study likewise accepts both positions of the Mode-3 tenor as equally legitimate: the semitone difference between them is accidental in the Aristotelian sense.

Of all the authors anthologized in the Appendix, only Glarean presents a variant of the “Re-la, re-fa” Rule that differs from the others on such an essential level as to constitute a fatal deformation, a category *sui generis*. **Example 4.8** shows Glarean’s notation with the Mode-5 dyad represented not as the fifth between final *F* and tenor *c* but as the minor third above *a*. This is no typographical error: his version of the riddle-quatrains gives the solmized pairing for Mode 5 as “mi sol,” which corresponds precisely to this notation.¹³⁴

¹³² “Tercij toni de mi ad mi per quintam vel de mi ad fa per sextam.” Felstin, *Opusculum musice*, f.Bijv; Appendix no. 31.

¹³³ “Tonus in tenore antiquo ... Tonus recentior, ubique receptus et diuturno usu probatus.” *AM* 1212–13.

¹³⁴ Henricus Glareanus, *Dodecachordon: A Facsimile of the 1547 Basel Edition*. Monuments of Music and Music Literature in Facsimile, Second Series – Music Literature LXV (New York: Broude Brothers, 1967), 32. TML GLADOD1 TEXT http://www.chmtl.indiana.edu/tml/16th/GLADOD1_TEXT.html (accessed November 29, 2013); Appendix no. 35.

Example 4.8 Glarean's "Re-la, re-fa" model (*Dodecachordon*, Book I)¹³⁵



Glarean understands the "Re-la, re-fa" dyads not as structural, identifying, or definitive traits, but only as intervals by which melodies of one mode or another commonly and characteristically proceed. "Chants of the first mode frequently leap from re to la," he writes, citing three examples whose incipits each feature a direct leap from *D-re* to *a-la*.¹³⁶ Glarean here describes a repeated and characteristic interval, which is different in kind from the *repercussio* of his Renaissance colleagues.

Glarean has apparently observed that in Mode-5 melody the rising fifth from *F* to *c* is usually subdivided by the intervening third degree on *a* (as in the intonation to the psalm tone, for example), and that *c* also very often alternates with *a*; these descriptive features are prominent in the chants Glarean cites as examples for Mode 5, as in that mode generally.¹³⁷ Having made this observation, Glarean does not hesitate to alter the traditional "Re-la, re-fa" Rule to conform to his own way of thinking. Thus he severs the connection to the modal final that is both essential to and definitive of the Rule as handed down by all before and since. In

¹³⁵ http://www.chmtl.indiana.edu/tml/16th/GLADOD1_11GF.gif.

¹³⁶ "Cantilenae primi modi frequenter ex re in la saliunt. Exempla sunt: Gaudeamus omnes. Salve regina. Ave maris stella" (cf. *LU* 1724, 276, 1259). Glareanus, *Dodecachordon*, 32; Appendix no. 35.

¹³⁷ Glarean cites the antiphon *O sacrum convivium* (cf. *LU* 959), the Responsory *Illuminare, Jerusalem* (cf. *AM* 1185), and the Responsory *Regnum mundi* transcribed in Renate Amstutz, *Ludus de decem virginibus: recovery of the sung liturgical core of the Thuringian Zehnjungfraunspiel* (Toronto: Pontifical Institute of Medieval Studies, 2002), 325.

Aristotelian terms, this alteration destroys the subject of definition. How ironic that the chapter in which Glarean so mangles it, entitled “On the rude-mechanical identification of modes” (*De vulgare modorum agnitione*), condescends to that mnemonic “conveyed even by those unschooled in the precepts of this art” as modal cognition *a posteriori*, as opposed to the harmonic philosopher’s *a priori* understanding—ironic especially since the philosopher’s own understanding is arguably posterior to that of his era’s average cathedral choirboy.¹³⁸

As for Glarean’s *phrasis*, which enters the discourse of his *Dodecachordon* without definition,¹³⁹ Glarean makes clear by word and example that he derives it from the melodic ambitus, the feature he believes ought by rights to govern the mode:

And so we shall present two examples, the limits of which are *D* to *d*, but where the first belongs to the Phrygian mode, to which these limits do not relate at all, the second to the Hyperiastian, so that the reader can observe from them how much different the *phrasis* of each mode may be in a song.¹⁴⁰

Glarean does concede some weight to the final, and some to the intervals of the “Re-la, re-fa” Rule as he understands it. But if a chant displays the *phrasis* of one mode and ends with the final of another, then the fault must lie in the corruption of modern singers:

What we have proposed in the first book has not been taught without design, namely, the first, *re la*, the second, *re fa*, the third, *mi fa*, etc. Yet we do not entirely reject the final key, as it is called, especially since the common fifths in a

¹³⁸ “Poterunt et cantus notitia quadam a posteriore, ut Philosophi loquuntur, pernosci, regulis quibusdam leuioribus, ac omnino uulgatis, quae tamen, quod iuuant memoriam, atque a non indoctis huius artis praeceptoribus traditae sunt, non omittendae uidentur.” Glareanus, *Dodecachordon*, 32; Appendix no. 35.

¹³⁹ Book II, Chapter XXII: “Hic certe Hyperiastius praeter phrasin mediationemque ...” Glareanus, *Dodecachordon*, 120; TML GLADOD2 TEXT http://www.chmtl.indiana.edu/tml/16th/GLADOD2_TEXT.html (accessed November 29, 2013).

¹⁴⁰ Chapter XXXVI: Glareanus, *Dodecachordon*, 162; transl. Miller, *Heinrich Glarean: Dodecachordon*, 195.

song are so uncertain that it is not easily ascertained, for instance, which mode the *phrasis* may be dominating. And in fact the final keys should have been adapted to the *phrasis*, but many singers at present fit the *phrasis* of a song to these very keys. And therefore, the nature of the mode is confused.¹⁴¹

What exactly Glarean means by *phrasis* is finally demonstrated in the musical examples of his 37th chapter: it is the species of perfect consonance that emerges within the ambitus; if not the octave, then the fourth or fifth.¹⁴² Now such an interval may be solmized the same as one of the traditional “Re-la, re-fa” pairs, but such resemblance is accidental (as is the final, according to Glarean). The Mode-2 Antiphon *A timore inimici*, for example, displays in its narrow ambitus of C to F the diatessaron *ut-fa* that Glarean, following Marchetto, identifies as the third species of fourth; Glarean therefore classes it with three other chants having nothing in common but that ambitus.¹⁴³ Thus what Glarean considers ‘characteristic’ is not really the *repercussio*, and the *phrasis* he considers structural and definitive is another animal altogether.

§4.13 The “Re-la, re-fa” Rule after 1600

The “Re-la, re-fa” Rule remains with chant pedagogy in the seventeenth century even as the species-based 12-mode system Zarlino adapted from Glarean takes hold more generally. Banchieri includes in his *Cartella* of 1614 a brief introduction to the eight melodic *tuoni* of Vespers psalms and canticles, teaching how they are to be recognized by comparing the interval between their antiphon-final and recitation-tone tenor to the ancient “Re-la, re-fa” Rule, which

¹⁴¹ Ibid.; I have here corrected Miller’s “adopted” to “adapted.”

¹⁴² Glareanus, *Dodecachordon*, 165 ff.; Miller, *Heinrich Glarean: Dodecachordon*, 197 ff.

¹⁴³ *A timore inimici*, cf. AM 52; the others are *In matutinis*, an antiphon of the archaic *mi*-mode (cf. AM 372), the Mode-8 *In Israel* (cf. AM 66), and the Mode-6 Invitatory *Venite exultemus domino* (cf. LU 1779).

he demonstrates in no fewer than five distinct ways.¹⁴⁴ It is around the same time that French authors begin calling the upper note of the “Re-la, re-fa” pair ‘dominante,’¹⁴⁵ as in the 1650

Traité de l’accord de l’éspinette of Jean Denis:

[The organist] must know the proper keys whereon to begin and end the psalms, the *Magnificat*, and the *Benedictus*, in accordance with the modes of their antiphons. The first mode begins on *D*, its dominant on *a*, and its mediant on *F*. According to the antiphoner, the second ought to begin on *D* as well; for the convenience of the choir, however, the organist should key it on *G* and its dominant fa on *b*, that is a fourth higher than its natural sound.¹⁴⁶

Here ‘dominant’ refers to the reciting-note, located at the sixth, fifth, fourth, or third degree over the final, according to mode; ‘mediant’ in this context is a non-final cadential goal.¹⁴⁷ Already by

¹⁴⁴ “Modo di conoscere gli otto tuoni”: 1) in a prose summary, 2) in notation of final and tenor, 3) in a table (“Utilissima tabella in conoscere gl’otto tuoni”) which also includes beginning notes and solmization of psalm-intonations, 4) in an Italian-verse translation of the old Latin quatrain (“Re la primo sara”), and 5) in notation again, now with finals attached to the ends of typical antiphon-cadences, and tenors as the beginning notes of psalmodic termination-formulas. Adriano Banchieri, *Cartella musicale nel canto figurato Fermo, & Contrapunto* (Venice: G. Vicenti, 1614; facsimile Bologna: Forni, 1968), 68–69; Appendix no. 39.

¹⁴⁵ Alfred Mann, *The Study of Fugue* (New York: Dover, 1987), 50, traces this usage to the 1615 *Institution harmonique* of Salomon de Caus.

¹⁴⁶ “Il faut sçavoir les propres touches où il faut commencer & finir les Pseaumes, le *Magnificat*, & le *Benedictus*, selon les Tons que sont les Antiennes. Le premier ton commence en *D la, ré, sol*, sa dominante en *A mi, la, ré*, & sa mediant en *F ut, fa*. Selon l’Antiphonié, le second ce devroit commencer aussi en *D la, ré, sol*; mais pour la commodité du Choeur, l’Organiste le doit toucher en *G ré, sol, ut*, & sa dominante *fa*, en *B fa*, qui est une quarte plus haut que son naturel.” Jean Denis, *Traité de l’accord de l’éspinette* (Paris, 1650), reprinted with an Introduction by Alan Curtis (New York: Da Capo Press, 1969), 25–28; Appendix no. 40.

¹⁴⁷ Cf. Antoine Parran, *Traité de la musique théorique et pratique, contenant les préceptes de la composition* (Paris: Ballard, 1639, reprint ed., Geneva: Minkoff, 1972), 128: “La deuxiesme Cadence est appellée mediant, ou mediane, pource qu’on ne se sert point d’icelle à la fin comme de Cadence, ains seulement au milieu, et par fois au commencement, bien que le Pleinchant n’observe pas toujours cette reigle, veu qu’en certains Tons en l’Intonation des Pseaumes, les Mediations se trouuent à la fin, spécialement au premier, troisieme et huitiesme.” Indiana University *Traités français sur la musique*, PARTRA TEXT http://www.chmtl.indiana.edu/tfm/17th/PARTRA_TEXT.html (accessed July 27, 2009).

this time ‘dominant’ and ‘mediant’ could also mean the fifth and third degrees, respectively, of the *trias harmonica* over the final.¹⁴⁸ Rameau would later appropriate these terms for his own purposes, fixing the dominant to the fifth, and the mediant to the third, in relation to a new theoretical entity defined not as a melodic final but as the starting-point and goal of harmonic progression: the tonic. He then invents *ex post facto* a fanciful etymology for his ‘dominante’:

“The first of the two notes forming the perfect cadence in the bass is called the dominant, because it must always precede the final note and therefore dominates it.”¹⁴⁹

Although *dominante* and *tonique* are commonplace for ‘tenor’ and ‘final’ to this day in French-language chant research, I avoid the English derivatives ‘dominant’ and ‘tonic’ chiefly because their usage is so freighted with connotations of a harmonic system foreign to that of the chant. There is an English-language tradition of using the term ‘dominant’ for the psalmodic tenor, however, as seen for example in an 1848 article by J. Alfred Novello (who posits an etymology more likely than Rameau’s), and also in a 1904 Solesmes chant manual published in the U.S. (see Appendix nos. 43 and 44).¹⁵⁰

¹⁴⁸ “Il faut noter que mediant se prend en deux façons: premierement, eu esgard au milieu de la piece Musicale, où toutes les Consonances qui se peuuent rencontrer avec la note fondamentale du Mode propre ou empruntée, peuuent estre dites Cadances mediantes, ou mediations. Secondement, si nous comparons les trois notes ou chordes propres de chaque Mode, l’une avec les deux autres, qui [sont] les deux plus proches accords, à sçavoir le Diton et le Diapente, comme vt mi sol: alors nous dirons qu’vt c’est la finale, mi la mediant, et sol la dominante.” Ibid.

¹⁴⁹ Jean-Philippe Rameau, *Treatise on Harmony* Translated, with an Introduction and Notes, by Philip Gossett (New York: Dover, 1971), 65.

¹⁵⁰ J. Alfred Novello, “A Concise Explanation of the Gregorian Note, Compiled from Various Authorities [Part 1],” *The Musical Times and Singing-Class Circular* 3/49 (1848), 3–4 (Appendix no. 43); *A Complete and Practical Method of the Solesmes Plain Chant* From the German of the Rev. P. Suitbertus Birkle, O.S.B. With the authorization of the author Adapted and Edited by A. Lemaistre (New York: Joseph F. Wagner, 1904), 28–29 (Appendix no. 44).

These late sources also display the confusion that results when modern solfège syllables are recruited to replace those of the Rule's traditional Guidonian solmization. Novello represents the Mode-3 dyad as 'MI UT,' for example, 'UT' being understood here not as a transposable melodic quality but the fixed note C. This privileging of notational distinctions over sounding relationships, of *littera* over *vox*, persists in recent chant scholarship: see for example Appendix no. 45, from Columba Kelly's 2006 translation of Agustoni and Göschl's valuable *Einführung in die Interpretation des Gregorianischen Chorals*. Here again the solmization syllables of the traditional "Re-la, re-fa" Rule are replaced by fixed-pitch solfège syllables. The Mode-5 tenor, for example, is represented as *do* (pitch-class C) rather than the traditional melodic quality *fa*. Furthermore, the final and tenor appear here in reverse order, mediated with a backslash (\) to represent "the descending relationship between the psalmodic Tenor and the Final of a piece."¹⁵¹

Compare this with the latest pre-modern examples in the Appendix, nos. 40–41, both from the closing decades of the 17th century. In these the Rule appears, as in earlier sources, with solmization syllables signifying intervallic-vocalic relationships of finals and tenors, not fixed pitches. "Even so," says the Bodleian Library's 1682 Franciscan *Manuale cantus*,

one should know—in order that reason may hold firmer ground—also the positions (*loci*) on which are placed the notes, as well as their [solmized] names or appellations. Often it happens, for instance in antiphons of the eighth mode, that the last note may be not properly ut, but sol, as exemplified in the Antiphon *Rex pacificus* at Vespers of the Lord's Nativity.¹⁵²

¹⁵¹ Luigi Agustoni and Johannes Berchmans Göschl, *Einführung in die Interpretation des Gregorianischen Chorals, 1: Grundlagen* (Regensburg, 1987), translated and annotated by Columba Kelly as *An Introduction to the Interpretation of Gregorian Chant by Luigi Agustoni and Johannes Berchmans Göschl, Volume I: Foundations* (Lewiston, New York: The Edwin Mellen Press, Ltd., 2006), 20–21; Appendix no. 45.

¹⁵² "Hoc tamen ita intelligendum est, ut potior habeatur ratio situs, et loci in quo ponitur nota, quam nominis sive appellationis ipsius. Saepe enim contingit in Antiphonis 8. Toni, quod ultima

In the Antiphon here referenced, final *G* is approached from below and so in the immediate context is solmized as “sol,” not “ut”; only in the broader relationship to the modal tenor *fa* located on *c* does final *G* capture and prolong the melodic quality *ut*.¹⁵³ Despite such occasional difficulties in practical application, it is the solmized melodic quality of the traditional Rule that the *Manuale cantus* recommends as the primary means of recognizing modal identity, fixed pitches being called upon only as secondary reinforcement in difficult cases.

Matteo Coferati replaces the syllable *ut* with *du*—apparently a Florentine variant of the now-familiar *do*—for the “modern names of the modes” in his 1691 treatise which transmits the “Re-la, re-fa” Rule in Italian as well as Latin.¹⁵⁴ Yet that novel syllable retains its solmization function, serving not to describe the pitch-class *C* but the quality of the tetrardus final on *G*: this is not fixed-du solfège!

What these sources retain with solmization, and what is lost when modern sources treat it as solfège, is the “Re-la, re-fa” Rule’s sense of mode as a sounding relationship independent of, and logically prior to, the gamut and its notation. Granted that the Rule may have been discovered in that notation, and that some authors availed themselves to it only in the narrow context of that notation, nevertheless the Rule most often and most eloquently speaks of sounding melodic qualities, rather than written notes. As Cochlaeus says of its dyads, “these

nota proprie non sit *Ut*, sed *Sol*, ut patet in Antiphona *Rex pacificus* in Vesperis Nativitate Domini.” *Manuale cantus secundum usum FF. minorum rectorum provinciae comitatus Flandriae s. Joseph...* Candavi: Ex officina Haeredum Joannis Kerchovij, 1682 (Oxford, Bodleian Library, digitized August 30, 2006), 6: Appendix no. 41.

¹⁵³ Cf. *LU* 364.

¹⁵⁴ Matteo Coferati, *Il Cantore Addottrinato* (Florence, 1691), *Libro Terzo: De’ Tuoni del Canto Fermo*, edited by Luca Ricossa, <http://lrs.club.fr/coferati/cantore.html>, <http://lrs.club.fr/coferati/libro3.pdf> (accessed August 4, 2009); Appendix no. 42.

things being rightly considered, one can easily, even without seeing the notes, solely from hearing, recognize to which tone a chant belongs.”¹⁵⁵

Agustoni and Göschl lose more than the historically-authentic formal arrangement of syllables by reversing the traditional order of function, for the “Re-la, re-fa” Rule through the centuries gives priority to the modal final. Even Coussemaker’s Carthusian Monk, who specifically relates the second syllable of the modal pairing to the upper limit for *beginnings* of chants, respects the priority of the final nonetheless—a priority therefore logical, not rhythmic. So although Agustoni and Göschl do well to point out the “descending relationship” of tenor and final in the composed-out order of melodic events, their presentation of these elements in order of sounding appearance obscures the harmonic-structural significance ascribed to them in historical sources.

Agustoni and Göschl make what appears to be an outrageous claim: that the late-medieval “Re-la, re-fa” Rule constitutes “a theoretical chart of the Carolingian Octoechos.”¹⁵⁶ Certainly they present no historical documentation for such an assertion. The following section presents evidence of a different kind.

§4.14 Analytical comparison with *Noanoeane* and *Primum querite* prototypes

The historical stability and structural significance of the dyadic relationships inscribed in the “Re-la, re-fa” Rule snap strikingly into focus when with sounding voice we compare its eight component dyads with their corresponding first-millennium *Noanoeane* formulas and *Primum*

¹⁵⁵“His recte consideratis, potest quis facile, vel non inspectis notulis, ex solo auditu dinoscere, cuius toni cantus fuerit.” Cochlaeus, *Tetrachordum*, f.Ciir; Appendix no. 27.

¹⁵⁶ Agustoni and Göschl, *Interpretation*, 20; Appendix no. 45.

querite antiphons. We thus discover that these older prototypes demonstrate in conclusive melodic action the same unfolded harmonic dyads that the later “Re-la, re-fa” Rule freezes for analytic inspection. We also find that a theoretical argument central to this dissertation—namely that the modes of Gregorian Chant are the composing-out of the harmonic dyad of final and tenor—has long been made plain to the holistic musical intuition cultivated in the *cantus* tradition, if not to the rational intellect more highly prized by its rival the harmonics tradition. It has been made plain from the ninth century to our own, moreover, in the basic pedagogy of the *cantus* tradition.

For a sounding comparison of the late-medieval Rule’s component dyads with the *Noanoeane* prototype-melodies of the ninth century reveals to the listening ear those dyads imbedded within, and composed-out through, those melodies. Sing “re la” immediately after the Mode-1 “Noanoeane,” and what you hear is something like an echo, perhaps even an *echo*. The same with the Mode-2 “Noeais” followed by “re fa,” and so on down the line. **Example 4.9** transcribes the *Noanoeane* formulas from the *Commemoratio brevis*, each followed by its corresponding “Re-la, re-fa”-dyad located over the regular final. The reader must sing these aloud to obtain the full effect!

Example 4.9 *Noanoeane* formulas and “Re-la, re-fa” dyads compared

Protus Mode 1 	Mode 2 
Deuterus Mode 3 	Mode 4 
Tritus Mode 5 	Mode 6 
Tetrardus Mode 7 	Mode 8 

Where the eye may see a somewhat imperfect correspondence of melodic range, the ear hears a more cogent correspondence of dyadic harmony. Composed and disseminated before the invention of solmization or staff notation, the holistic *Noanoeane* prototypes enact, in miniature proportions and through a delicate veil of elaboration, the composing-out of the structural interval whose dimensions and qualities the later “Re-la, re-fa” Rule identifies analytically. This is not to say that such brief melodies could not by themselves be heard to prolong some other interval or perhaps no particular interval. The prolongation is difficult to miss in melodies for modes 1, 6, and 8, but those of modes 4 and 7 are decidedly ambiguous, the highest note in each heard potentially not as tenor but as upper neighbor, as with the highest notes in the melodies for

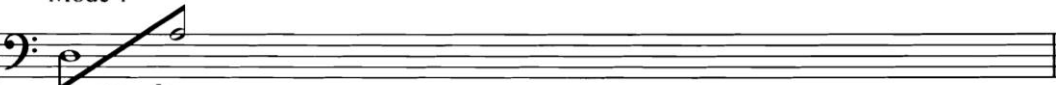
modes 2 and 5. These short antiphons did not function by themselves, however, but as a set of prototypes related to liturgical prototypes including recitation tones of unambiguous tenor. The primary goal of the prototype is to tune the mind to the mode, not necessarily to define that mode's distinction from some other. It is nonetheless remarkable how each manages in just a few notes not only to establish the intervallic and qualitative relationship of final and tenor that is necessary and sufficient for the projection of mode, but also to enact their complete reconciliation through descent of the pentatonic *Urlinie* of tenor function to the final.

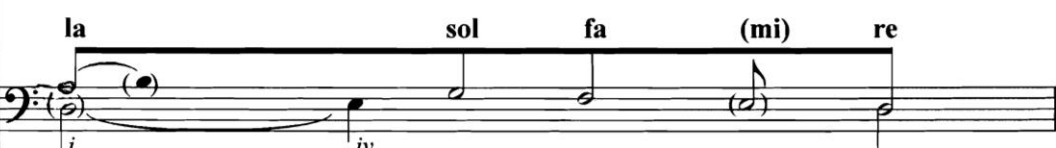
The somewhat later *Primum querite* melodies offer the same modal processes with slightly more elaboration, being comparable in length and syllabic text-setting to the typical Office antiphon. **Example 4.10** compares *Primum querite* melodies from an early eleventh-century manuscript from Reichenau (level d) with the corresponding *Noanoeane* formulas (level c) from *Commemoratio brevis* for modes 1 and 2.¹⁵⁷ The figure also provides melodic-functional analysis demonstrating their essential identity of modal process (level b; here elaborations displayed only in one or the other melody are given in parentheses). Finally, the harmony composed out through that process is represented both graphically as an unfolded harmonic dyad, and also syllabically as in the “Re-la, re-fa” Rule to which it corresponds precisely (level a). This reveals the modal process by which the voice of tenor function traverses the space of the modal nucleus to reach its ultimate resolution in unity with the voice of final function. Similar comparison and graphic analysis could easily be made for the formulas of the six remaining modes, perhaps as a classroom exercise.

¹⁵⁷ Bamberg, Staatsbibliothek MS lit. 5 (Reichenau); Wolfenbüttel, Herzog August Bibliothek MS 4376 (*Commemoratio brevis*). Bailey, *The Intonation Formulas*, 81–82 (editions), 94, 92 (manuscript information).

Example 4.10 Mode-1 and -2 *Primum querite* and *Noanoeane* analytical comparison

Mode 1

a. 
re - la

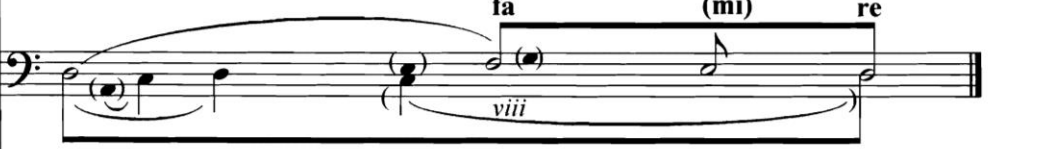
b. 
la sol fa (mi) re
i iv

c. 
No - a - no - e - a - - ne.

d. 
Pri - mum que-ri - te reg - num de - i.

Mode 2

a. 
re - fa

b. 
fa (mi) re
viii

c. 
No - - - e - a - - is.

d. 
Se - cun - dum au - tem si - mi - le est hu - ic.

§4.15 From the *octoechos* to the “Re-la, re-fa” Rule

The essential unity of the *cantus*-tradition approach to mode in the harmonic relationship of final and tenor having been demonstrated, there remains the historical question of its development from intuitive typology to analytical system. Between the holistic melodic process of the ninth-century *Noanoeane* prototypes and the systematic index of modal dyads that is the late-medieval “Re-la, re-fa” Rule there lies a gradual process of abstraction whose progress we can trace through the history of modal theory as described in this and previous chapters.

The absence of prototype-melodies in the earliest surviving tonary-fragment suggests that Carolingian musicians may have first learned to discern the set of eight distinct but interrelated modes directly in the liturgical repertoire, no doubt prompted by the example of the *octoechos* communicated by Byzantine colleagues. It may have been a subsequent generation, then, that composed or adapted from Byzantine practice the *Noanoeane* formulas as a means of encapsulating those melodic archetypes.¹⁵⁸ Surely of aid to the process of discerning these archetypes were both the repercussion of functional degrees within individual chants, and the repetition from one chant to another of melodic gestures both long-range and immediate—in the psalmodic recitation-tones most especially. But as these are always sung to one word or another in the liturgy, and furthermore present a wide variety of species by virtue of their many *differentia*, it is not always easy to see the modal forest for the trees. The nonlexical syllables of the *Noanoeane* formulas achieve separation of tone from word, each melody nevertheless having its own stable pattern of vocables helping to impress it in the memory and differentiating it from its fellows. This may be seen as a step toward solmization, but the naming of individual degrees

¹⁵⁸ Bailey, *The Intonation Formulas*, 7–8.

within the flow of melody represents a further stage of abstraction that seems to have taken place only later, a stage that is moreover unnecessary (perhaps even unhelpful, to the extent it emphasizes note-to-note relations rather than broad melodic process) for the intuitive recognition by melodic Gestalt or *tropus* that Guido himself describes in the *Micrologus*. The *Noanoeane* and later *Primum querite* formulas provide holistic prototypes for recognizing and performing complete melodic processes, not analytical tools for identifying individual notes.

It is a separate task to abstract from the undivided melodic gesture its constituent figures (neumes), and yet another to identify modal degrees and their intervallic relationships. These steps Hucbald is at pains to take in the post-Carolingian ninth century. One can then also begin to identify melodic functions residing in modal degrees; this is greatly aided by the regularity of psalmodic practice, but complicated by the relative freedom of the antiphon to elaborate upon the basic structures unfolded in the modal process.

It is perhaps for this reason that analytic resolution of the Modal Dyad into its constituent functions was not immediate. Ninth-century sources already recognize the modal final by melodic position at least; the tonaries by their very organization recognize a modal function in the recitation formula, if not in the tenor itself. Around the turn of the millennium, the *Dialogus* solidifies the authority of the final, but in a pitch-system that sacrifices for the sake of secure intonation the clarity of modal quality that the daseian system of the *Enchiriadis* treatises had offered earlier generations. With the subsequent identification of the reciting-note in the notational convention of the *seculorum amen*, with the later abstraction by Johannes of that tenor as a functional degree, and with the advent of solmization based on the doctrine of affinities pioneered by Hucbald and later developed by Guido, conditions become ripe for the “Re-la, re-

fa” Rule. A remaining mystery is why so much time passed between the early-twelfth-century treatise of Johannes, wherein all these conditions are present, and the first positive evidence of that Rule in treatises of the later thirteenth century. It may also seem curious that it was only in the sixteenth century that theorists began to propose formal terms for what Petrus de Cruce styled informally as *duo dura*. As necessity is the mother of invention, however, it appears that *cantus*-tradition modal theory was at each stage adequate to its task, adapting and refining its pedagogy only when some new challenge arrived.

At each of its later stages, moreover, the *cantus* tradition has had to overcome resistance from its offspring the harmonics tradition, the criteria of which are positional (how modal degrees are arranged in the scale) rather than functional (how modal degrees behave in the course of melody). It was necessary for Johannes to acknowledge his predecessor Berno’s interval-species theory, for example, even though it had little to do with his own theory, one of melodic-functional species. Later readers of Johannes misread his acknowledgement as dependence as bit by bit the *cantus*-tradition discourse became covered over by the harmonics tradition.

APPENDIX: HISTORICAL SOURCES, TEXTS, AND TRANSLATIONS
OF THE “RE-LA, RE-FA” RULE

1. Petrus de Cruce Ambianensi, *Tractatus de tonis* [c. 1260? c. 1290?] (London, British Museum

Ms. Harleian 281, ff. 52v–52r):

Versus de intonatione psalmodum quo ad principium psalmodum.

Primum cum sexto cantu, fa, sol, la, teneto,
Tertius, octavus, ut, re, fa, sicque secundus,
Septimus incipiet [fa,] mi, fa, sol, quartusque la, sol, la,
Nunc quintum dicas quem, fa, la[/]re, fa, bene cantas.

Versus de intonatione psalmodum quantum ad mediationem psalmodum.

Septimus et sextus dant fa, mi, re, mi, quoque primus,
Quintus et octavus fa, fa, sol, fa, sicque secundus,
Sol, fa, mi, fa, tertius, re, ut, re, mi, re, quartus.

Per hos versus scitur cuius toni est quaelibet antiphona.

Primus re, la, secundus re, fa,
Tertius mi, fa, quartus mi, la,
Quintus fa, fa, dico, sextus fa, la,
Septimus ut, sol, octavus ut, fa, duo dura.*

Verses on the intonation of psalm tones, for the beginning of psalms.

The first song, along with the sixth, keep fa sol la,

The third and eighth ut re fa, thus also the second;

The seventh begins [fa] mi fa sol, and the fourth la sol la,

Now the fifth, which you pronounce “fa la/re fa,” you sing well.

* Petrus de Cruce Ambianensi, *Tractatus de tonis* ed. Denis Harbinson. CSM 29 (1976), VII. See §§4.2, 4.9.

Verses on the intonation of psalm-tones, at the mediation thereof.

Seventh and sixth give fa mi re mi, as does the first,

The fifth and eighth fa fa sol fa, thus also the second,

Sol fa mi fa the third, re ut re mi re the fourth.

By these verses is known to what mode belongs whatsoever antiphon.

The first re la, the second re fa,

The third mi fa, the fourth mi la,

The fifth fa fa, say I, the sixth fa la,

Seventh ut sol, eighth ut fa, pairings certain.

2. Amerus, *Practica artis musice* (Italy, August 1271), §20:

Octo sunt toni, scilicet primus, secundus, tercius, quartus, quintus, sextus, septimus, octavus. Primus et secundus finiuntur in desolre gravi cum re. Differencia primi est in alamire, secundi in effaut. Tercii et quarti finiuntur in elami cum mi. Differencia tercii est in cesolfaut, quarti in alamire. Quinti et sexti finiuntur in effaut. Differencia quinti est in cesolfaut, sexti in alamire. Septimi et octavi finiuntur in gesolreut. Differencia septimi est in desolre, octavi in cesolfaut.*

Eight are the modes, that is, first, second, third, fourth, fifth, sixth, seventh, eighth. The first and second conclude on low *D* as re. The *differentia* of the first is on *a*, that of the second on *F*. Third and fourth conclude on *E* as mi. The *differentia* of the third is on *c*, that of the fourth on *a*. Fifth and sixth conclude on *F*. The *differentia* of the fifth is on *c*, that of the sixth on *a*. Seventh and eighth conclude on *G*. The *differentia* of the seventh is on *d*, that of the eighth on *c*.

* *Ameri Practica artis musice* [1271], ed. Cesarino Ruini. CSM 25 (1977), 83. See §4.9 and Critical Excursus IV: Amerus and the *Differentia*.

3. Jacobi Leodiensis, *Speculum musicae* (early 14c.), Book VI, Chapter LXXXI:

Iam ex dictis regulae ponantur per quas
ex tenoribus et “saeculorum”
differentiis in antiphonis et introitibus
tonos simpliciores agnoscant.

Et illae tales sunt:

Omnis antiphona vel introitus finiens in
re (tenor autem illius et “saeculorum”
incipiunt per diapente regulariter ad
quintam notam, idest in la) primi est
toni, vel esse debet.

Omnis antiphona finiens in re, cuius
“saeculorum” incipit per ditonum ad
tertiam vocem desuper, idest in fa,
secundi toni est.

Omnis antiphona vel introitus finiens in
mi, “saeculorum” ad sextam desuper
vocem per semitonium cum diapente
*incipit, idest in fa, est tertii toni...**

Proceeding from what has been said
already, rules may be laid down by
which the more simple might discern
the modes in antiphons and introits
from their tenors and differentia
“saeculorum.”

And those rules are as such:

Every antiphon or introit ending on re
(but whose tenor and “saeculorum”
begin by regular diapente [perfect fifth]
at the fifth degree, that is on la) is of the
first mode, or so it ought to be.

Every antiphon ending on re, whose
“saeculorum” begins by [semi]ditone
at the third degree above, that is on fa,
is of the second mode.

Every antiphon or introit ending on mi,
[whose] “saeculorum” begins at the
sixth degree above by semitone-with-
diapente, that is on fa, is of the third
mode.

... ending on mi, ... by diatessaron ...at
the fourth degree ... la ... fourth mode.

... ending on fa, or on ut, ... by diapente
... at the fifth degree ... sol ... fifth mode.

... ending on fa, or on ut, ... by ditone ...
at the third degree ... la ... sixth mode.

... ending on sol, or on ut, ... by diapente
... at the fifth degree ... sol ... seventh
mode.

... ending on sol, or on ut, ... by
diatessaron ... at the fourth degree ... fa
... eighth mode.

* *Jacobi Leodiensis Speculum musicae*, ed.
Roger Bragard. CSM 3/VI (1973), 227–28;
TML JACSP6B TEXT
http://www.chmtl.indiana.edu/tml/14th/JACSP6B_TEXT.html (accessed November 30,
2013).

4. Chapel Hill, University of North Carolina Wilson Library MS 63 (Italy, before 1360),

88v: *

Primum cum sexto fa sol la semper habeto ...

Primus re la. Secundus re fa ...

Primus et secundus finiuntur in re ...

Primus ad quintam. Secundus ad quartam ...

First with sixth fa sol la remember always ... [psalmodic intonations]

First re la. Second re fa ... [modal dyads by tonal quality]

First and second are ended in re ... [modal finals]

First at the 5th. Second at the 4th [*recte* 3rd] ... [modal dyads by interval]

5. Petrus de Amalfia (Italian, “[flourished] 2nd half of the 14th century”),[†] *Compendium*

musicale, ed. Adrien de la Fage, *Essais de diphthérogaphie musicale* (Paris: Legouix, 1864), 313:

Quomodo cognoscuntur toni in antiphonis?—Primus ad quintam supra suam litteram finalem, secundus ad tertiam, tertius ad sextam, quartus ad quartam, quintus ad quintam, sextus ad tertiam, septimus ad quintam et octavus ad quartam.[‡]

* *RISM US-CHH* MS 63. LmL <http://www.lml.badw.de/info/us.htm> (accessed November 30, 2013).

[†] F. Alberto Gallo and Andreas Bückner, “Petrus de Amalfia [Petrus Capuanus],” in *Grove Music Online*.

[‡] TML NICCOM TEXT http://www.chmtl.indiana.edu/tml/15th/NICCOM_TEXT.html (accessed November 30, 2013).

How are the modes recognized in antiphons?—The first at the 5th over its final note, the second at the 3rd, the third at the 6th, the fourth at the 4th, the fifth at the 5th, the sixth at the 3rd, the seventh at the 5th, and the eighth at the 4th.

6. *The Berkeley Manuscript* [Paris, 1375], ed. and trans. Oliver B. Ellsworth. Greek and Latin

Music Theory, vol. 2 (Lincoln: University of Nebraska Press, 1984), 80–83:

7. Preterea, cum in finibus antiphonarum ponatur communiter Euouae, sciendum est quod primus tonus habet a fine usque Euouae quintam vocem in elevacione, scilicet de re in la. Secundus tonus habet terciam, scilicet re fa. Tercius tonus habet sextam, scilicet mi fa. Quartus tonus habet quartam, scilicet mi la. Quintus habet quintam, scilicet fa fa. Sextus habet terciam, scilicet fa la. Septimus habet quintam, scilicet [82] ut sol. Octavus habet quartam, scilicet ut fa; et hec patent per hos versus:

Pri re la, se re fa,
Ter mi fa, quar quoque mi la,
Quin fa fa, sex fa la,
Sep ut sol, oc tenet ut fa.

De incepcionibus autem psalmorum dantur hii versus:

Primus cum sexto fa sol la semper habeto ...

[81] 7. Since Euouae is commonly placed at the ends of antiphons, it must be known that the first tone has from the final to the Euouae the fifth syllable going up (from re to la). The second tone has the third (re fa). The third tone has the sixth (mi fa). The fourth tone has the fourth (mi la). The fifth has the fifth (fa fa). The sixth has the third (fa la). The seventh has the fifth (ut sol). The eighth [83] has the fourth (ut fa). These are shown by these verses:

The first re la, the second re fa,
The third mi fa, the fourth mi la,
The fifth fa fa, the sixth fa la,
The seventh ut sol, the eighth ut fa.

For the beginnings of the psalms, these verses are given:

The first and the sixth shall always have fa sol la ...

7. Avignon, Bibliothèque municipale 235 (“end of the 14th century, origin unknown, provenance: Convent of Celestines of Gentilly”), f. 2:

Pri re la, se re fa, ter ...*

8. Florence, Biblioteca Riccardiana 688 (Avignon, 1381), f. 145v–146:

Primus cum sexto fa sol la ...

Est primus tonus re la re fa quam secundi ...†

First with sixth fa sol la ...

The first mode is re la, so much as re fa is of the second ...

9. Princeton, Institute for Advanced Studies Codex Lowe (“14–15c”):

“Missel votif de Biella, acheté en 1939 à Turin par le Prof. E.A. Lowe ... Le missel (XIV–XV^e s.) commence par un tonaire ... Après le tonaire, formule résumant le degré de la tonique et de la dominante psalmodique de chaque ton: *Pri(mus)* re la; *Se(cundus)* re fa, etc. et (de seconde main plus récente) la formule résumant les intonations de chaque ton: *Primus cum sexto* fa sol la ...”‡

Votive missal from Biella, acquired in 1939 at Turin by Prof. E. A. Lowe ... The missal (14–15c) begins with a tonary ... Following the tonary, formula summarizing the degree of the tonic and of the psalmodic dominant of each tone: *Pri(mus)* re la; *Se(cundus)* re fa, etc. and (by a second hand more recent) the formula summarizing the intonations of each tone: *Primus cum sexto* fa sol la ...

* *RISM F-A* 235, LmL <http://www.lml.badw.de/info/f.htm> (accessed November 30, 2013). See Michel Huglo, Review of Waesberghe et al., *The Theory of Music, From the Carolingian Era up to 1400*, Vol. I (*RISM VIII*), *Revue de Musicologie* 49 (1963), 114–117.

† *RISM I-Fr* 688, LmL <http://www.lml.badw.de/info/i.htm> (accessed November 30, 2013).

‡ Huglo, *Les Tonaires*, 414.

10. Seville, Biblioteca Capitulare y Colombina 5-2-25 (Venice, c. 1420), 56v:

Nota quod primus ad quintam, secundus ad terciam ...

Primus cum sexto fa sol la semper habeto ...^{*}

Note that the first at the 5th, the second at the 3rd ...

First with sixth fa sol la keep always in mind ...

11. Vienna, Österreichische Nationalbibliothek Cod. 3646 (Mondsee Abbey, 15c), 311:

De tenoribus 8 tonorum etc. Nota hos versus.

Est primus tonus re la, re faque secundus ...

Versus ubi tenor cuiuslibet toni fuerit initium

Primus cum quarto, sextus simul inchoat ex a ...[†]

On the tenors of the 8 tones, etc. Note these verses.

The first mode is re la, and re fa the second ...

Verses [for] where the tenor of whichever mode shall begin

The first with the fourth, the sixth as well begins from *a* ...

12. London, British Library Lansdowne 763 (Waltham, Abbey of the Holy Cross, “copié par John Wylde” c. 1450), f. 68v:

Et octo tonorum incipit tractatus metricus.

Primus est tonus Re La. Re Fa. quoque secundus.

Tercius est tonus Mi La. Mi Fa. quoque quartus [*recte* “Mi Fa. Mi La.”].

Quintus est tonus Fa Fa Fa La quoque sextus.

Septimus est Vt Sol. Octauus dicitur Vt Fa.^{*}

^{*} *RISM E-Sc* 5-2-25, LmL <http://www.lml.badw.de/info/e.htm> (accessed November 30, 2013).

[†] *RISM A-Wn* Cod. 3646, LmL <http://www.lml.badw.de/info/a.htm> (accessed November 30, 2013).

Here begins a metered treatise on the eight modes.

The first mode is *re la*, and the second *re fa*,

The third mode is [*mi fa*], and the fourth [*mi la*],

The fifth mode is *fa fa*, and the sixth *fa la*,

The seventh is *ut sol*; the eighth is said *ut fa*.

13. Catania, Biblioteche Riunite Civica e Antonio Ursino Recupero D 39 (“1453–1473 ... Sicily

or southern Italy, perhaps in the milieu of the court of Aragon at Naples and in Sicily”),

40r–v:[†]

Et ad cognoscendum seculorum cuiuslibet intonacionis, benedictus et gloriosus Gregorius hanc sequentem regulam porrigit, que inventionem facit de ultimo puncto anthifane et prima seculorum ut sequitur.

<II.> REGULA

¹ Primus tonus finit in *re* et accipit suum seculorum in *la*.

² Secundus tonus finit in *d.solre* et accipit suum seculorum in *fa*.

³ Tercius tonus finit in *mi* et accipit suum seculorum in *fa*.

⁴ Quartus tonus finit in *mi* et accipit suum seculorum in *la*.

⁵ Quintus tonus finit in *fa* et accipit suum seculorum in *fa*.

⁶ Sextus tonus finit in *fa* et accipit suum seculorum in *la*.

⁷ Septimus tonus finit in *ut* et accipit suum seculorum in *sol*.

⁸ Octavus tonus finis in *ut* et accipit suum seculorum in *fa*.

<III.> Vel sic :

¹ Pri. *re la se. re fa ter. mi fa quar. mi la*

² Quin. *fa fa. sex. fa la sep. ut sol occ. ut fa*.

<IV.> Vel sic :

Primus ad quintam. Secundus ad terciam. Tercius ad sextam. Quartus ad quartam. Quintus ad quintam. Sextus ad terciam. Septimus ad quintam. Octavus ad quartam.

* *RISM GB-Lbl* Lansdowne 763, LmL <http://www.lml.badw.de/info/gb.htm> (accessed November 30, 2013); http://www.chmtl.indiana.edu/tml/14th/ANOCTT_MLBLL763.html (accessed November 29, 2013).

[†] *RISM I-CATc* D 39, LmL http://www.lml.badw.de/info/i.htm#I_CATc (accessed November 30, 2013).

<40v> <V.>

¹ Quatuor exposcit sub plano regula cantu

² Esto solfalis regula prima tibi

³ Sepe canas unaque more tenero

⁴ Ad facilem aures porrige sepe tuas.

<VI.> Versus ad inchoandum Magnificat, Benedictus, Nunc dimittis et psalmos in festis precipue.

¹ Primus cum sexto *fa sol la* semper habeto

² Tercius et octavus *ut re fa* vel *ut re mi fa* fitque secundus

³ *La sol sol la* quartus *ut mi sol* vel *fa la re fa* sit tibi quintus

⁴ Septimus *fa mi fa sol* vel *ut fa mi fa sol* sic omnes esse recordor.

<VII.> Versus mediacionum

¹ Septimus et sextus dant *fa mi mi re mi* quoque primus

² Quintus et octavus *fa sol fa* sicque secundus

³ *Sol fa mi re fa* ternus *re ut re mi re* que quaternus.*

And for knowing the seculorum to whatsoever intonation, the blessed and glorious Gregory has laid down the following rule, which discovery he made about the last note of the antiphon and first of the seculorum, as follows.

II. RULE:

The first mode ends on re and takes its seculorum on la.

The second mode ends on *d-sol-re* and takes its seculorum on fa.

The third mode ends on mi and takes its seculorum on fa.

The fourth mode ends on mi and takes its seculorum on la.

The fifth mode ends on fa and takes its seculorum on fa.

The sixth mode ends on fa and takes its seculorum on la.

The seventh mode ends on ut and takes its seculorum on sol.

The eighth mode ends on ut and takes its seculorum on fa.

III. Or thus:

* Transcription by Christian Meyer (February 2006), LmL
<http://www.lml.badw.de/info/catD39e.htm> (accessed November 30, 2013).

Pri re la, se re fa ...

IV. Or thus:

First at the 5th, second at the 3rd ...

14. Rome, Vatican Library lat. 5129 (“15c, on paper”), f. 147:

Principia tonorum.

Versus sequentes docent cognoscere “seculorum Amen:”

Pri re la – Se re fa ...

Principles of the Modes.

The following verses teach how to know the “seculorum Amen”:

First re la, second re fa ...

“Aux fol. [additional folio] 148 ... *Primus cum sexto fa sol la semper habeto ...*”^{*}

First with sixth fa sol la always keep to mind ...

15. Parma, Bibl. Palatina 3597 (“Italy ... end of 15c”), f. 20v–21:

[20v–21] *Primus ad quintam re la ...*

[21] *Primus cum sexto fa sol la semper abeto ...*

“Dans un ‘Cantorinus’ franciscain du XV^e siècle ... quelques indications sur les dominantes psalmodiques: *Primus ad quintam re-la; secundus ad tertiam, etc.*”[†]

In a Franciscan ‘Cantorinus’ of the fifteenth century ... certain indications of the psalmodic tenors: First at the 5th re la; second at the 3rd, etc.

^{*} Huglo, *Les Tonaires*, 415.

[†] *RISM I-Pac* pal. parm. 3597, LmL <http://www.lml.badw.de/info/i.htm> (accessed November 30); Huglo, *Les Tonaires*, 373.

16. Anonymous [15c], *Quaestiones et solutiones advidendum tam mensurabilis quam immensurabilis musica*, ed. Albert Seay, Critical Texts, no. 2 (Colorado Springs: Colorado College Music Press, 1977), 29:

De terminis tenoris.

(f. 65v) Item nota che ogni canto chi finisse in re e lo seculorum vel EUOUAE e in A la mi re acuto, sempre quello e primo tono, e se lo seculorum sara in F fa ut grave, quello e secundo tono. Item che ogni canto chi finisse in mi e la seculorum vel EUOUAE sera in C sol fa ut, sempre quella e terzo tono. Se anchora lo seculorum sera in A la mi re acuto, quella sera quarto tono. Item ogni canto el qual finisse in fa e lo seculorum vel EUOUAE in C sol fa ut, sempre e quinto tono. Se anchora lo seculorum sera in A la mi re acuto, sempre sera sexto tono. Item ogni canto el qual finisse in sol et lo seculorum vel EUOUAE sera in D la sol re, sempre e septimo tono. Se anchora lo seculorum sera in C sol fa ut, sera octavo tono, unde versus:

Re la vult primus, re fa retinetque secundus,
Per sextam mi fa tertio quarto dato mi la,
Fa fa fert quintus, fa la prebet tibi sextus.
Ut sol septimus, ut fa captatque supremus.

Alius

Primus ad quintam, id est re la; secundus ad tertiam id est re fa.
Tertius ad sextam, id est, mi fa, quartus ad quartam, id est, mi la.
Quintus ad quintam, id est, fa fa, sextus ad tertiam, id est, fa la.
Septimus ad quintam, id est, ut sol; octavus ad quartam, id est, ut fa.*

On the limitations of the tenor.

Also note that every song which finishes on re and the seculorum or EUOUAE is on acute *a*-la-mi-re, that one is always first mode, and if its seculorum should be on *F*-fa-ut grave, that one is

* Indiana University Center for the History of Music Theory and Literature, and Andreas Giger, *saggi musical italiani: A Database for Texts on Music Theory and Aesthetics*, http://www.chmtl.indiana.edu/smi/quattrocento/ANOQUS_TEXT.html (accessed November 30, 2013).

second mode. Also that every song which finishes on mi and the seculorum or EUOUAE shall be on c-sol-fa-ut, that one is always third mode. Further, if the seculorum should be on acute *a*-la-mi-re, that one will be fourth mode. And every song that finishes on fa and the seculorum or EUOUAE on c-fa-ut, always is fifth mode. If however the seculorum shall be on acute *a*-la-mi-re, it shall always be sixth mode. And every song that finishes on sol and the seculorum or EUOUAE should be on *d*-la-sol-re, always is seventh mode. Further, if the seculorum be on c-fa-ut, it will be eighth mode, thus the verses:

The first wants re la, and the second retains re fa,
 You shall give the third mi fa by sixth, to the fourth mi la,
 The fifth carries fa fa, the sixth takes to itself fa la.
 Ut sol the seventh, and the last captures ut fa.

Otherwise

The first by fifth, that is, re la; the second by third, that is, re fa.
 The third by sixth, that is, mi fa; the fourth by fourth, that is, mi la.
 The fifth by fifth, that is, fa fa, the sixth by third, that is, fa la.
 The seventh by fifth, that is, ut sol; the eighth by fourth, that is, ut fa.

17. Conrad von Zabern, *Novellus musicae artis tractatus* (c. 1460 – 70).^{*} Karl-Werner Gumpel, *Die Musiktraktate Conrads von Zabern*. Akademie der Wissenschaften und der Literatur, Abhandlungen der Geistes- und Sozialwissenschaftlichen Klasse, Jahrgang 1956, Nr. 4 (Wiesbaden: Steiner, 1956), 236, 243–4:

[236:]Pro agnitione tonorum:

^{*} Heinrich Hüschen and Joseph Dyer, “Conrad von Zabern,” in *Grove Music Online* (accessed November 30, 2013).

Pri re la . Se re fa . Ter mi fa . Quar quoque mi la.
 Quin fa fa . Sex fa la . Sep ut sol . Oc tenet ut fa.

For the recognition of the modes:

Pri re la, Se re fa ...

[243:] Sequuntur intonationes psalmorum secundum morem Coloniensis provinciae, et primo de primo tono.*

Here follow the intonations of psalmody after the custom of the diocese of Cologne, and first that of the first mode.

* TML CONNOV TEXT http://www.chmtl.indiana.edu/tml/15th/CONNOV_TEXT.html (accessed November 30, 2013).

Conrad, Tractatus, 243

Primus re la, et sextus fa la.

Di-xit do-mi-nus do-mi-no me-o Be-ne-dic-tus do-mi-nus De-us Is-ra-el Be-ne-dic-tus Do-
-mi-nus De-us Is-ra-el Mag-ni-fi-cat Mag-ni-fi-cat E u o u a e E u o u a e

Secundus re fa, et octavus ut fa.

Di-xit do-mi-nus do-mi-no me-o Be-ne-dic-tus do-mi-nus De-us Is-ra-el Be-ne-dic-tus do-
-mi-nus De-us Is-ra-el Mag-ni-fi-cat Mag-ni-fi-cat E u o u a e E u o u a e octavi

Tertius mi fa.

Di-xit do-mi-nus do-mi-no me-o Be-ne-dic-tus do-mi-nus De-us Is-ra-el Be-ne-dic-tus do-mi-nus De-us Is-
-ra-el Mag-ni-fi-cat a-ni-ma Mag-ni-fi-cat a-ni-ma Nun-ci-um mi-li-ser-vitu-m, do-mi-ne

Quartus mi la.

Di-xit do-mi-nus do-mi-no me-o Be-ne-dic-tus do-mi-nus De-us Is-ra-el *

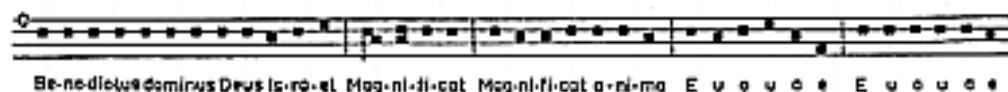
First re la, and sixth fa la.

Second re fa, and eighth ut fa.

Third mi fa. Fourth mi la.

* http://www.chmtl.indiana.edu/tml/15th/CONNOV_09GF.gif.

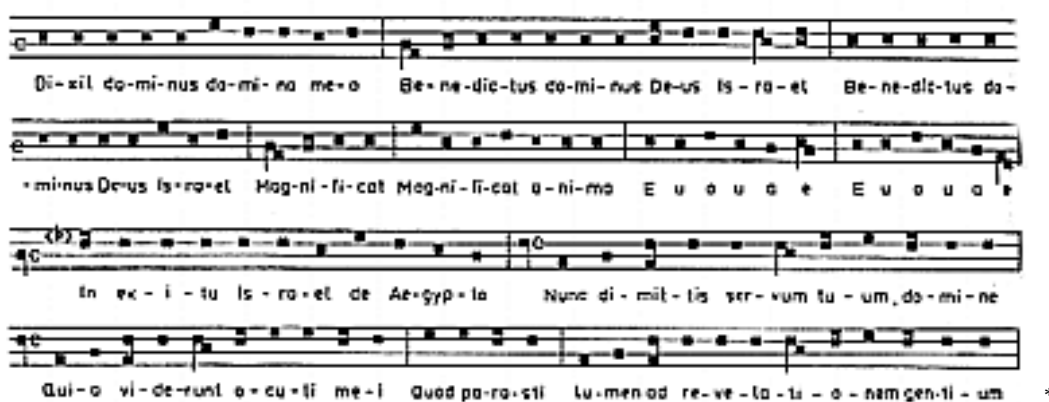
Conrad, Tractatus, 244



Quintus fa fa.



. . . (1) Septimus ut sol.



Fifth fa fa.

Seventh ut sol.

18. Guilielmus Monachus, *De preceptis artis musice et pratice compendiosus libellus* (Venice,

Biblioteca Nazionale Marciana lat. 336):

Sequuntur alii versus ad cognoscendum tonos per sua seculorum et sunt uti subsequentes:

Pri re la, se re fa, ter mi fa, quater quoque mi la,

Quin fa fa, sex fa la, sep ut sol, oc tenet ut fa.

* http://www.chmtl.indiana.edu/tml/15th/CONNOV_10GF.gif.

Sententia enim istorum versuum est talis, quod si primus tonus sive antiphona vel responsorium vel introitus primi toni finiuntur in re, eius vero seculorum inchoatur per quintam vocem, quae vox dicitur la. Se, id est, secundus, tonus vel antiphona vel responsorium vel introitus secundi toni finiuntur in re, eius vero seculorum inchoatur per tertias voces, licet, tertiam vocem, quae dicitur fa. Tertius vero tonus vel antiphona, et cetera, si [-59-] finiuntur in mi, tunc eius vero seculorum inchoatur per sextam vocem, quae dicitur fa. Quartus vero tonus vel antiphona, et cetera, si finiuntur in mi, eius vero seculorum inchoatur per quartam vocem, quae dicitur la. Quintus vero tonus vel antiphona, et cetera, quinti toni, si finiuntur in fa, eius vero seculorum inchoatur per quintam vocem, quae dicitur fa per [sqb] quadrum. Sextus vero tonus vel antiphona vel responsorium sexti toni, si finiuntur in fa, eius vero seculorum inchoatur per tertiam vocem altam, quae dicitur la. Septimus vero tonus vel antiphona vel responsorium vel introitus, et cetera, septimi toni, si finiuntur in ut, eius vero seculorum inchoatur per quintam supra, quae dicitur sol. Octavus vero tonus vel introitus vel antiphona, et cetera, octavi toni, si finiuntur in ut, eius vero seculorum inchoatur per quartam vocem supra, quae dicitur fa.*

Here follow other verses for recognizing modes by their seculorum, and they are as follows:

Pri re la, se re fa ...

For the meaning of these verses is such, that if (**p**rimus tonus) either antiphon or responsory or introit of the first mode end on re, truly its seculorum begins at the fifth degree, which voice is pronounced la. **S**e, that is, second, tone: either antiphon or responsory or introit of the second mode end on re, truly its seculorum begins three degrees away, that is on the third degree, which is pronounced fa ...

* *Guilielmi monachi De preceptis artis musicae*, ed. Albert Seay, CSM 11 (1965), 58–59.

19. Oxford, Bodleian Library Can.Lit.216, f.

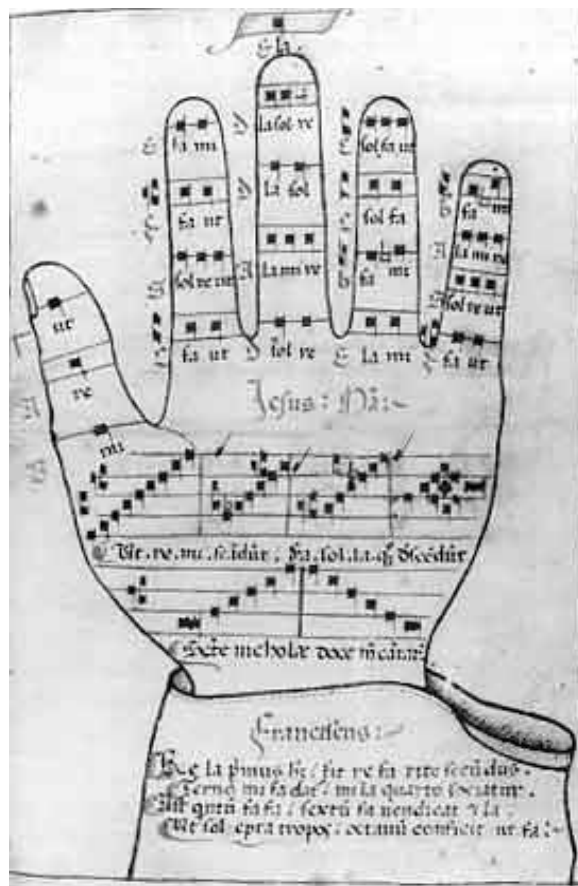
168r:*

On sleeve of Guidonian hand:

Franciscus:

Re la primus habet: fit re fa rite secundus.
Terno mi fa datur: mi la quarto sociatur.
Ascit quintum fa fa: sextum fa vendicat et la.
Ut sol epta tropos: octavum conficit ut fa.

(For translation and discussion see Chapter Four,
Critical Excursus V: The Bodleian Quatrain)



20. Bologna, Civico Museo Bibliografico Musicale A57. Bonaventura da Brescia, *Brevis*

collectio artis musicae (Venturina) [September 15, 1489] ed. Albert Seay, Critical Texts,

no. 11 (Colorado Springs: Colorado College Music Press, 1980), 48 – 49:

De terminis tonorum et de modo intonandi: Capitulum 18.

Notare debemus quod omnis cantus finem in D gravi collocans et Saeculorum vel EUOUAE eius est in A la mi re acutum, dicimus esse primus tonus. Item, omnis cantus finem in D gravi collocans et Saeculorum vel EUOUAE eius est in F gravi, tunc dicimus esse secundus tonus. Item, quando cantus finem in E gravi collocans et Saeculorum eius est in C acuto, dicimus

* Reproduced in Andrew Hughes, “Solmization §I,” in *The New Grove Dictionary of Music and Musicians*, ed. S. Sadie and J. Tyrell (Macmillan, 2001) xxiii, 645 [“Mantua, last quarter of the 15th century”]. Thanks to Professor Hughes, Matthew Cheung-Salisbury of the Bodleian Library, and Luca Ricossa for help in establishing this text.

esse tertius tonus. Item, quando cantus finem in E gravi collocans et Saeculorum eius est in A acuto, tunc dicimus esse quartus tonus. Item, quando cantus finem in F gravi collocans et Saeculorum eius est in C acuto, dicimus esse quintus tonus. Item, omnis cantus finem in F gravi collocans et Saeculorum eius est in A acuto, dicimus esse sextus tonus. Item, omnis cantus finem in G secundo gravi collocans et Saeculorum eius erit in D acuto, dicimus esse [–49–] septimus tonus. Item, omnis cantus finem in G secundo gravi collocans et Saeculorum eius erit in C acuto, tunc dicimus esse octavus tonus.

Versus: Primus re la, secundus re fa,
 Tertius mi fa, quartus mi la,
 Quintus fa fa, sextus fa la,
 Septimus ut sol, octavus ut fa.

Vel sic versus:

 Primus ad quintam, secundus ad tertiam,
 Tertius ad sextam, quartus ad quartam,
 Quintus ad quintam, sextus ad tertiam,
 Septimus ad quintam, octavus ad quartam.*

On the limitations of modes and on the ways of their being intoned: Chapter 18.

We should note that every song disposing its end on low *D* and its Saeculorum or EUOUAE is on high *a*-la-mi-re, we say to be first mode. Likewise, every song disposing its end on low *D* and its Saeculorum or EUOUAE is on low *F*, we then say to be second mode. Likewise, every song disposing its end on low *E* and its Saeculorum or EUOUAE is on high *c*, we say to be third mode. Likewise, when song disposing the end on low *E* and its Saeculorum is on high *a*, we then say to be fourth tone. Likewise, when song disposing the end on low *F* and its Saeculorum is on high *c*, we say to be fifth mode. Likewise, every song disposing its end on low *F* and its Saeculorum is on high *a*, we say to be sixth mode. Likewise, every song disposing its end on the second *G* and its Saeculorum shall be on high *d*, we say to be seventh mode. Likewise, every

* TML BONBRE TEXT http://www.chmtl.indiana.edu/tml/15th/BONBRE_TEXT.html (accessed November 30, 2013).

song disposing its end on the second *G* and its *Saeculorum* shall be on high *c*, we then say to be eighth mode.

Verse: First re la, second re fa,

Third mi fa, fourth mi la,

Fifth fa fa, sixth fa la,

Seventh ut sol, eighth ut fa.

Or thus the verse:

First at the fifth, second at the third,

Third at the sixth, fourth at the fourth,

Fifth at the fifth, sixth at the third,

Seventh at the fifth, eighth at the fourth.

21. Bonaventura da Brescia, *Breviloquium musicale* (1497), tr. Albert Seay, 1979:

Concerning the terminals of tones: Chapter 37.

Also, note that for every melody that finishes on re, its “*Saeculorum*” or “*EUOAE*” being on A la mi re acute, this is always the first tone. If the “*Saeculorum*” will be on F fa ut grave, this is the second tone. Also, for every melody that finishes on mi and its “*Saeculorum*” or “*EUOUAE*” being on C sol fa ut, this is always third tone; if also the “*Saeculorum*” will be on A la mi re acute, this will be fourth tone. Also, every melody that finishes on fa and its “*Saeculorum*” or “*EUOUAE*” being on C sol fa ut, it is always fifth tone; if also the “*Saeculorum*” will be on A la mi re acute, it will always be sixth tone. Also, every melody that finishes on sol and its “*Saeculorum*” or “*EUOUAE*” being on D la sol re, it is always seventh tone; if also the “*Saeculorum*” will be on C sol fa ut, it will be eighth tone, etc.

Verse: First to fifth, that is, re la; second to third, that is, re fa.

Third to sixth, that is, mi fa; fourth to fourth, that is, mi la.

Fifth to fifth, that is, fa fa; sixth to third that is, fa la.

Seventh to fifth, that is, ut sol; eighth to fourth, that is, ut fa.*

* Bonaventura da Brescia, *Brevis collectio artis musicae*, ed. Albert Seay, Critical Texts, no. 11 (Colorado Springs: Colorado College Music Press, 1980), 30.

22. Brussels, Bibliothèque du Conservatoire Royal de Musique Ms. M 16.857 (Italy, c. 1490), f.

38v:

Pri re la se re fa ...

Primus in re la ...

Primus cum sexto fa sol la ...

Tercius et primus quintus ...

Primus finitur in D pariterque secundus ...*

23. Anonymous Carthusian Monk, *Tractatus de musica plana*. Scriptorum de musica medii aevi

nova series a Gerbertina altera, 4 vols., ed. Edmond de Coussemaker (Paris: Durand,

1864–76; reprint ed., Hildesheim: Olms, 1963), 2:451:

Etiam nota quod sicut toni habent suos proprios tenores, sic etiam habent et proprias inceptions. Unde versus:

Primo cum sexto fa, sol, la, semper habeto.

Tertius, octavus ut, re, fa, datque secundus.

La, sol, la, quartus, ut, mi, sol, dat tibi quintus.

Septimus fa, mi, fa, sol, sic omnes esse recordor.

Sed quia supra sermo sepe factus est de ascensione et descensione tonorum, ideo hic sciendum est quod musici distinguunt inter istos terminos ascensio et descensio ex una parte, et intentio et remissio ex altera parte. Nam ipsi reputant hos terminos ascensio et descensio communiores, tamquam cantui competentes. Sed aliis duobus terminis scilicet intentione et remissione utuntur contractius. Unde primo termino, scilicet intentione, utuntur ad significandum ascensum principii cantus vel semitonii; et remissione utuntur ad significandum descensum principii cantus vel semitonis. Unde hemitonia vocatur inceptions vocum que fiunt post pausationem in medio cantus. De istis ergo duobus scilicet de intentione et remissione due possunt dare regule; quarum prima est, quod omnis autentus potest suum principium vel etiam semitonium a suo finali

* *RISM B-Bc* Ms. M 16.857 (FA IV 66), LmL <http://www.lml.badw.de/info/b.htm> (accessed November 30, 2013).

ad quintum graduum et ad proximum gradum sub suo finali remittere; sed ab hac regula excipitur autentus deuterus, id est, tertius tonus, quia ipse intendit suum principium usque ad sextum gradum, sicut in pluribus cantibus invenitur.

Secunda regula est quod quibusdam plagalibus, licet sua principia vel etiam semitonia ad quartum gradum intendere, puta quarto et octavo; quibusdam vero ad tertiam puta secundo et sexto; quibusdam vero etiam licet remittere ad quartum gradum, scilicet et quarto licet remittere ad quartum, octavo vero ad quintum. Unde versus:

Est primus tonus re la, re fa, que secundus.
Tertius est tonus mi fa, mi la, quoque quartus.
Sed quintus fa fa, sextus fa la, retinebit.
Septimus est ut sol; post octavus tenet ut fa.

Unde etiam sciendum quod ipsum cantum non modicum exornat si in intentionibus plagalium id observent, ut scilicet finalem clavem sepe repetant; et circa illa versentur; et in quarta rarissime pausent et in quinta nullo modo, sed si quintam aliquando tetigerint, raptim et quasi formidando eam contingentes ad finalem recurrant. Sed in autentis hoc est tenendum ut dum quintam a finali bis vel ter pulsaverint, finalem revisant; rursumque ad superiores festinantes se transferant, quia plagalium maxime est ut in gravibus versentur. Autentorum autem maxime in acutis.*

Note, moreover, that just as the modes have their own proper tenors, so also do they have proper intonation-figures. Thus the verse:

First with sixth fa sol la remember always ...

But since mention is often made above of the ascent-and-descent [ambitus] of modes, therefore let it be known that some musicians distinguish between these limitations ‘ascent’ and ‘descent,’ whereas others speak of ‘winding up’ and ‘relaxation.’ For they themselves acknowledge the limitations ‘ascent’ and ‘descent’ to be more common, even among competent cantors, whereas the other two, that is ‘winding up’ and ‘relaxation,’ are rarely used. Thus the first limitation, that is ‘winding up,’ is used to signify raising of the beginning of song or phrase

* TML CARTRA TEXT http://www.chmtl.indiana.edu/tml/15th/CARTRA_TEXT.html (accessed November 29, 2013).

[above the final], and ‘relaxation’ they use to signify lowering of the beginning of song or phrase [below the final]. (‘Hemitone’ means the beginning notes that are made after a pause in the midst of song.) Therefore of these two—that is, of winding up and relaxation—two rules can be given, of which the first is that every authentic can wind up its beginning or medial phrase-beginning to the fifth degree from the final, and can relax it to the nearest degree below that final; but from this rule is excepted the authentic deuterus, that is the third mode, for the latter winds up its beginning so far as the sixth degree, as evidenced in many chants. The second rule is that certain plagals may wind up their beginnings or even their phrase beginnings to the fourth degree—think here of modes four and eight—, others only to the third—think here of the second mode and the sixth—; and indeed of the same [plagals] it is possible to relax to the fourth degree [below the final], that is in the fourth [mode] one may relax to the fourth [below], and in the eighth [mode] to the fifth [below] ...

Thus the verses:

The first mode is re la, and re fa the second.

Third is the mode mi fa, and mi la the fourth.

But the fifth shall retain fa fa, the sixth fa la.

Ut sol is the seventh; thereafter the eighth upholds ut fa.

Thus also to be noted is that the chant itself is no little decorous if in exercises of the plagals they [the plagals] observe the following: that they often repeat the final note, and circle about it; and pause on the fourth [degree] most rarely, and by no means on the fifth; but if some time they do touch upon the fifth, hastily and as if from fear of connection with it they run back to the final. But in authentics this [degree] is to be sustained so that when the fifth from the final they shall have twice or three times re-struck, they may re-visit the final; and then let them

transfer themselves back to the higher notes in haste, whereas of plagals mostly they turn about the low notes. But of authentics, mainly in the heights.

24. Salzburg, St. Peter's Abbey, a.VI.44 (1490)*, ff. 1r–19v [*Tractatus de octo tonis*], f. 18v:

[Above column 3:]

Est primus tonus re la[,] re fa que secundus
Tercius est mi fa[,] sed quartus sit in mi la
Fa fa tonus quintus[,] fa la accipit sextus
Septimus vt sol Octauus dicitur vt fa[:]

Pri re la se re fa ter mi fa quar quoque mi la
Quin fa fa sex sit la sept vt sol oc tenet vt fa[.]

The first mode is re la, and re fa the second,

Third is mi fa, but let the fourth be on mi la,

Fa fa the fifth mode, the sixth takes fa la,

The seventh ut sol, the eighth is pronounced ut fa:

[Thus] Pri re la ...

[Top of column 3:]

Tenores sunt ille voces in quibus tropus maxime vsatur et presertim versus
Responsoriorum et Introituum[.]

Tenors are those tones on which the trope mostly dwells and particularly the verses of responsories and introits.

[Within column 3, above upper notes of pedes:] Tenor primi, Tenor secundi, Tenor tercy,
Tenor quarti, Tenor quinti, Tenor sexti, Tenor septimi, Tenor octau.

Tenor of the first [mode]. Tenor of the second [mode] ...

* *RISM A-Ssp* Cod. a. VI. 44, LmL <http://www.lml.badw.de/info/a.htm> (accessed November 30, 2013).

[Below pedes:] Protus, Deuterus, Tritus, Tetrardus.

[Bottom of column 3:] Exemplum Tenorum.

Figure of the tenors.

[Column 4, bottom left:] Exemplum Affinium. [Right:] Tenores quantum ad Affines.

Figure of the affinals. Tenors in relation to the affinals.

[Below scales left, and pedes right:] Protus, Deuterus, Tritus.

[Within the scales, aligned with bottoms of pedes:] a finalis, b finalis, c finalis.

[Below column 4:] Nota Quod isti cantus qui in proprio cursu cantari nequeunt vt sepe contingit. necessario habent recursum ad voces superiores propriys id est ad Affines. In eleuacione et deposicione cum eis conuenientibus. et signantur In hoc exemplo. Item Nota quod tropus tetrardus affines non recipit quia d cum g non conuenit in eleuacione et deposicione.*

Note that those chants that cannot be sung in their proper course, as often happens, by necessity have recourse to tones higher than those proper, that is, to the Affinals, which are agreeable in ascent and descent with these [regular finals], as shown in this example. Likewise note that the tetrardus maneria does not take affinals because *d* does not agree with *G* in ascent and descent.

* TML ANOTOT MSAVI44

http://www.chmtl.indiana.edu/tml/15th/ANOTOT_MSAVI44.html (accessed November 30, 2013).

[illegible]

25. Utrecht, Universiteitstibliotheek 16 H 26 (Deventer? c. 1500):

Primum cum sexto fa sol la semper habeto ...

Sol fa cantabis ...

In d finitur primus tonus atque secundus ...

Fines cunctorum cantor dinosce tonorum ...

Pri re la se re fa ... *

First with sixth fa sol la always bear in mind ...

Sol fa shall you sing ...

The first mode ends on *D*, and so does the second ...

To know the finals of all modes the cantor ...

Pri re la, se re fa ...

26. Hugo Riemann, "Anonymi Introductorium musicae (c. 1500)," *Monatshefte für*

Musikgeschichte 29 (1897), 162–63:

(fol. 7 v.) De vera et infallibili tonorum agnitione.

[Tonus cognoscitur ex melodia. in marg.] (M)elodia insuper ducit in cuiusvis toni agnitionem vsque adeo ut solum audita harmonia alicuius modulationis mox cuius toni sit facillime poterit agnosci. Cantus igitur qui versatur in RE pluries repetens in acutum LA repercutiendo sursum ad FA est primi toni. [Prima regula. in marg.] Si vero versetur in RE sepius sursum FA ejus terciam reuerberans est toni secundi. [Secunda. in marg.] Uerum si in MI versetur: et sepe visat sursum FA ejus sextam est terciij toni. Sin autem sepius repetat a MI sursum LA est quarti toni. [Tercia. in marg.] Quum autem sepius FA occupauerit arripiens sursum SOL et si frequentius decidat ad ejus terciam scilicet MI: iterum verberando est quinti toni. [Quarta. in marg.] Si vero frequentius a FA sursum LA repercutiat est sexti toni. Quod si in UT moram fecerit: pluries repetens in acutum SOL:

* *RISM NL-Uu* 16 H 26, LmL <http://www.lml.badw.de/info/nl.htm> (accessed August 16, 2009).

reuerberando sursum ad LA est septimi toni. Sin autem sepius ab UT FA reuerberet decidens per quintam ad FA est toni octavi. quod his duobus versiculis perlucescit:

PRI re la; SE re fa; TER mi fa; QUART quoque mi la;
QUINT fa sol; SEXT fa la; SEPT vt sol; OCT tenet vt fa.

Quod etiam presentibus exemplaribus notissime percipi potest.*

MfM29:162



MfM29:163,1



On the true and infallible recognition of modes.

[Marginal note: Mode is recognized from *melodia*.] *Melodia*, in addition to recognition of whichever mode, leads even further to which mode of whatever *modulatio* being recognized most easily, and solely by hearing its harmony. Song, therefore, which is turned upon RE, often repeating on high LA with repercussion to FA above [the seventh degree over the final, as in the example with *a-la* alternating with *c-fa*], is of the first mode. [Marginal note: First rule.] If

* TML ANOLEIP TEXT http://www.chmtl.indiana.edu/tml/16th/ANOLEIP_TEXT.html (accessed November 30, 2013).

† http://www.chmtl.indiana.edu/tml/16th/ANOLEIP_06GF.gif.

indeed it is turned upon RE more often with repercussion of FA its third [degree] above, it is of the second mode. [Margin: Second.] Truly, if it is turned upon MI and often visits its sixth the FA above, it is of the third mode. Otherwise, if it more often repeats from MI the LA above, it is of the fourth mode. [Margin: Third.] But when it more occupies FA taking hold of SOL above and if it frequently falls to its third, that is, MI: once again it is of the fifth mode. [Margin: Fourth.] If truly frequently from FA it re-strikes LA it is of the sixth mode. But if it tarries on UT, several times repeating SOL above, touching on LA above, it is of the seventh mode. Should it otherwise reverberate UT FA, falling by fifth to FA, it is of the eighth tone. This matter these two lines shall illuminate:

PRI re la; SE re fa; TER mi fa; QUART quoque mi la;

QUINT fa sol; SEXT fa la; SEPT vt sol; OCT tenet vt fa.

Which moreover may be perceived most notably by the present examples.

27. Johannes Cochlaeus, *Tetrachordum Musices* (Nuremburg, 1511), Tractatus tertius, Ciiir –

Ciiiiv:

De melodia tonorum. Caput .IIII.

Quid est melodia toni? Est solita notarum deductio secundum certa interualla: vni tonorum magis quam alteri familiaris. De eius cognitione quatuor extant regulae, secundum quatuor tonorum finales.

Prima. Cantus exiens in Dsolre, a re saepe repetens in acutum la, re percutiendo sursum ad fa, est primi toni. Si vero versatur in re, pluries sursum fa, eius tertiam reuerberans, est secundi toni.

Secunda. Cantus exiens in elami, si versetur in mi et saepe visat sursum fa eius sextam, est tertii toni, Si vero saepius repetat a mi sursum la eius quartam, est quarti toni.

Tertia. Cantus exiens in Ffaut, si ex ut frequenter exiliat in sol, rursusque decidat in mi, iterum reuerberando sol, est quinti toni. Si vero frequentius a fa sursum la eius tertiam repercutiat est sexti toni.

Quarta. Cantus exiens in Gsolreut, ab ut saepe exultans in sol reuerberando sursum ad la, est septimi toni. Sinautem ab ut crebrius la repetat, decidens per quintam ad fa, est octaui

toni. Versus. Pri re la. Se re fa. Ter mi fa. Quart quoque mi la. Quint fa sol. Sext fa la. Sept ut sol. Oct tenet ut fa. Sequuntur exempla.

On the *melodia* of the modes. Chapter IV

What is the *melodia* of a mode? It is a customary relation according to a certain interval, more familiar to one of the modes than to the others, about the recognition of which there are rules according to the four finals of the modes.

First. Song ending on *D*-sol-re, from re often repeating high la with repercussion to fa above [that is, the seventh degree over the final], is of the first tone. If indeed it turns on re, often repeating fa its third [degree] above, it is of the second tone.

Second. Song ending on *E*-la-mi, if it turns on mi and often visits its sixth the fa above, is of the third mode; if it more often repeats from mi its fourth above la, it is of the fourth mode.

Third. Song ending on *F*-fa-ut, if from ut frequently it rises to sol, and falls to mi, again with reverberation of sol, is of the fifth mode. If indeed more frequently from fa it repercusses la its third, it is of the sixth mode.

Fourth. Song ending on *G*-sol-re-ut, from ut often exulting onto sol with reverberation above to la, is of the seventh mode. If, however, from ut it much repeats la, falling by fifth to fa, it is of the eighth mode. Verse: Pri re la ... Examples follow.

[Examples:] Formula of the first mode. Formula of the second ... Progression of the sixth ...

Cochlaeus, f. Ciiir, 2



Cochlaeus, f. Ciiiv



His recte consideratis, potest quis facile, vel non inspectis notulis, ex solo auditu dinoscere, cuius toni cantus fuerit. Quapropter summopere debet quilibet melodiam curare. Nam autenticus a plagali ex fine non discernitur, nec ex qualitate cantus: sed ex melodia, atque ex ascensu et descensu.*

These things being rightly considered, one is able easily, even without having inspected the notations, to determine solely by hearing of which tone is the song. For this reason, one ought to pay attention to the *melodia* most of all. For the authentic is not distinguished from the plagal on account of the final, nor an account of the *b/h* distinction [*qualitas*] of the song, but by the *melodia*, and by ascent and descent.

* TML COCTET3 TEXT http://www.chmtl.indiana.edu/tml/16th/COCTET3_TEXT.html (accessed November 30, 2013).

28. Nicholas Wollick, *Enchiridion Musices* (Paris: 1512), (dviv–viiiir):

De tenoribus tonorum tam autentorum quod plagalium de neumatibus et distinctione.
Capitulum quartum.

TEnor in hac plana musica est determinata octo tonorum respectu finalium vel affinalium in proprio esse conseruatio. Cuius quidem precipua consideratio penes primam Euouae notulam simul antiphone finalem intuendo potissimum versari debet. Multiplicatur que huiusmodi tenoris harmonia per tonorum multiplicationem. quoniam quemadmodum differentes tonos octo numeramus: totidem etiam Euouae principalia complectamur necessarium est: per euouae nihil aliud quam vocales ablatis consonantibus de ly seculorum amen: super quod melodia que tenor hoc pacto nuncupatur: intelligentes. Uniquique in super (vt musici solent) tono proprium et principale Euouae ascribentes necnon cuiuslibet principalis differentialia: (vt vbertim [-f.dviir-] in sequenti tonorum dyatonico elucubrabis) subinde complectentes Apprimeque tenores: vnde sibi tale nomen vendicarint: apertius fateri conabimur. quos denique: eo quod cantum (ne sedes suarum finalium vel affinalium excurrat) teneant. Atque cuiuslibet carminis cuiusue toni fuerit: aditum preparent et ostendant rationabiliter dictos putamus. Quod profecto non minus quam predicta memorie commendandum musici merito asserunt. Quandoquidem veluti octo tonis quattuor littere terminales assignantur: pariter et octo tonorum tenoribus quattuor initiales littere examussim condonabuntur. Duorum vero tonorum semper ab eadem finali littera fit exitus. Non autem duorum tonorum idem character vnquam fiet principium. In F namque finali initium secundi toni reponitur: in a autem acuto primi: quarti et sexti exordium. in c vero confinali principium tenoris tercii quinti et octaui. In d igitur acuto initium Septimi tenoris quorum secundus omnium maxime descendit. Septimus autem inter ceteros altius scandit. vt in eius tenoribus iam sequentibus patebit.

On the tenors of modes authentic as well as plagal, on neumas, and on distinction. Chapter four.

Tenor in this plain manner of song is a prolonging (*conservatio*) to be determined of the eight modes in respect to the finals or affinals in proper. In this regard, indeed particular consideration ought to hinge on the control of the first note of Euouae together with the final of the antiphon, very powerful for understanding. Harmony is multiplied—which harmony? of what mode of tenor?—according to the multiplicity of modes. For in the same way that we number eight different modes, then also it is necessary we comprehend the same number of Euouae beginning-notes. (By ‘Euouae’ you should understand nothing other than the vowels of the

“seculorum amen” with the consonants taken away, over which [is notated] the melody by which the tenor is in this way expressed.)

What’s more, all those who ascribe—as is customary among musicians—to the mode the proper and principal *Euouae* and not whichever differentias of the principals (as we shall elucidate at length in the following music examples of modes), constantly and before all else comprehending the tenors, thus may rightly claim for themselves the title [of musicians].

Without reserve we shall endeavor to confess them, then, in addition to saying which chant (if it does not run contrary to the seat of its finals or affinals) they hold. Also, as for whichever mode any song shall be, we think reasonable the sayings that the tenors prepare the way and that they make manifest. Which doctrine having been taught no less commonly than the matters mentioned previously, musicians worthily recommend them to be memorized.

Just as indeed four final notes are assigned to the eight modes, also in the same manner precisely four initial notes shall meet approval as tenors for the eight modes. Certainly of two modes always from the same final note there is made conclusion. The same note may not be the beginning of [the same] two modes, however. On *F* of the finals the initial of the second mode is laid up, but on upper *a* the opening of the first, fourth, and sixth; on *c*, (indeed [also] a co-final), the beginning of the tenor of the third, fifth, and eighth. Therefore on high *d* we find the initial of the seventh of the tenors, of which the second is lowest. But among the rest the seventh goes highest, as of which now by the following tenors shall be made plain.



The sixth asks, on *a* by ditone
[from the final]
[dviiv]



Euouae
First, beginning on *a* by diapente
[from the final],

It speaks secondly on *F* by
semiditione [from the final].

Call third to us on *c* by semitone
plus diapente [from the final (not
shown)],
Having arrived fourth on *a* by
diatessaron [from the final].

Which turning about fifth on *c* by
diapente [from the final (not
shown)],

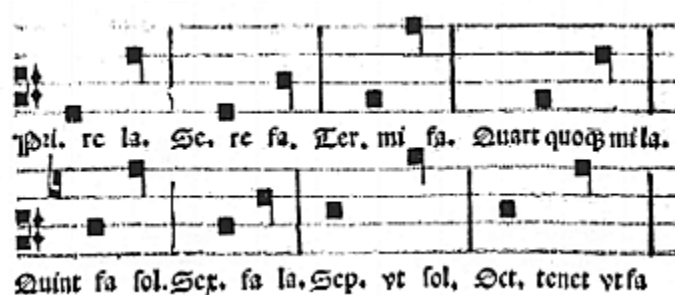
Where now the seventh is, on *d*
through diapente;

The eighth responds on *c* by
diatessaron.

Here is the tonus peregrinus.

Melodia inquam: que et ordinata tenorum contextura dignoscitur nos infallibiliter ducit in tonorum noticiam. Quapropter imnis tenor autentus ad quintam vel supra quintam suum principium capiens impares tonos notos efficit ita videlicet quod si quintam tetigerit sic est tenor primi/ quinti/ et septimi tonorum: si sextam sic est tenor tertii. Omnis vero tenor placalis ad quartam aut subtus eandem incipiens pares tonos hoc est collaterales diucidat quartum et octauum per quartam secundum et sextum per tertiam iudicans[.] Unde postremo sequitur & omnis tenor autentus suum placalem in duabus clavibus excedit: dempto septimo unica dumtaxat excedente, quinta ergo autentis, quarta quoque subiugalibus convenit que singula singulis hoc disticho: notulis declarabuntur.

Melodia, I declare: that which, the ordered what-is-to-be-bound-together of the tenors having been appreciated, leads us infallibly to knowledge of the modes. Wherefore in chants the authentic tenor at the fifth (or above its fifth) taking its place at the beginning produces the recognized authentic modes. Thus, that is, if it shall have touched the fifth [degree], then it is the tenor of the first, fifth, or seventh of the modes: if the sixth [degree], thus it is the tenor of the third [mode]. Indeed every plagal tenor beginning at the fourth, or below the fourth, prolongs (!) plagal modes, that is collaterals, the fourth and eighth [modes] rendering judgment by 4th, the second and sixth [modes] by 3rd. Thus in conclusion it follows that every authentic tenor exceeds its plagal by two degrees, with the single exception of the seventh. The 5th therefore is the common feature for the authentic, and the 4th for the plagals, which by this couplet [are distinguished] one from another; they shall be set out in notes:



Pri re la,
Se re fa,
Ter mi fa,
Quart quoque mi la.
Quint fa sol,
Sex fa la,
Sep ut sol.
Oct tenet ut fa.

[-f.dviiiir-] Pro quorum euidencia specialiori Sciendum quam omnis cantus desinens in re cuius seculorum Amen principium capit in la est primi toni: tam regulariter quam per transpositionem.

Secunda regula est quod omnis cantilena finiens in re cuius Euouae sursum ponitur in fa/ tam artificialiter/ quam transpositione est tertii toni.

Tertia regula est quod omnis cantus in mi terminum statuens nec non seculorum amen ad fa sursum per sextam exposcens: tercii toni extat. Preterea raro transponitur ad [sqb] quadratum acutum: alio quin enim minime veram tonorum imitaretur normam: cum tenorem in fa veluti precedens dyatonica troporum ratio ostendit: collocet. Admittitur

ecquidem: quum huiusmodi cantus tertii toni finiatur in [sqb] quadrato acuto: quod eius tenor in g solreut superacuto principium statuatur: non autem ratione vocis sol: sed fa per musicam fictam propriam sibi vendicantis solmisationem. Finitur quoque idem tonus nonnunquam in a acuto ratione mi sursum fa pro suo euouae in F superacuto per semitonium cum diapente: inuestigantis: fitque tunc ad quartam supra finalem transpositio. Quarta regula est quod quartus tonus regulariter in E finali terminatur: capitque tenorem in a acuto vel transpositus ad [sqb] quadratum finem locat: tenorem in e superacuto accipiens. finitur etiam interdum in a acuto principium Euouae in d acuto reponens: quod quidem pari ratione per ceteros tonorum tenores (decenti tamen medio) practicandum censebimus. Secunda predictarum syllabarum interpretatio.

Prima preceptio talis est quod omnis cantus la. sursum mediate vel immediate frequenter attingens: altius a fa reuerberans: si huiusmodi cantus finitur in re est primi toni.

Secunda regula omnis cantio sepius in reversans ad fa repercussionem faciens si iam in re exierit: secundi toni naturam obseruat: ita de singulis que omnia exemplo praticanti patebunt.*

For evidence of which more specifically, let it be known that all song ending on re, the seculorum Amen of which takes its initial-note on la, is of the first mode, whether on the regular final or by transposition.

The second rule is that all song ending on re, the Euouae of which is placed above on fa, even by artifice [with G final and b tenor] or by transposition [a final, c tenor], is of the third [recte second] mode.

The third rule is that all song standing its terminal note on mi, failing not to pray seculorum amen at fa above by 6th, shows itself of the third mode. Furthermore is it rarely transposed to high 4; for where else at least should it imitate the true norm of the modes [that is, transposition by 5th] when its ratio displays its tenor on fa, just as in the above musical example of the modes? Let it so establish itself. Indeed it is to be admitted that where song of this kind of

* Nicholas Wollick, *Enchiridion Musices* (Paris: 1512, Minkoff Reprint Geneva: 1972); TML WOLENC3 TEXT http://www.chmtl.indiana.edu/tml/16th/WOLENC3_TEXT.html; http://www.chmtl.indiana.edu/tml/16th/WOLENC3_03GF.gif; http://www.chmtl.indiana.edu/tml/16th/WOLENC3_04GF.gif (accessed November 30, 2013).

third mode is to be finished on high $\natural$, it stands its beginning tenor on g -sol-re-ut superacute.

Not, however, for the reason of attaining the quality sol: but laying claim to fa by musica ficta as the proper solmization for itself. And the same mode ends sometimes on high a , by reason of [a -]mi with fa above for its euouae on f superacute by semitone-plus-diapente: look into it yourself: in that case it is transposition at the 4th above the [regular] final.

Rule Four is that the fourth mode regularly ends on E final, and it takes the tenor on high a , or transposed locates its final on $\natural$, taking the tenor on superacute e . It may end also from time to time on high a of the principals, with Euouae placed on high d : which certainly by the same reason as by which tenors of certain other modes (legitimate although in the middle [of the traditional transposition by 5th] we reckon to be practicable.

Second interpretation of the above-discussed syllables.

The first precept is such that all song frequently attaining la above, with or without mediation, reverberating fa above: if song of this manner end on re it is of the first mode. The second rule: all song more often making repercussion reverting to fa, that is, if it ends on re, observes the nature of the second mode. Thus of single cases which by practical example all will be made clear.

29. Stefan Monetarius, *Epitoma utriusque musicae practicae* (Cracow: Florian Ungler, 1515);

facsimile: Jerzy Morawski, ed., *Monumenta Musicae in Polonia: Bibliotheca Antiqua*,

Vol. I (Krakow: Insytut Sztuki Polskiej Akademii Nauk, 1975), 22 (pages unmarked):

Habet igitur quivis tonorum peculiarem quondam in qua omnis (perfecta toni.) modulatio. ut hostium in cardine circumagit: quam reverberationem seu tenorem apellant, ut in isto videtur exemplo,

Therefore each of the modes has a peculiar feature sometimes on which all completed *modulatio* of the mode turns about like a door on a hinge: this is called the reverberation or tenor, as is seen in this example:

Of the first,

Of the second, etc.



30. Andreas Ornithoparchus, *Musice Active Micrologus liber primus* 2nd ed. (Leipzig, 1517),

f.Bijr–v: De repercussionibus Tonorum. Unde repercussio: que et Tropus a Guidone dicitur: est cuiuslibet toni propria et adequata melodia. Uel est proprium cuiusque toni interuallum. vt in sequentibus patet exemplis.*

* TML ORNMUS1 TEXT.

Ornithoparchus, Musice Actiue Micrologus, f.Bijr,2



Ornithoparchus, Musice Actiue Micrologus, f.Bijv

Deuterius

Mi mi dat ternus Mi la poscit si bi quartus

Tritius

Ut sol qnt^o petit Sextus fa la si bi querit

Tetrardus

Ut sol impar tetrardus Ut fa postremus habebit *

[For translation, see § 4.1.]

* http://www.chmtl.indiana.edu/tml/16th/ORNMUS1_03GF.gif.

31. *Opusculum musice compilatum nouiter per dominum Sebastianum presbiterum de Felstin.*

Pro institutione adolescentum in cantu Simplici seu Gregoriano ([Cracow: Jan Haller, 1517]; reprint ed., Cracow: Polskie Wydawnictwo Muzyczne, 1979), f.Bijv–Biijr:

Cognoscuntur etiam toni per
repercussiones. Nam toni autentici qui
magis ascendunt habent
repercussiones per saltus maiores
scilicet per quintam sextam et
octauam. Plagales vero habent
repercussiones per saltus minores
scilicet per terciam aut quartam, quia
illi non multum ascendunt.
Repercussio ergo primi toni est de re
ad la per quintam, secundi de re ad fa
per terciam, tercij toni de mi ad mi per
quintam vel de mi ad fa per sextam,
quarti de mi ad la per quartam, quinti
de vt ad sol per quintam, sexti de fa ad
la per terciam, septimi de vt ad sol per
quintam. Et differt a quinto, quia
septimus ascendit de gsolreut ad
dlasolre eius octaua est sol quintus
vero ascendit ab ffaut ad csolfaut eius
octaua est fa octauus de vt ad fa per
quartam, vt in istis exemplis

Repercussiones tonorum.
[Primi repercussio.
Tercii repercussio.
Quinti repercussio.
Septimi repercussio.
Secundi repercussio.
Quarti repercussio.
Sexti repercussio.
Octavi repercussio.]

Modes are indeed recognized by their
repercussions. For authentic modes,
which more ascend, have repercussions
by larger leaps, namely by fifth, sixth,
and octave [!]. Plagals, on the other hand,
have repercussions by smaller leaps,
namely by third or fourth, because they
do not so much ascend. The repercussion,
therefore, of the first mode is from re to
la by fifth, of the second from re to fa by
third, that of the third mode from mi to
mi by fifth, or from mi to fa by sixth, of
the fourth [mode] from mi to la by fourth,
that of the fifth from ut to sol by fifth, of
the sixth from fa to la by third, of the
seventh from ut to sol by fifth. And it
differs from the fifth insofar as the
seventh ascends from *G* to *d*[:] its octave
is sol [*g*.] [T]he fifth on the other hand
ascends from *F* to *c*: its octave is fa [*f*.]
[T]he eighth [mode] from ut to fa by
fourth, as in these examples[:]

Repercussions of the modes.
[Repercussion of the first.
Repercussion of the third.
Repercussion of the fifth.
Repercussion of the seventh.
Repercussion of the second.
Repercussion of the fourth.
Repercussion of the sixth.
Repercussion of the eighth.]

Felstin, Opusculum, f. Biiijr

The image displays a musical score for a piece titled 'Felstin, Opusculum, f. Biiijr'. The score is organized into nine staves, each representing a different 'repercussio' (percussion) part. The staves are labeled as follows:

- Primi repercussio.
- Tercij repercussio.
- Quinti repercussio.
- Septimi repercussio.
- Secundi repercussio.
- Quarti repercussio.
- Sexti repercussio.
- Octavi repercussio.

The notation is written on five-line staves. The first staff (Primi) begins with a treble clef and a common time signature (C). The second staff (Tercij) begins with a treble clef and a common time signature (C). The third staff (Quinti) begins with a treble clef and a common time signature (C). The fourth staff (Septimi) begins with a treble clef and a common time signature (C). The fifth staff (Secundi) begins with a treble clef and a common time signature (C). The sixth staff (Quarti) begins with a treble clef and a common time signature (C). The seventh staff (Sexti) begins with a treble clef and a common time signature (C). The eighth staff (Octavi) begins with a treble clef and a common time signature (C). The ninth staff (Octavi) begins with a treble clef and a common time signature (C). The notation consists of diamond-shaped notes and rests, typical of early printed music notation.

* http://www.chmtl.indiana.edu/tml/16th/FELOP_07GF.gif (accessed November 30, 2013).

32. Iohannes Spangenberg, *Quaestiones musicae in usum scholae Northusianae* (Nuremberg:

Iohannes Petreius, 1536), f.C3r–4v:

Quid est repercussio toni?

Est cuiuslibet toni propria et certa melodia.

Quae sunt huiusmodi repercussiones?

Habentur his uersibus.

Re la, sit primi, re fa, dat norma secundi.

Mi mi dat ternus, mi la poscit sibi quartus.

Vt sol quintus habet, sextus fa la sibi quaerit.

Vt sol Tetartus, ut fa postremus habebit.

Quomodo cognoscitur tonus in fine?

Quando in ueris clausulis finalibus terminatur. Et hic modus cognoscendi tonos, est certior et perfectior alijs, quemadmodum et uulgo dicitur. In fine uidetur cuius toni.

[C3v] Quis est cantus mixtus?

Est qui ad octauam uel altius ascendit ut autentus, et ad quartam descendit ut plagalis.

Sicque cursum autenti et plagalis simul usurpat.

Quomodo cognoscitur tonus in cantu mixto?

Bifariam. Primo penes melodiam uel clausulas, uel repercussiones cantuum. Secundo penes ascensum et descensum. In his canticis enim, finalis uox diligenter consideranda est, ad quem tonum plus declinent. Dum enim ultra finalem mox ad quintam scandunt, autenti sunt. Cum uero ad tertiam uel quartam infra finalem mox ceciderint, plagales dicuntur.

Exemplo sunt, Fidelis sermo, et O praeclara.

[C4v] Fit nonnunquam ut duorum tonorum cursus clausulae et repercussiones in una cantilena coniunguntur, tum iudicandus est tonus, secundum notam tenoris, circa quam saepius uersatus fuerit.*

What is repercussion of mode? It is of whatever mode the proper and certain *melodia*. What are the repercussions of whichever modes? They are acquired through these verses.

Let re la belong to the first; the rule of the second gives re fa.

The third gives mi mi; the fourth demands for itself mi la.

The fifth has ut sol; the sixth seeks for itself fa la.

* TML SPANQUA TEXT http://www.chmtl.indiana.edu/tml/16th/SPANQUA_TEXT.html (accessed November 30, 2013).

Ut sol the tetrardus; the last shall have ut fa.

How is mode recognized in the end?

When it is terminated on the true final notes. And this way of recognizing modes is more certain and more perfect than others, even as in the common saying: in the end is perceived of which mode [is the tune].

What is mixed song?

It is what ascends to the octave or higher like the authentic, and descends to the fourth [below the final] like the plagal. And thus it usurps the course of authentic and plagal at once.

How is the mode recognized in mixed song?

In two ways. First according to the *melodia*, or cadences, or repercussions of the songs. Second, according to ascent and descent [ambitus]. For in chants, the tone of the final is to be considered diligently, toward which the mode most intends. For when they soon rise to the fifth over the final, they are authentic. When indeed to the third or fourth below the final they fall more or less immediately, they are called plagal. Take for example *Fidelis sermo* and *O praeclara*.

Sometimes it happens that the range, cadences, and repercussions of two modes are joined together in one song, wherewith the mode is to be judged according to the note of the tenor around which it shall have principally turned.

33. Martin Agricola, *Rudimenta musices* (Vitebergae apud Geor. Rhaw, 1539; reprint ed., New York: Broude Bros., 1966), f. Diiij: *

Agricola, Rudimenta, Diiijr	1	re la	finis D, $\sharp$ dur.	
	2	re fa		
	3	mi fa		
		E. c.	finis E, $\sharp$ dur.	cantus,
* Repercussio	4	mi la		ut in ex
	5	ut sol	finis F, $\flat$ mol.	emplo
	6	fa la		parebit.
	7	ut sol	finis G, $\sharp$ dur.	
	8	ut fa		

Agricola, Rudimenta, Diiijv

re la. re fa. mi fa. mi la. ut sol. fa la. ut sol. ut fa
1. 2. 3. 4. 5. 6. 7. 8.

Repercussion 1 is re la, 2 is re fa, ending: D with hard $\sharp$;

3 is mi fa (E c), 4 is mi la, ending: E with hard $\sharp$;

5 is ut sol, 6 is fa la, ending: F with soft $\flat$;

7 is ut sol, 8 is ut fa, ending: G with hard $\sharp$; of song, as the example will show.

* TML AGRRUD 17GF http://www.chmtl.indiana.edu/tml/16th/AGRRUD_17GF.gif (accessed November 30, 2013).

34. Sebaldu Heyden, *De arte canendi, ac vero signorum in cantibus usu, libri duo*

(Norimbergae [Nuremberg] apud Ioh. Petreium, 1540), 136:

CAPVT OCTAVVM

De Tonis.

DE industria mihi hic temperabo a longiore Tonorum descriptione. Quid enim opus est Autentas ac Plagales Tonorum, ut uocant, limitationes, et cuiusque illorum superadditas differentias, religiosius prosequi, quorum in figuratis cantibus pene nullam rationem haberi cernimus? Sufficiat ergo hic quam simplicissime monstrasse, quomodo Toni uulgationis cuiusque Cantilenae cognosci, Psalmique et Magnificat, sic enim loqui licet, intonari debeant. Qui plura uolet, is ex alijs petat.

Quid est Tonus?

Est certa quaedam qualitas melodiae, seu potius affectus cantionis. Vt enim affectuum animi, alij alacres ac plausibiles, alij graues et sedati, quidam tristes ac gemebundi, rursus iracundi alij ac impetuosius: ita et melodiae cantuum, quod aliae aliter afficiant, uarie distinctae sunt Musicis.

Quot sunt species Tonorum?

Octo. Quae ex certis interuallis, quorum quisque aliquod peculiare, et ceu proprium habet, discernuntur. At quae ea sint, et quod quemque Tonum adtineat, ex subscriptis uersibus facillime ediscent pueri.

De interuallis, cuique Tono peculiaribus.

Primus Re, La, dat: Secundus Re, Fa: Tertius Mi, Fa: Mi, Laque Quartus Quintus Fa, Fa: Sextus Fa, La: Septimus Vt, Sol: Octauus sonat Vt, Fa.*

CHAPTER EIGHT

On the modes.

Out of diligence I shall here restrain myself from a lengthier description of the modes. For what is the need of religiously pursuing “authentics and plagals” of modes, as they are called, “limitations,” and to which of them apply “superadded differentias,” of which we discern to have

* TML HEYDAC2 TEXT http://www.chmtl.indiana.edu/tml/16th/HEYDAC2_TEXT.html (accessed November 30, 2013).

almost no rationale in polyphonic songs? It is enough, therefore, here simply to show how the modes of whatever chants, psalms, and the Magnificat are most commonly recognized; for thus, it is safe to say, they ought to be intoned. Anyone wanting more than this may seek it in other treatises.

What is mode?

It is a certain reliable quality of melody, or more aptly, affective disposition of song. For as with the affective dispositions of the mind, some cheerful and inviting applause, others grave and sedate, certain ones sad and sighing, others contrariwise irascible and impetuous: so also are the melodies of songs, that others of these otherwise move the affections, their varieties being distinguishable to trained musicians.

How many are the species of modes?

Eight. Which are discerned from certain intervals, of which each has one in particular, even as its *proprium*. And what that interval might be, and to which mode it pertains, children easily learn by heart from the verses written below.

On the intervals peculiar to each mode.

The first gives re la: the second re fa:

Third mi fa: and mi la the fourth.

Fifth fa fa, sixth fa la,

Seventh ut sol; the eighth sounds ut fa.

35. Heinrich Glareanus, *Dodecachordon* I, (1547), 32:

De uulgari modorum agnitione, Caput XIII.

Poterunt et cantus notitia quadam a posteriore, ut Philosophi loquuntur, pernosci, regulis quibusdam leuioribus, ac omnino uulgatis, quae tamen, quod iuuant memoriam, atque a

non indoctis huius artis praeceptoribus traditae sunt, non omittendae uidentur. Sunt autem huiusmodi: Cantilenae primi modi frequenter ex re in la saliunt. Exempla sunt: Gaudeamus omnes. Salve regina. Ave maris stella. Secundi ex re in fa. Exempla: Salve sancta parens. Terribilis est. Emendemus in melius. Tertij ex mi in fa, quod ab eo distat sexta, ut in Pange lingua. Discubuit Iesus. Omnia quae fecisti nobis domine. Quarti ex mi in la. Exempla: Tota pulchra es. Resurrexi. Spiritus ubi vult spirat. Quinti ex mi in sol. Exempla: O sacrum. Regnum mundi. Illuminare Hierusalem. Sexti ex fa in la. Exempla: O quam admirabile. Homo quidam fecit. Septimi ex ut in sol. Exempla: Puer natus est nobis. Viri Galilaei. Summae Trinitatis. Octavi ex ut in fa. Exempla: Veni sancte Spiritus. Spiritus domini. Vespere autem sabbati. Pro memoria etiam adiiciunt haec incondita uelut carmina, neutiquam reiicienda.

Pri. re la. Se. re fa. Ter. mi fa. Quart quoque mi la.

Quint. mi sol. fa la Sext. Sept. ut sol. Oct. tenet ut fa.*



On the rude-mechanical recognition of modes, Chapter XIII.

Songs will also be able to be learned thoroughly by means of a certain notice *a posteriori*, as philosophers say: by certain rules that are easy and altogether generally known, which to the extent that they aid the memory, and are conveyed even by those unschooled in the precepts of this art, we consider not to be omitted. And they are as such: Chants of the first mode frequently leap from re to la. Examples are [Introit] *Gaudeamus omnes*, [Antiphon] *Salve regina*, [Hymn] *Ave maris stella*. Of the second, from re to fa. Examples: [Introit] *Salve sancta parens*. [Introit] *Terribilis est*. [Responsory] *Emendemus in melius*. Third, from mi to fa that is distant from it by 6th, as in [Hymn] *Pange lingua*. [Responsory] *Discubuit Iesus*. [Introit] *Omnia quae fecisti nobis domine*. Fourth, from mi to la. Examples: [Antiphon] *Tota pulchra es*. [Introit] *Resurrexi*. [Antiphon] *Spiritus ubi vult spirat*. Fifth from mi to sol. Examples: [Antiphon] *O sacrum*.

* TML GLADOD1 TEXT.

† http://www.chmtl.indiana.edu/tml/16th/GLADOD1_11GF.gif (accessed November 30, 2013).

[Responsory] *Regnum mundi*. [Responsory] *Illuminare Hierusalem*. Sixth from fa to la.

Examples: [Antiphon] *O quam admirabile*. [Responsory] *Homo quidam fecit*. Seventh from ut to sol. Examples: [Introit] *Puer natus est nobis*. [Introit] *Viri Galilaei*. [Responsory] *Summae Trinitati*. Eighth from ut to fa. Examples: [Sequence] *Veni sancte Spiritus*. [Antiphon] *Spiritus Domini*. [Antiphon] *Vespere autem sabbati*. And for memory are added these as-it-were nonsense songs, by no means to be despised.

36. Adrian Petit Coclicus, *Compendium musices descriptum ab Adriano Petit Coclico, discipulo*

Josquini de Pres (Nürnberg: Johann Berg, Ulrich Neuber, 1552; reprint ed., Kassel:

Bärenreiter, 1954), f. Dir–Dijr:

DE TONIS.

NON dici potest, quàm Musico cognitu necessaria sit cognitio Tonorum, in utroque cantu Choralis et Figurali. Consulto itaque in hac prima parte, eorum mentionem [-f.Div-] faciam. Octo sunt Toni in usu in cantu Choralis et figurato. Primus et secundus semper finiuntur in - - Dsolre -- graui regulariter, sed irregulares habent finem in -- Alamire -- acuto per bmollarem. Et in Gsolreut per b[sqb]duralem. Et primus semper finitur in re, et frequentat la, per diapente. Secundus autem fa per ditonum. Tertius et quartus semper finem faciunt regulariter in Elami graui. Irregulariter autem in Alamire per bmollarem, et in bfa[sqb]mi per b[sqb]duralem. Sed siue sint regulares siue irregulares, respiciendum est in cantu figurato ad Tenorem, si frequentauerit mi et fa per sextam, tunc erit tertij, si autem mi et la, tunc absque dubio erit quarti toni per quartam, et sic de alijs tonis iuxta regulam sequentem. Pri re la, Se re fa, Ter mi fa, Quar quoque mi la, Quin fa fa, Sex fa la, Sep ut sol, Oc tenet ut, fa. Quintus et sextus semper finiuntur in Ffaut graui, et quintus frequentat Diapente, Sextus uero Dytonium, aut Diapason. Irregulariter autem finiuntur in bfa[sqb]mi, per bmollarem acutum, et accipitur, fa pro ut, et sol pro fa. Aut in Csolfaut per naturam acutam, et accipitur ut pro fa, et fa pro sol, sed raro contingit. Septimus et octauus semper finiunt regulariter in Gsolreut acuto. Septimus frequentat Dyapente, scilicet ut sol, Octauus Dyatesseron, scilicet ut fa, iuxta regulam. Cum autem irregulares fiunt, quod raro accidit, finiunt in Csolfaut, per naturam acutam, siue in Ffaut graui, sed haec raro contingunt.

[f.Dijr-] DE INFLEXIONIBVS, ET REGula tonorum regularium, et irregularium.*

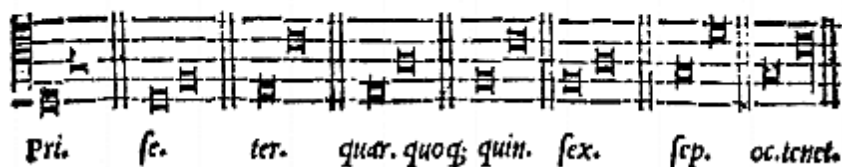
ON THE MODES.

It is not possible to put in words how necessary for the musician's education is knowledge of the modes, both in plainsong and polyphony, and so I deliberately make mention of them in this first section. There are eight modes in use in chant and polyphony. First and second always are concluded regularly on low *D*-sol-re, but irregular specimens have their end on high *a*-la-mi-re with soft *b* [*recte* hard $\natural$]. Also on *G*-sol-re-ut with hard $\natural$ [*recte* soft *b*]. And the first is always ended on re and frequents la by diapente; but the second fa by ditone [*recte* semiditone]. Third and fourth always make ending regularly on low *E*-la-mi, but irregularly on *a*-la-mi-re with soft *b*, and on *b*-fa- $\natural$ -mi by hard $\natural$. But whether they are regular or irregular, respect is to be given in polyphony to the tenor: if it shall have frequented mi and fa by 6th, then it shall be of the third; if however mi and la, then without doubt it shall be of the fourth mode by 4th, and thus with the remaining modes in accord with the following rule: Pri re la, Se re fa, Ter mi fa, Quar quoque mi la, Quin fa fa, Sex fa la, Sep ut sol, Oc tenet ut, fa. The fifth and sixth are always ended on *F*-fa-ut of the graves, and the fifth frequents the diapente; the sixth indeed the ditone, or octave. But they are irregularly ended on *b*-fa- $\natural$ -mi, by soft *b* acute, and fa is taken for ut [as tenor], and sol for fa. Or on high *c*-sol-fa-ut by the natural [hexachord], and ut is taken for fa [as tenor], and fa for sol, but this rarely occurs.

ON INFLECTIONS, AND THE Rule of the regular and irregular modes.

* TML COCCOM TEXT http://www.chmtl.indiana.edu/tml/16th/COCCOM_TEXT.html (accessed November 30, 2013).

Prima regula, cognoscendi tonos regulares per b $\times$ duralem grauem.



**Toni irregulares iuxta cantum bmo-
larem, & naturalem.**



**Toni irregulares per b $\times$ ralem,
& naturalem.**



*

First rule, for knowing
regular modes with low
B- $\flat$.

Irregular modes with
soft hexachord, and
natural.

Irregular modes by hard
 $\flat$, and natural.

37. *Practica musica Hermannii Finckii, exempla variorum signorum, proportionum et canonum,*

iudicium de tonis, ac quaedam de arte suaviter et artificiose cantandi continens

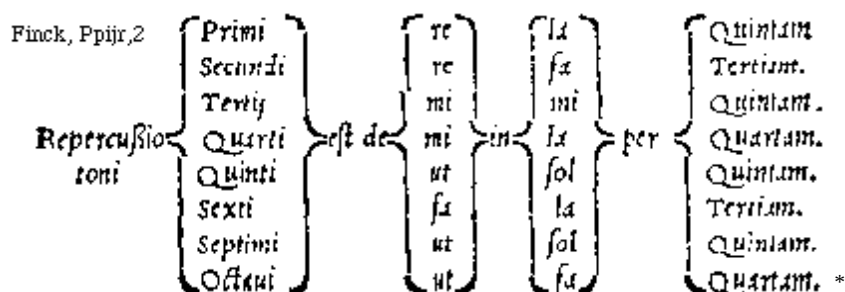
(Vitebergae, excusa typis haeredum Georgii Rhaw, 1556), f.Ppijr–v:

Repercussio autem est illud proprium interuallum, quod saepe repetit quilibet tonus, quarum octo sunt, quae a uoce finali incipiunt, atque sursum tendunt, ad eamque rursus redeunt.[†]

* http://www.chmtl.indiana.edu/tml/16th/COCCOM_07GF.gif (accessed November 30, 2013).

† TML FINPRA TEXT http://www.chmtl.indiana.edu/tml/16th/FINPRA_TEXT.html (accessed November 29, 2013).

Repercussio is that proper interval which whatever mode often repeats, of which there are eight, which begin on the tone of the final, and extend above, and return to it again.



Repercussio of mode 1st is from re to la by 5th, etc.

[-f.Ppijv-] Sequuntur Exempla.

Musical examples follow.

Finck, f. Ppijv, 1

Re, la, fit primi. Re, fa, norma secundi.

Mi, mi, dat tertius. Mi, la, poscit sibi quartus.

Ut, sol, quintus petit. Sextus fa, la, sibi querit.

Ut, sol, impar tertius. Ut, fa postremus habebit.

[For translation, see Example 4.1b (p. 186).]

* http://www.chmtl.indiana.edu/tml/16th/FINPRA_69GF.gif (accessed November 30, 2013).

† http://www.chmtl.indiana.edu/tml/16th/FINPRA_70GF.gif (accessed November 30, 2013).

38. János Czerey, *De musica plana* [17th century]. Ágnes Papp, “Eine späte Abschrift der Lehre der Musica plana in einem Gesangbuch aus Ungarn: Musiktheoretische Aufzeichnungen und Tonar,” in *Quellen und Studien zur Musiktheorie des Mittelalters*, vol. 3, ed. Michael Bernhard. Bayerische Akademie der Wissenschaften, Veröffentlichungen der Musikhistorischen Kommission, Band 15 (München: Bayerische Akademie der Wissenschaften; C. H. Beck, 2001), 507–509:

Regulae de tonorum ambitibus.

1. Omnis cantus saepius la attingens sursumque repercussionem faciens ad b fa [sqb] mi, huiusmodi cantus in re desinit est primi toni si vero circa re saepius versatur reflexionem ad fa sursum faciens est secundi toni.

<2.> Omnis cantus finiens in mi naturali, si citius tangit fa per [sqb] quadr<at>um acutum quam quartam, supra notam finalem, est tertii toni si vero non immediate tangit fa, per [sqb] quadr<at>um acutum, sed saepius revertetur ad mi per naturam, et licet etiam post tangat fa praedictum semel aut bis non ascendens ad dictorum est 4. toni.

<3.> Omnis cantus finiens in fa per naturam si citius tangit fa per [sqb] Quadratum, acutum quam fa seu [sqb] quadr<at>um grave est sexti toni.

<4.> Omnis cantus finiens in sol per naturam si citius tangit per naturam acutum quam re per naturam gravem est septimi toni. Se vero ad re per naturam gravem, est 8. toni qui in sequentibus [...]

[39r in marg.] Pri re la, se re fa, ter mi fa, quart quoque mi la.

quint fa sol, sext fa la, sept ut sol, oct tenet ut fa. [notis musicis instructis]

[-508-] De tenore et differentiis tonorum.

Quid est tenor? est breviuscula melodia quae in ecclesiasticis canticis fini subiungitur hac dictione euouae, haec vero dictio significat, seculorum Amen. Dicitur autem tenor a tenendo quia cantum ne ex suo tono in aliud evagetur.

Est autem Duplex. Antiphonarum et Introituum. Antiphonarum est sub cuius melodia psalmodiarum fines clauduntur. Introituum vero sub cuius melodia versuum caude clauduntur. Tot sunt autem tenores tam introituum quam antiphonarum, quot toni.

Quid est differentia? Est qua idem tonus a seipso et ab aliis differt ob variationem notarum, quae non necessitatis [39v in marg.] sed <or>natus gratia sunt inventa et ut facilius ac suavior sit tonorum inceptio.

[-509-] De tonorum psalmodia.

Quid est psalmodia? Est psalmodiarum secundum tonorum tenores modulatio et est duplex maior, et minor.

Quid est psalmodia maior? Est quae solemne notarum modulatu principium variat et medium clauditque finem tenore toni et tantum inveniatur in Magnificat, et Benedictus. Quid est psalmodia minor? Quae planiori modo incedens medium diversificat finemque toni tenore claudit et comprehendit. Haec psalmodia minor omnes psalmos praeter Magnificat et Benedictus ac cantica quae magis ad maiorem psalmodiam videtur pertinere.*

Rules regarding the ranges of the modes.

1. All song most often touching la and making repercussion to *b*-fa- $\natural$ -mi, the melody of which ends on re, is of the first mode; if indeed it turns more around re, bending toward fa above, it is of the second mode.
2. All song finishing on mi natural, if it soon touches fa by high $\natural$ -mi as much as the fourth [degree] over the final note, is of the third mode; if instead it does not immediately touch fa, by high $\natural$, but more often reverts to mi of the natural hexachord, and it may indeed after it touches the aforesaid fa once, but not twice ascending to those notes, it is of Mode 4.
3. All song ending on fa by the natural hexachord, if soon it touches [*c*-]fa by high square $\natural$, as much as fa or low $\natural$, is of sixth mode.
4. All song ending on sol by the natural hexachord, if soon it touch by the natural hexachord so much as high re by the low natural [?] is of seventh mode; if indeed to re by the low natural, it is of Mode 8 as in the following ...

Pri re la ...

On the tenor and differentiae of the modes.

* TML CZEDMP TEXT http://www.chmtl.indiana.edu/tml/17th/CZEDMP_TEXT.html (accessed November 30, 2013).

What is the tenor? It is a most brief melody which in ecclesiastical chants is attached to this saying “euouae,” which really means “seculorum Amen.” It is called tenor, moreover, from *tenendo* (holding fast), since the song may not wander from its mode into another.

It is however twofold [in species], that of antiphons and that of introits. Of antiphons it is according to whichever melody of psalms the ends are concluded. Of introits, on the other hand, under of which melody of verses are concluded as a dependent section. And there are as many tenors, whether of introits or of antiphons, as there are modes.

What is the differentia? It is that by which the same mode differs from itself and from others by variation of notes, which were invented not of necessity but by reason of decoration, and as simpler and suaver may be the beginning of the tones.

What is psalmody? It is *modulatio* of psalms [and canticles, see below] according to tenors, and it is twofold, major and minor.

What is major psalmody? It is that which solemnly varies with the modulatio of notes its beginning and middle, and closes the end by the tenor of the mode, and as such is found in [canticles] Magnificat and Benedictus.

What is minor psalmody? That which beginning in a plainer manner diversifies mediation and end of the mode by the tenor it closes and comprehends. This minor psalmody pertains to all the psalms except Magnificat and Benedictus and canticles which are seen to be more toward major psalmody.

39. Adriano Banchieri, *Cartella musicale nel canto figurato Fermo, & Contrapunto* (Venice: G. Vicenti, 1614; facsimile Bologna: Forni, 1968), 68–69:

69

VTHLSSIMA TABELLA IN CONOSCERE GL'OTTO TVONI.

	Principio del Salmo	Intonatione
1. D.	In F. fa vt Graue.	Fa sol la.
2. R.	In C. Graue.	Vt re fa.
3. M.	In G. Acuto.	Vt re fa.
4. M.	In A. Acuto.	La sol la.
5. L.	In F. Graue.	Fa re fa.
6. L.	In F. Graue.	Fa sol la.
7. G.	In C. Acuto.	Fa mi fa sol.
8. G.	In G. Acuto.	Vt re fa.

Quattro versi per conoscere il Tuono del fine dell'Antifona all'Euoae.

Re la primo fara. Re fa secondo
Mi fa terzo. Mi la quarto, & il quinto
Fa fa sesto. Fa la, e insieme auito.
Vt fol tertio. Vt fa l'Ottauo è in fondo.
Il fa fol la, fara del primo, o sesto
Terzo è Ottauo. Vt re fa anco il secondo
La sol la quarto. Vt mi fol quinto e il mondo
Fa mi fa fol tertio Tuono il mello.

AVVENTICI

PLAGALI

C 7 IN-

Cartella del Banchieri.

VTH.

63

INTROTTIONE DE GL'OTTO MODI

Quarto Documento.

Dagli Mufici antichi variati, & diuersamente praticati furono gli Modi, quali do fur dritto il di loro numero, & intonationi, che fin hora vengono praticate dalla fanta, & felice memoria di S. Leone Papa, di questo nome fecondo. Questi otto Tuoni si diuidono diui parte Primo, Terzo, Quinto, & Settimo sono Autentici, & apreso il Secondo, Quarto, Sesto, & Ottauo Plagali; la qual parola Plagale deriva da Plagon, che di Greca in nostra fauella significa contrario. Quegli otto Tuoni si formano sopra quattro lettere già vedute nel confronto della Mano, & ciascuno di loro ha per assignamento vna difanza di otto voci, come qui vediamo.

MODO DI CONOSCERE GL'OTTO TVONI

Quinto Documento.

Questa voce Tuono deriva dal verbo intonare, si come ne viene inseguito dal Ioaniffimo Mufico David nel Salmo Sedicesimo. Il modo di conoscere quegli otto Tuoni, si pratica dal fine dell'Antifona Vespertine all'Euoae, cioè a due SECVLOR VM AMEN, come a dire se il fine dell'Antifona fara Re, & il principio dell'Euoae fara La, all'hora fara primo Tuono per Quinta ascendente; se faranno Re fa, per Terza e secondo Tuono; se faranno Mi fa, per Sesta e Terzo; se faranno Mi la, per Quarta e Quarto; se faranno Fa fa per la quadro, ouero Vt fol per bimolle, per Quinta e Quinto; se faranno Fa la per Terza e Sesto; se faranno Vt fol per il fine dell'Antifona, & principio dell'Euoae.

VTH.

Primo Secondo Terzo Quarto Quinto Sesto Settimo & Ottauo

Autentici. Primo Quinto Settimo

Plagali. Secondo Quarto Sesto & Ottauo

40. Jean Denis, *Traité de l'accord de l'éspinette* (Paris, 1650); reprinted with an Introduction by Alan Curtis (New York: Da Capo Press, 1969), from “Des huict Tons de l'Eglise” (On the Eight Church Modes), 25–28:

[26] *L'ordre des Tons, et leurs propres touches.*

Le premier <i>ré, la.</i>	Le cinquiesme <i>fa, fa.</i>
Le second <i>ré, fa.</i>	Le sixiesme <i>fa, la.</i>
Le troisiemes <i>mi, fa.</i>	Le septiesme <i>ut, sol.</i>
Le quatriemes <i>mi, la,</i>	Le huitiesme <i>ut, fa.</i>

Il faut sçavoir les propres touches où il faut commencer & finir les Pseaumes, le *Magnificat*, & le *Benedictus*, selon les Tons que sont les Antiennes.

Le premier ton commence en *D la, ré, sol*, sa dominante [27] en *A mi, la, ré*, & sa mediant en *F ut, fa*.

Selon l'Antiphonié, le second ce devroit commencer aussi en *D la, ré, sol*; mais pour la commodité du Choeur, l'Organiste le doit toucher en *G ré, sol, ut*, & sa dominante *fa*, en *B fa*, qui est une quarte plus haut que son naturel.

Le troisiemes qui se chante *mi, fa*, faut entendre que le *mi*, qui est sa premiere touche est en *E mi, la*, & sa dominante en *C sol, ut, fa*, la Clef qui est une sixte mineure[,], contre la pensée du plusieurs qui croiroient que ce fut un semiton, & ce que dessus [*recte* “que ce fut un semiton dessus, & ce que”] pour l'*Antienne* seulement, & pour le *Magnificat* & pour le *Benedictus* il se commence en *G ré, sol, ut*.

La [*sic*] quatriemes commence au *mi*, d'*E mi, la*, & sa dominante en *A mi, la, ré*; & ce ton est nommé Arithmetique entendu qu'il a sa quarte en bas au contraire de tous les autres, & n'a point de cadence parfaite, & n'y a que luy seul qui n'en a point, & ce finit en *E mi, la*.

Le cinquiesme qui est *fa, fa*, commence en *F ut, fa*, & sa dominante en *C sol, ut, fa*, la Clef, & finit en *A mi, la, ré*; Mais pour la commodité du Choeur on le commence en *C sol, ut, fa*, & sa dominante en *G ré, sol, ut*, & finit en *C sol, ut, fa*.

Le sixiesme commence en *F ut, fa*, & sa dominante en *A mi, la, ré*, & finit en *F ut, fa*, par *b mol*.

Le septiesme en son naturel commence en *G ré, sol, ut*, sa dominante en *D la, ré, sol*, passe jusques en *F ut, fa*, proche la Clef de *G ré, sul, ut*, & se termine & fini en plusieurs sortes de façons & diverses touches; mais l'Organiste le doit toujours finir en *G ré, sol, ut*, par *b-mol*, & laisser chanter les [28] Chantres comme il est escrit dans leurs Livres.

Le huictiesme commence en *G ré, sol, ut*, & sa dominante en *C sol, ut, fa*, & finit en *G ré, sol, ut*, par $\natural$ *quarre*; mais pour la commodité des Chantres il faut le toucher *F ut, fa*, par *b mol*, & *b mol* par tout[.]

[For partial translation see §4.13.]

41. *Manuale cantus secundum usum FF. minorum rectorum provinciae comitatus Flandriae s. Joseph ... Candavi (Gandavi?): Ex officina Haeredum Joannis Kerchovij, 1682 (Oxford, Bodleian Library, digitized August 30, 2006), 6:*

Hoc tamen ita intelligendum est, ut potior habeatur ratio situs, et loci in quo ponitur nota, quam nominis sive appellationis ipsius. Saepe enim contingit in Antiphonis 8. Toni, quod ultima nota proprie non sit *Ut*, sed *Sol*, ut patet in Antiphona *Rex pacificus* in Vesperis Nativitate Domini.

[For translation see §4.13.]

42. Matteo Coferati, *Il Cantore Addottrinato* (Florence, 1691), *Libro Terzo: De' Tuoni del Canto*

Fermo:

[73] ***De' Nomi antichi, e moderni de' Tuoni*** [Cap. 3]

I nomi moderni de' Tuoni sono questi.

1. Re La Primo. 2. Re Fa Secondo. 3. Mi Fa Terzo. 4. Mi La Quarto. 5. Fa Fa Quinto. 6. Fa La Sesto. 7. Du Sol Settimo. 8. Du Fa Ottauo, come si caua da' seguenti versi.

*Re là Primus habet, Re Fa datur inde Secondo,
Terno ad Sextam Mi Fa, at Mi La Quartus habebit,
Fa Fa fert Quintum, Fa La concedito Sexto,
Septimo vis Vt Sol, Vt Fa Postreme requiris.*

[136] ***Regola per imparare a conoscere di qual Tuono sieno i Responsori. Cap. 37***

[138] *Primus ad quintam, vel aequalis, idest, in Alamire, aut Dsolre ...*

[145] ***Regola per conoscere di che Tuono sieno l'Antifone, Cap. 41.***

Tutte l'Antifone hanno dopo di se annesso il *Saeculorum*, ouuero *Euouae*, ad effetto di potere facilmente conoscere di che Tuono esse Antifone sieno, il che si fa osseruando l'ultima nota dell'Antif. e la prima dell'*Euouae*, o *Saeculorum*, come dice l'Illuminato lib. 3. cap. 9.

Se l'Ant. adunque finisce in Re di Nat. Gr. e il *Saeculorum* [146] comincia una quinta sopra il La di Nat. Gr. sarà del primo Tuono, e dirà Re la primo.

Se l'Ant. parimente resta in Re di Nat. Gr. e il *Saeculorum* comincia una terza sopra in Fa di Nat. Gr. sarà del secondo Tuono, e si dirà Re fa secondo.

... Mi fa terzo

... Mi la quarto

... fa fa quinto

... Fa la sesto

... Du sol settimo

... Du fa ottauo, come si caua da' seguenti versi.

*Re La vult primus, Re fa retinetque secundus,
Per sextam Mi Fa terno datur, & Mi La quarto,
Fa Fa fert quintus, Fa La praebet tibi sextus,
Vt Sol septimus, Vt Fa captatque supremus.*

[147] ***Formule per conoscere i Tuoni dell'Antifone. Cap. 43***

... La prima nota di ciascun Tuono, come qui sopra si può vedere, significa la finale dell'Ant. e la seconda dimostra il principio del *Saeculorum*, ouero *Euouae*, che congiunte insieme danno notizia alla qualità del t[uono].*

43. J. Alfred Novello, "A Concise Explanation of the Gregorian Note, Compiled from Various

Authorities [Part 1]," *The Musical Times and Singing-Class Circular* 3/49 (1848): 3–5,

3–4:

The eight ecclesiastical Tones (or more properly MODES) are regulated in their descant by two sounds, one of which is termed the DOMINANT, or most prevailing sound in the melody, and the other the FINAL, or terminating sound thereof.

Nothing, therefore, more remains for the true understanding the Gregorian Chant, than an accurate solmization of the natural scale of music, with a careful observation of the several DOMINANTS and FINALS explained below.

For the ascertainment of the several DOMINANTS and FINALS, the above eight syllables (Ut, Re, Mi, &c.) are employed.

The several Dominants and Finals of the eight modes are thus given in the two following barbarous Hexameter verses:—

* Matteo Coferati, *Il Cantore Addottrinato* (Firenze, 1691), *Libro Terzo: De' Tuoni del Canto Fermo*, edited by Luca Ricossa, <http://lrs.club.fr/coferati/cantore.html>, <http://lrs.club.fr/coferati/libro3.pdf> (accessed August 17, 2009).

“Prim. RE LA. Sec. RE FA. Ter. Mi UT. Quart. quoque, Mi LA”

“Quint. FA UT. Sext. FA LA. Sept. SoL RE. Oct. dato, SOL UT”

This riddle being interpreted, signifies the following

The First Tone or Mode has	RE for Final and	LA for Dominant.
... Second .. .	RE	FA
... Third	MI	UT
... Fourth	MI	LA
... Fifth .. .	FA	UT
... Sixth .. .	FA	LA
... Seventh	SOL	RE
... Eighth	SOL	U T

44. *A Complete and Practical Method of the Solesmes Plain Chant* From the German of the Rev.

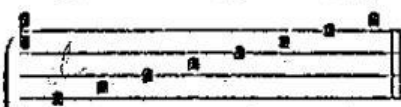
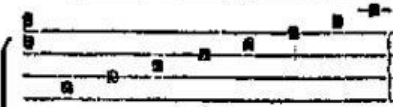
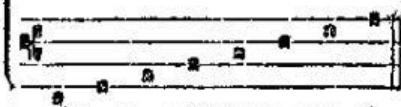
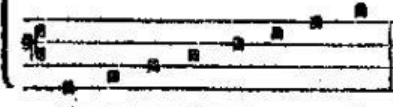
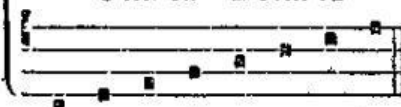
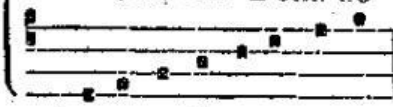
P. Suitbertus Birkle, O.S.B. With the authorization of the author Adapted and Edited by

A. Lemaistre (New York: Joseph F. Wagner, 1904), 28–29:

The four fundamental tones are called Authentic (original) tones, and the four derived scales are termed Plagal. As a rule, the Plain Chant tones do not appear under their proper names, but are indicated by numbers placed at the beginning of a Chant: I. (doric), II. (hypodoric), III. (phrygic), IV. (hypophrygic), V. (lydic), VI. (hypolydic), VII. (mixolydic), VIII (hypomixolydic). Two notes are of particular importance in every mode, the *Final* and the *Dominant*; the latter also called recital note.

The *Final* is the concluding note of a composition (and the first note of the authentic scales). The *Dominant* (recital note), on the other hand, is the [29] note about which the melody is grouped for its greater part. The psalm-tone of a mode is sung on its Dominant, or reciting-note.

The following table will show the modes, their finals and reciting notes:

I. Fifth. Fourth.  Fin. re Dom. la	III. Fifth. Fourth.  Fin. mi Dom. do
II. Fin. re Dom. fa  Fourth. Fifth.	IV. Fin. mi Dom. la  Fourth. Fifth.
V. Fifth Fourth.  Fin. fa Dom. do	VII. Fifth. Fourth.  Fin. sol Dom. re.
VI. Fin. fa Dom. la  Fourth. Fifth.	VIII. Fin. sol Dom. do  Fourth. Fifth.

45. Luigi Agustoni and Johannes Berchmans Göschl, *Einführung in die Interpretation des Gregorianischen Chorals, 1: Grundlagen* (Regensburg, 1987), translated and annotated by Columba Kelly as *An Introduction to the Interpretation of Gregorian Chant by Luigi Agustoni and Johannes Berchmans Göschl, Volume I: Foundations* (Lewiston, New York: The Edwin Mellen Press, Ltd., 2006), 20–21:

If one considers the movements between the two structural poles of the different modes, the psalmodic Tenor and the Final, one obtains the following table. It is a theoretical chart of the Carolingian Octoechos, always subject[,] in practice, to more or less notable exceptions. The descending relationship between the psalmodic Tenor and the Final of a piece is graphically represented by the sign \:

1 st mode:	authentic Protus	<i>la \ re</i>	Ant. <i>Puer</i> , GT 138
2 nd mode:	plagal Protus	<i>fa \ re</i>	Ant. <i>Sitivit</i> , GT 700
3 rd mode:	authentic Deuterus	<i>si \ mi</i> [*]	Ant. <i>Ecce Dominus</i> , GT 539
4 th mode:	plagal Deuterus	<i>la \ mi</i>	Ant. <i>Crucem tuam</i> , GT 175
5 th mode:	authentic Tritus	<i>do \ fa</i>	Ant. <i>Domine</i> , GT 885
6 th mode:	plagal Tritus	<i>la \ fa</i>	Ant. <i>Alleluia</i> , GT 852
7 th mode:	authentic Tetrardus	<i>re \ sol</i>	Ant. <i>Caro</i> , GT 883
8 th mode:	plagal Tetrardus	<i>do \ sol</i>	Ant. <i>In pace</i> , GT 703

[GT = *Graduale Triplex* (Solesmes, 1979)]

[*(Agustoni/Göschl:)] The Vatican gives a *do* for the psalmodic Tenor of the 3rd psalm tone, which does not correspond to the witness of the most ancient manuscripts. The “Commemoratio brevis de tonis et psalmis modulandis” (M. GERBERT, *Scriptores ecclesiastici de Musica ...*, t. I, S. Blasius 1784, new edition Hildesheim 1963, p. 213–229), of the second half of the IXth century, clearly indicates the Tenor as *si*. In the [*Antiphonale Monasticum* (Tournai: Desclée, 1934)], this original Tenor has been restored (while also maintaining the “tonus recentior” with Tenor *do*, “ubique receptus et diuturno usu probatus” AM 1213[.]) [(Kelly:)] Only the *si* is used in the [*Psalterium Monasticum* (Solesmes, 1981)].

BIBLIOGRAPHY

- Agustoni, Luigi, and Johannes Berchmans Göschl. *Einführung in die Interpretation des Gregorianischen Choral, 1: Grundlagen* [Regensburg, 1987]. Translated and annotated by Columba Kelly as *An Introduction to the Interpretation of Gregorian Chant by Luigi Agustoni and Johannes Berchmans Göschl, Volume I: Foundations*. Lewiston, New York: The Edwin Mellen Press, Ltd., 2006.
- Ambros, August Wilhelm. *Geschichte der Musik* vol. 2, 2nd ed. Leipzig: F.E.C. Leuckart, 1880.
- Ameri Practica artis musice* [1271], edited by Cesarino Ruini. CSM 25 (1977).
- Amstutz, Renate. *Ludus de decem virginibus: recovery of the sung liturgical core of the Thuringian Zehnjungfraunspiel*. Toronto: Pontifical Institute of Medieval Studies, 2002.
- Anonymi Tractatus de cantu figurativo et de contrapuncto* (c. 1430–1520). Edited by Christian Meyer. CSM 41 (1997).
- Antiphonale monasticum pro diurnis horis*. Tournai: Desclée, 1934.
- Antiphonale Sarisburiense: a Reproduction in Facsimile of a Manuscript of the Thirteenth Century*. Edited by Walter Howard Frere. London, 1901–24.
- Aribonis de Musica*. Edited by Joseph Smits Van Waesberghe. CSM 2 (1951).
- Asaf'yev, Boris Vladimirovich. *Muzikal'naya forma kak protsess* (Moscow, 1930–47). Translated by James Robert Tull as *B. V. Asaf'yev's Musical Form as a Process: Translation and Commentary*. 3 vols. PhD diss., Ohio State University, 1977.
- Ashworth, E. J. "The eclipse of medieval logic." In *The Cambridge History of Later Medieval Philosophy*, edited by Norman Kretzmann, Anthony Kenny, and Jan Pinborg, 787–96. Cambridge: Cambridge University Press, 1982.
- Atkinson, Charles M. "De Accentibus Toni Oritur Nota Quae Dicitur Neuma: Prosodic Accents, the Accent Theory and the Paleofrankish Script." In *Essays on Medieval Music in Honor of David G. Hughes*, edited by Graeme M. Boone, 17–42. Cambridge, MA: Harvard University Department of Music, 1995; reprinted in Kelly, *Oral and Written Transmission*.
- _____. "The 'Parapteres: Nothi' or Not?" *The Musical Quarterly* 68, no. 2 (1982): 32–59.
- _____. *The Critical Nexus: Tone-System, Mode, and Notation in Early Medieval Music*. New York: Oxford University Press, 2009.
- Aureliani Reomensis Musica Disciplina*. Edited by Lawrence Gushee. CSM 21 (1975).

- Avenary, Hanoch. "The Northern and Southern Idioms of Early European Music: A New Approach to an Old Problem." *Acta Musicologica* 49, no. 1 (Jan.–June, 1977): 27–49.
- Babb, Warren. *Hucbald, Guido, and John on Music: Three Medieval Treatises*. Edited, with introductions, by Claude V. Palisca. Music Theory Translation Series 3. New Haven: Yale University Press, 1978.
- Bailey, Candace. "Concepts of Key in Seventeenth-Century Keyboard Music." In Judd, *Tonal Structures*, 247–274.
- Bailey, Terence, and Alma Santosuosso, eds. *Music in Medieval Europe: Studies in Honour of Bryan Gillingham*. Burlington, VT: Ashgate, 2007.
- Bailey, Terence. "Modes and Myth." *Studies in Music from the University of Western Ontario* 1 (1976): 43–54.
- _____. *Commemoratio brevis de tonis et psalmis modulandis*. Introduction, Critical Edition, Translation. Ottawa: University of Ottawa Press, 1979.
- _____. *The Intonation Formulas of Western Chant*. Toronto: Pontifical Institute of Mediaeval Studies, 1974.
- Banchieri, Adriano. *Cartella musicale nel canto figurato Fermo, & Contrapunto*. Venice: G. Vicenti, 1614. Facsimile Bologna: Forni, 1968.
- Bartel, Dietrich. *Musica Poetica: Musical-rhetorical figures in German Baroque Music*. University of Nebraska Press, 1997.
- Bede, *Historia Ecclesiastica Gentis Anglorum*. www.thelatinlibrary.com (accessed November 27, 2013).
- Bellermann, Heinrich. *Der Contrapunkt*, 3rd ed. Berlin: Julius Springer, 1887.
- Bent, Margaret. "The Grammar of Early Music: Preconditions for Analysis." In Judd, *Tonal Structures*, 15–59.
- Bergeron, Katherine. *Decadent Enchantments: The Revival of Gregorian Chant at Solesmes*. Berkeley: University of California Press, 1998.
- Bernhard, Michael. "Didaktische Verse zur Musiktheorie des Mittelalters." *International Musicological Society Study Group Cantus Planus: Papers read at the Third Meeting, Tihany, Hungary, 19–24 September 1988*, 227–36. Budapest: Hungarian Academy of Sciences Institute for Musicology, 1990.

- Berry, Mary (Mother Thomas More). "The Performance of Plainsong in the Later Middle Ages and the Sixteenth Century." *Proceedings of the Royal Musical Association* 92 (1965–6): 121–34.
- Bernstein, David W. "Nineteenth-century harmonic theory: the Austro-German legacy." In *The Cambridge History of Western Music Theory*, 778–811.
- Bianchi, Luca. "Continuity and change in the Aristotelian tradition." In *The Cambridge Companion to Renaissance Philosophy* edited by James Hankins, 49–71. Cambridge: Cambridge University Press, 2007.
- von Blumröder, Christoph. "Modulatio/Modulation" in Eggebrecht, *Handwörterbuch*.
- Boethius, Anicius Manlius Severinus. *Fundamentals of Music*. Translated, with Introduction and Notes, by Calvin M. Bower, Edited by Claude V. Palisca. New Haven: Yale University Press, 1989.
- Boetii De institutione musica libri quinque*. Edited by Godofredus Friedlein. Leipzig: B. G. Teubner, 1867.
- Bonaventura da Brescia. *Brevis collectio artis musicae (Venturina)*. Edited by Albert Seay. Critical Texts 11. Colorado Springs: Colorado College Music Press, 1980.
- Bonds, Mark Evan. *Wordless Rhetoric: Musical Form and the Metaphor of the Oration*. Cambridge, MA: Harvard University Press, 1991.
- Bower, Calvin M. Review of Babb, *Hucbald, Guido, and John on Music: Three Medieval Treatises*. *JAMS* 35, no. 1 (Spring 1982): 157–67.
- Bower, Calvin. "Boethius." In *Grove Music Online*.
- _____. "The Grammatical Model of Musical Understanding in the Middle Ages." In *Hermeneutics and Medieval Culture*, edited by Patrick J. Gallagher and Helen Damico, 133–45. Albany, NY: SUNY Press, 1989.
- Bradshaw, Murray C. *The Origin of the Toccata*. Musicological Studies and Documents 28. American Institute of Musicology, 1972.
- Breviarium ad Usum Insignis Ecclesiae Sarum*. Edited by Francis Procter and Christopher Wordsworth. Cambridge, 1882.
- Brockett, C.W., Jr. "Saeculorum Amen and Differentia: Practical versus Theoretical Tradition." *Musica Disciplina* 30 (1976): 13–36.
- Burnham, Scott. "Form." In *The Cambridge History of Western Music Theory*, 880–906.

- Busse Berger, Maria. *Medieval Music and the Art of Memory*. University of California Press, 2006.
- Cahn, Peter. "Repercussio." In Eggebrecht, *Handwörterbuch*.
- Caldwell, John. "Modes and modality: a unifying concept for Western chant?" In Bailey and Santosuosso, *Music in Medieval Europe*, 35–48.
- _____. "Plainsong and Polyphony 1250–1550." In Kelly, *Plainsong in the Age of Polyphony*, 6–31.
- The Cambridge History of Western Music Theory*. Edited by Thomas Christensen. New York: Cambridge University Press, 2002.
- Chailley, Jacques. "Du pentatonisme à l'octoéchus." *Études grégoriennes* XIX (1980): 165–84.
- _____. "Essai analytique sur la formation de l'octoéchus latin." In *Essays presented to Egon Wellesz*, edited by Jack Westrup, 84–93. Oxford: Clarendon Press, 1966.
- _____. "Essai sur la composition des mélodies grégoriennes." In *Scritti in onore di Luigi Ronga*, 91–97. Milan: Riccardo Ricciardi, 1973.
- _____. "Une nouvelle méthode d'approche pour l'analyse modale du chant grégorien." In *Speculum Musicae Artis*, Festgabe für Heinrich Husman, edited by Heinz Becker and Reinhard Gerlach, 85–92. Munich: Wilhelm Fink Verlag, 1970.
- _____. *Alia Musica (Traité de musique du IX^e siècle)*. Édition critique commentée avec un introduction sur l'origine de la nomenclature modale pseudo-grecque ad Moyen-Âge. Paris: Centre de documentation universitaire et Société d'édition d'enseignement supérieur réunis, 1965.
- Chartier, Yves, editor and translator. *L'Œuvre musicale d'Hucbald de Saint-Amand. Les Compositions et le traité de musique*. Cahiers d'études médiévales (Cahier spécial no. 5). Montreal: Éditions Bellarmin, 1995.
- Claire, Jean, translated by Thomas Forrest Kelly. "Modality in western chant: an overview." *Plainsong and Medieval Music* 17, no. 2 (2008): 101–27.
- Claire, Jean. "Les répertoires liturgiques latins avant l'octoéchus, I: L'Office ferial romano-franc." *Études grégoriennes* XV (1975): 5–192.
- Clark, Suzannah. "Schenker's Mysterious Five." *19th-Century Music* 23, no. 1 (Summer, 1999): 84–102.
- Cochlaeus, Johannes. *Tetrachordum Musices*. Nuremburg, 1511.

- Coclicus, Adrian Petit. *Compendium musices descriptum ab Adriano Petit Coclico, discipulo Josquini de Pres*. Nuremberg: Johann Berg, Ulrich Neuber, 1552. Reprint Kassel: Bärenreiter, 1954.
- Coferati, Matteo. *Il Cantore Addottrinato* (Florence, 1691), *Libro Terzo: De' Tuoni del Canto Fermo*. Edited by Luca Ricossa. <http://lrs.club.fr/coferati/cantore.html>, <http://lrs.club.fr/coferati/libro3.pdf>.
- Cohen, David E. "The Imperfect Seeks Its Perfection': Harmonic Progression, Directed Motion, and Aristotelian Physics." *Music Theory Spectrum* 23, no. 2 (2001): 139–69.
- . "Notes, scales, and modes in the earlier Middle Ages." In *The Cambridge History of Western Music Theory*, 307–63.
- A Complete and Practical Method of the Solesmes Plain Chant* From the German of the Rev. P. Suitbertus Birkle, O.S.B. With the authorization of the author Adapted and Edited by A. Lemaistre. New York: Joseph F. Wagner, 1904.
- Deason, William David. "A Taxonomic Paradigm from Boethius' *De divisione* Applied to the Eight Modes of Music." DMA diss., Ohio State University, 1992.
- Denis, Jean. *Traité de l'accord de l'épinette* (Paris, 1650). Reprinted with an Introduction by Alan Curtis. New York: Da Capo Press, 1969.
- Desmond, Karen. "Sicut in grammatica: Analogical Discourse in Chapter 15 of Guido's *Micrologus*." *The Journal of Musicology* XVI, no. 4 (Autumn 1998): 467–93.
- Dobszay, László. "The Debate about the Oral and Written Transmission of Chant." *International Musicological Society Congress Report XV: Madrid 1992* [*Revista de Musicología* 16]: 706–29; reprinted in Kelly, *Oral and Written Transmission*.
- Dod, Bernard G. "Aristoteles latinus." In *The Cambridge History of Later Medieval Philosophy*, edited by Norman Kretzmann, Anthony Kenny, and Jan Pinborg, 45–79. Cambridge: Cambridge University Press, 2008.
- Dowland, John. *Andreas Ornithoparcus His Micrologus, or Introduction: Containing the Art of Singing*. London, 1609.
- Duerkson, Marva. "Schenker's Organicism Revisited." *Intégral* 22 (2008): 1–58.
- Eggebrecht, Hans Heinrich, and Albrecht Riethmüller, eds. *Handwörterbuch der musikalischen Terminologie*. Wiesbaden, Stuttgart: Steiner, 1971–2006.
- Ellsworth, Oliver B. *The Berkeley Manuscript*. Greek and Latin Music Theory, vol. 2. Lincoln: University of Nebraska Press, 1984.

- Erickson, Raymond. *Musica enchiriadis and Scolica enchiriadis*. Edited by Claude V. Palisca. New Haven: Yale University Press, 1995.
- Feld, Steven, and Aaron A. Fox. "Music and Language." *Annual Review of Anthropology* 23 (1994): 25–53.
- Franchini Gafurii Extractus parvus musice*. Edited by F. Alberto Gallo. *Antiquae musicae italicae scriptores*, vol. 4. Bologna: Università degli Studi de Bologna, Istituto di Studi Musicali e Teatrali - Sez. Musicologia, 1969.
- Franconis de Colonia Ars Cantus Mensurabilis*. Edited by Gilbert Reaney and André Gilles. CSM 18 (1974).
- Freedman, Joseph S. "Aristotle and the Content of Philosophy Instruction at Central European Schools and Universities during the Reformation Era (1500–1650)." *Proceedings of the American Philosophical Society* 137, no. 2 (1993), 213–253.
- Fry, Timothy, ed. *Rule of Saint Benedict 1980*. Collegeville, MN: Liturgical Press, 1981.
- Gallo, F. Alberto, and Andreas Bücken. "Petrus de Amalfia [Petrus Capuanus]." In *Grove Music Online*.
- Gevaert, François-Auguste. *La Melopée antique dans le chant de l'église latine*. Ghent, 1895; reprint Osnabrück: Zeller, 1967.
- Glareanus, Henricus. *Dodecachordon: A Facsimile of the 1547 Basel Edition*. Monuments of Music and Music Literature in Facsimile, Second Series – Music Literature LXV. New York: Broude Brothers, 1967.
- Gollin, Edward. "From Tonoï to Modi: A Transformational Perspective." *Music Theory Spectrum* 26, no. 1 (Spring 2004): 119–129.
- Grant, Edward. *God and Reason in the Middle Ages*. Cambridge: Cambridge University Press, 2001.
- Grout, Donald Jay, and Claude V. Palisca. *A History of Western Music*, 5th ed. W.W. Norton & Company, 1990.
- Grove Music Online*. Edited by Deane Root. <http://www.oxfordmusiconline.com> (accessed November 27, 2013).
- Guasti, María Teresa. *Language Acquisition: The Growth of Grammar*. Cambridge, MA: MIT Press, 2004.
- Guidonis Micrologus*. Edited by Joseph Smits van Waesberghe. CSM 4 (1955).

Guilielmi monachi De preceptis artis musicae. Edited by Albert Seay. CSM 11 (1965).

Gümpel, Karl-Werner. *Die Musiktraktate Conrads von Zabern*. Akademie der Wissenschaften und der Literatur, Abhandlungen der Geistes- und Sozialwissenschaftlichen Klasse, Jahrgang 1956, Nr. 4. Wiesbaden: Steiner, 1956.

Haggh, Barbara, and Michel Huglo. "Réôme, Cluny, Dijon." In Bailey and Santosuosso, *Music in Medieval Europe*, 49–64.

Haines, John, and Patricia DeWitt, "Johannes de Grocheio and Aristotelian Natural Philosophy." *Early Music History* 27 (2008): 47–98.

Hansen, Finn Egeland. *The Grammar of Gregorian Tonality: An Investigation Based on the Repertory in Codex H 159, Montpellier*. 2 vols. Copenhagen: Dan Fog Musikforlag, 1979.

Heinrich Glarean: Dodecachordon, translation, transcription and commentary by Clement A. Miller. 2 vols. Musical Studies and Documents 6. N.p.: American Institute of Musicology, 1965.

Hepokoski, James, and Warren Darcy. *Elements of Sonata Theory: Norms, Types, and Deformations in the Late-Eighteenth-Century Sonata*. New York: Oxford University Press, 2006.

Herlinger, Jan W. *The Lucidarium of Marchetto of Padua: A Critical Edition, Translation, and Commentary*. University of Chicago Press, 1985.

von Heusinger, Klaus. "Information Structure and the Partition of Sentence Meaning." In *Function, Form, and Meaning: Bridges and Interfaces*, edited by Eva Hajičová, Petr Sgall, Jiří Hana, and Tomáš Hoskovec, 275–305. Prague Linguistic Circle Papers 4. Amsterdam and Philadelphia: John Benjamins, 2002.

Heyden, Sebaldus. *De arte canendi, ac vero signorum in cantibus usu, libri duo*. Nuremburg: Ioh. Petreium, 1540.

Hiley, David. "Neuma." In *Grove Music Online*.

_____. *Western Plainchant: A Handbook*. New York: Clarendon Press, 1993.

Hindemith, Paul. *Unterweisung im Tonsatz*. Translated by Arthur Mendel as *The Craft of Musical Composition*. 2 vols. New York: Associated Music Publishers, 1942.

Hucke, Helmut. "Toward a New Historical View of Gregorian Chant." *JAMS* 33, no. 3 (Autumn 1980): 437–67.

Hughes Andrew. "Solmization, §I." In *The New Grove Dictionary of Music and Musicians*, edited by Stanley Sadie and James Tyrell. New York, Macmillan, 2001.

Hughes, David G. "Evidence for the Traditional View of the Transmission of Gregorian Chant." *JAMS* 40, no. 3 (Autumn 1987): 377–404; reprinted in Kelly, *Oral and Written Transmission*.

_____. "Guido's Tritus: An Aspect of Chant Style." In *The Study of Medieval Chant: Paths and Bridges, East and West in Honor of Kenneth Levy*, edited by Peter Jeffery, 211–225. Rochester, NY: The Boydell Press, 2002.

_____. "The musical text of the introit *Resurrexi*." In Bailey and Santosuosso, *Music in Medieval Europe*, 163–80.

Huglo, Michel. "L'auteur du traité de Musique dédié à Fulgence d'Affligem," *Revue belge de Musicologie / Belgisch Tijdschrift voor Muziekwetenschap* 31 (1977): 5–19.

_____. "The Diagrams Interpolated into the *Musica Isidori* and the Scale of Old Hispanic Chant." In *Western Plainchant in the First Millennium: Studies in the Medieval Liturgy and its Music*, edited by Sean Gallagher, James Haar, John Nádas, and Timothy Striplin, 243–259. Burlington, VT: Ashgate, 2003.

_____. "Study of Ancient Sources of Music Theory in the Medieval Universities." In *Music Theory and Its Sources: Antiquity and the Middle Ages*, edited by André Barbera, 150–72. Notre Dame, IN: University of Notre Dame Press, 1990.

_____. *Les tonaires: Inventaire, analyse, comparaison*. Publication de la Société française de musicologie, Ser. III, Vol. II. Paris: Heugel, 1971.

_____. Review of Waesberghe et al., *The Theory of Music, From the Carolingian Era up to 1400*, Vol. I (*RISM VIII*), *Revue de Musicologie* 49 (1963): 114–117.

Hüschen, Heinrich, and Joseph Dyer. "Conrad von Zabern." In *Grove Music Online*.

Indiana University Center for the History of Music Theory and Literature, and Andreas Giger, *saggi musical italiani: A Database for Texts on Music Theory and Aesthetics*, http://www.chmtl.indiana.edu/smi/quattrocento/ANOQUS_TEXT.html.

Indiana University *Traité français sur la musique*, PARTRA TEXT, http://www.chmtl.indiana.edu/tfm/17th/PARTRA_TEXT.html (Parran, *Traité*).

Jacobi Leodiensis [Jacques de Liège] *Speculum musicae*, edited by Roger Bragard. CSM 3/VI (1973).

Jeffery, Peter. "The Earliest Oktōēchoi: The Role of Jerusalem and Palestine in the Beginnings of Modal Ordering." In *The Study of Medieval Chant: Paths and Bridges, East and West*,

- in Honor of Kenneth Levy*, edited by Peter Jeffery, 147–209. Rochester, NY: The Boydell Press, 2001.
- _____. “Oktōēchos.” In *Grove Music Online*.
- _____. *Re-envisioning Past Musical Cultures: Ethnomusicology in the Study of Gregorian Chant*. Chicago: The University of Chicago Press, 1992.
- _____. Reply to Treitler’s review of *Re-envisioning Past Musica Cultures*. *JAMS* 49, no. 1 (Spring 1996): 175–79.
- Jeppesen, Knud. *Counterpoint: The Polyphonic Vocal Style of the Sixteenth Century*. Translated by Glen Haydon, with a new foreword by Alfred Mann. New York: Dover, 1992.
- Johannis Affligemensis, De Musica cum Tonario*. Edited by Joseph Smits van Waesberghe. CSM 1 (1950).
- Johannis Tinctoris Opera theoretica*. Edited by Albert Seay. CSM 22 (1975–78).
- Judd, Cristle Collins, ed. *Tonal Structures in Early Music*. Criticism and Analysis of Early Music, vol. 1. New York: Garland Publishing, 1998.
- Judd, Cristle Collins. “Modal Types and ‘Ut, Re, Mi Tonalities’: Tonal Coherence in Sacred Vocal Polyphony from about 1500.” *JAMS* 45, no. 3 (Autumn 1992): 428–67.
- _____. “Renaissance modal theory.” In *The Cambridge History of Western Music Theory*, 364–406.
- Kelly, Thomas Forrest, ed. *Oral and Written Transmission in Chant*. Music in Medieval Europe 2. Burlington, VT: Ashgate, 2009.
- _____, ed. *Plainsong in the Age of Polyphony*. Cambridge studies in performance practice. New York: Cambridge University Press, 1992.
- Keyes, Ralph. *The Quote Verifier: Who Said What, Where, and When*. New York: St. Martin’s Press, 2006.
- Klosterneuburg Stiftsbibliothek 1013. Electronic facsimile: Austrian Academy of Sciences and Austrian National Library, *Mittelalterliche Handschriften in österreichische Bibliotheken* http://www.manuscripta.at/_scripts/php/digi.php?ms_code=AT5000-1013 (accessed November 27, 2012).
- Kruckenbergh, Lori. “Neumatizing the Sequence: Special Performances of Sequences in the Central Middle Ages,” *JAMS* 59, no. 2 (2006): 243–318.

- Lagerlund, Henrik. "Medieval Theories of the Syllogism." In *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/medieval-syllogism/> (accessed November 27, 2013).
- Le Roux, Edna Marie, RSM, "The De harmonica and Tonarius of Regino of Pruem." Ph.D dissertation, Catholic University of America, 1965.
- Lester, Joel. *Between Modes and Keys: German Theory 1592–1802*. Stuyvesant, NY: Pendragon Press, 1992.
- Levy, Kenneth, et al. "Plainchant [plainsong]." In *Grove Music Online*.
- Levy, Kenneth. "Charlemagne's Archetype of Gregorian Chant." *JAMS* 40, no. 1 (Spring 1987): 1–30; reprinted in Levy, *Gregorian Chant and the Carolingians*; also in Kelly, *Oral and Written Transmission*.
- _____. "On Gregorian Orality." *JAMS* 43, no. 2 (Summer 1990): 185–227; reprinted in Kelly, *Oral and Written Transmission*.
- _____. "Toledo, Rome and the Legacy of Gaul." *Early Music History* 4 (1984): 49–99.
- _____. *Gregorian Chant and the Carolingians*. Princeton, NJ: Princeton University Press, 1998.
- Liber usualis*. Tournai: Desclée, multiple editions.
- Lipphardt, Walther. *Der Karolingische Tonar von Metz*. Münster Westfalen: Liturgiewissenschaftliche Quellen und Forschungen 43, 1965.
- LmL (Bayerische Akademie der Wissenschaften online Lexicon musicum Latinum Informationen zur Musiktheorie des Mittelalters). <http://www.lml.badw-muenchen.de/info/index.htm>.
- Lochner, Fabian. "Theogerus of Metz." In *Grove Music Online*.
- Loeb, David. "Dual-Key Movements." In *Schenker Studies*, edited by Hedi Siegel, 76–83. New York: Cambridge University Press, 1990.
- Lohr, Ina. *Solmisation und Kirchentonarten*, 4th ed. Zürich: Hug, 1981.
- London, Justin. "Rhythm in twentieth-century theory." In *The Cambridge History of Western Music Theory*, 695–725.
- Maître, Claire. "La modalité du plain-chant au moyen âge." *Musurgia* 4, no. 3 (1997): 31–42.
- Mann, Alfred. *The Study of Fugue*. New York: Dover, 1987.

- Manuale cantus secundum usum FF. minorum rectorum provinciae comitatus Flandriae s. Joseph...* Candavi: Ex officina Haeredum Joannis Kerchovij, 1682 (Oxford, Bodleian Library, digitized August 30, 2006).
- Marcheti de Padua Pomerium*. Edited by Joseph Vecchi. CSM 6 (1961).
- Marenbon, John. "Anicius Manlius Severinus Boethius." In *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/boethius/#8> (accessed November 27, 2013).
- McAlpine, Fiona. "Beginnings and Endings: Defining the Mode in a Medieval Chant." *Studia Musicologica Academiae Scientiarum Hungaricae* 45, nos. 1–2 (2004): 165–77.
- _____. *Tonal Consciousness and the Medieval West*. Varia Musicologica 10. Berne: Peter Lang, 2008.
- McCarthy, T. J. H. *Music, Scholasticism and Reform: Salian Germany, 1024–1125*. New York: Manchester University Press, 2009.
- McKinnon, James W. "Benedict of Nursia." In *Grove Music Online*.
- _____. "Gregorian Chant." In *Grove Music Online*.
- _____. *The Advent Project: the Later Seventh-Century Creation of the Roman Mass Proper*. Berkeley: University of California Press, 2000.
- McKitterick, Rosamund. Review of *Gregorian Chant and the Carolingians* by Kenneth Levy. *Early Music History* 19 (2000): 279–91.
- Meier, Bernhard. "Bemerkungen zu Lechners 'Motectae Sacrae' von 1575." *Archiv für Musikwissenschaft* 14, no. 2 (1957): 83–101.
- _____. *The Modes of Classical Vocal Polyphony [Die Tonarten der klassischen Vokalpolyphonie, 1974]* translated by Ellen S. Beebe. New York: Broude Brothers, 1988.
- Minio-Paluello, Lorenzo, and B.G. Dod, editors, *Aristoteles latinus I 6–7. Categoriarum supplementa Porphyrii Isagoge, Translatio Boethii, et Anonymi Fragmentum vulgo vocatum "Liber sex principiorum."* Paris-Bruxelles: Desclée, DeBrouwer, 1966. IntraText Digital Library, http://www.intratext.com/IXT/LAT0917/_P5.HTM.
- Mokkapati, Vijayasree. "Modal Action: An Indo-European Perspective in Gregorian Chant." Ph.D diss., Wesleyan University, 1997.
- Monetarius, Stefan. *Epitoma utriusque musicae practicae*. Krakow: Florian Ungler, 1515; facsimile: Jerzy Morawski, editor, *Monumenta Musicae in Polonia: Bibliotheca Antiqua*, Vol. I. Krakow: Insytut Sztuki Polskiej Akademii Nauk, 1975.

- Novack, Saul. "The Analysis of Pre-Baroque Music." In *Aspects of Schenkerian Theory*, edited by David Beach, 113–33. New Haven, Yale University Press, 1983.
- Novello, J. Alfred. "A Concise Explanation of the Gregorian Note, Compiled from Various Authorities [Part 1]." *The Musical Times and Singing-Class Circular* 3, no. 49 (1848): 3–5.
- Ornithoparchus, Andreas. *Musice Active Micrologus liber primus*. Leipzig, 1517.
- Ornithoparchus/Dowland: A Compendium of Musical Practice*, edited by Gustave Reese and Steven Ledbetter. New York: Dover, 1973.
- Owen, Barbara, et al. "Organ." In *Grove Music Online*.
- Owens, Jessie Ann. "Concepts of Pitch in English Music Theory, c. 1560–1640." In Judd, *Tonal Structures*, 183–246.
- Palisca, Claude V. "Johannes Cotto." In *Grove Music Online*.
- Papp, Ágnes. "Eine späte Abschrift der Lehre der Musica plana in einem Gesangbuch aus Ungarn: Musiktheoretische Aufzeichnungen und Tonar." In *Quellen und Studien zur Musiktheorie des Mittelalters*, vol. 3, edited by Michael Bernhard, 498–510. Bayerische Akademie der Wissenschaften, Veröffentlichungen der Musikhistorischen Kommission, Band 15. München: Bayerische Akademie der Wissenschaften; C. H. Beck, 2001.
- Parran, Antoine. *Traité de la musique théorique et pratique, contenant les préceptes de la composition*. Paris: Ballard, 1639. Reprint Geneva: Minkoff, 1972.
- Paul VI. *Sacrosanctum concilium* [Constitution on the Sacred Liturgy, December 12, 1963]. http://www.vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_const_19631204_sacrosanctum-concilium_en.html (accessed November 28, 2013).
- Pesce, Dolores. "A Historical Context for Guido d'Arezzo's Use of *Distinctio*." In Bailey and Santosuosso, *Music in Medieval Europe*, 146–62.
- _____. "Guido d'Arezzo, *Ut queant laxis*, and Musical Understanding." In *Music Education in the Middle Ages and Renaissance*, edited by Russell E. Murray, Jr., Susan Forscher Weiss, and Cynthia J. Cyrus, 25–36. Bloomington and Indianapolis: Indiana University Press, 2010.
- _____. *Guido D'Arezzo's Regule Rithmice, Prologus in Antiphonarium, and Epistola ad Michahelem: A Critical Text and Translation*. Ottawa: The Institute of Mediaeval Music, 1999.
- _____. *The Affinities and Medieval Transposition*. Bloomington and Indianapolis: Indiana University Press, 1987.

Peter of Spain (Petrus Hispanus Portugalensis). *Tractatus called afterwards Summule logicales*. First Critical Edition from the Manuscripts with an Introduction by L. M. De Rijk. Assen, Netherlands: Van Gorcum, 1972.

Petrus de Cruce Ambianensi. *Tractatus de tonis*. Edited by Denis Harbinson. CSM 29 (1976).

Phillips, Nancy. "Music." In *Medieval Latin: An Introduction and Bibliographical Guide*, edited by F.A.C. Mantello and A.G. Rigg, 296–306. Washington, DC: Catholic University Press, 1996, repr. 1999.

PM (Paléographie Musicale) VII. *Antiphonarium tonale missarum, XIe siècle: Codex H. 159 de la Bibliothèque de l'École de Médecine de Montpellier*. Solesmes: 1901.

PM IX *Antiphonaire Monastique (XII^e Siècle) Codex 601 de la Bibliothèque Capitulaire de Lucques*. Berne: Herbert Lang, 1974.

PM XII *Antiphonaire monastique, XIII^e siècle: Codex F. 160 de la Bibliothèque de la Cathédrale de Worcester*. Solesmes, 1922.

PM II/I *Antiphonaire de l'office monastique transcript par Hartker: MSS Saint-Gall 390–391 (980–1011)* Paléographie Musicale Series II, vol. I. Solesmes, 1900.

Ponte, Joseph. *Aurelian of Reóme: The Discipline of Music (Musica Disciplina)*. Colorado College Music Press Translations 3 (Colorado Springs: Colorado College Music Press, 1968).

Porterfield, Richard. "Bedrock: The Modal Underpinnings of Schenker's *Ursatz*." Paper delivered at the 2013 International Schenker Symposium at Mannes College in New York City.

Potiron, Henri. "La définition des modes liturgiques." *Etudes grégoriennes* VIII (1967): 41–46.

_____. "Théoriciens de la modalité." *Etudes grégoriennes* VIII (1967): 29–37.

Powers, Harold S. "From Psalmody to Tonality." In Judd, *Tonal Structures*, 275–340.

_____. "Is Mode Real? Pietro Aron, the octenary system, and polyphony." *Basler Jahrbuch für historische Musikpraxis* 16 (1992): 9–52.

_____. "Language Models and Musical Analysis." *Ethnomusicology* 24, no. 1 (Jan. 1980): 1–60.

_____. "Modal Representation in Polyphonic Offertories." *Early Music History* 2 (1982): 43–86.

- _____. "Mode." In *The New Grove's Dictionary of Music and Musicians*, edited by Stanley Sadie. New York: Macmillan, 1980.
- _____. "Tonal Types and Modal Categories in Renaissance Polyphony." *JAMS* 34, no. 3 (Autumn 1981): 428–70.
- Powers, Harold S., et al. "Mode." In *Grove Music Online*.
- Quaestiones et solutiones [advidendum tam mensurabilis cantus quam immensurabilis musica]*. Edited by Albert Seay. Critical Texts, no. 2. Colorado College Music Press, 1977.
- Rameau, Jean-Philippe. *Treatise on Harmony*. Translated, with an Introduction and Notes, by Philip Gossett. New York: Dover, 1971.
- Reckow, Fritz. "Clavis." In Eggebrecht, *Handwörterbuch*.
- Regulae Rhythmicæ*. Edited by Joseph Smits van Waesberghe and Eduard Vetter. Divitiae musicae artis, A/IV. Buren: Knuf, 1985.
- Riemann, Hugo. "Anonymi Introductorium musicae (c. 1500)." *Monatshefte für Musikgeschichte* 29 (1897): 149–54, 157–64; 30 (1898): 1–8, 11–19.
- _____. *Musik-lexicon*, 3rd ed. Leipzig: Max Hesse, 1887.
- Rothfarb, Lee. "Energetics." In *The Cambridge History of Western Music Theory*, 927–55.
- Rubin, Miri. *Corpus Christi: The Eucharist in Late-Medieval Culture*. Cambridge University Press, 1991.
- Russell, Tilden A. "A Poetic Key to a Pre-Guidonian Palm and the *Echemata*." *JAMS* 34, no. 1 (Spring 1981): 109–118.
- Sachs, Curt. *The Wellsprings of Music*. New York: McGraw-Hill, 1965.
- Salzer, Felix. "The Historical Development of Tonal Coherence." In *Structural Hearing: Tonal Coherence in Music*, 264–81. New York: Dover, 1982.
- _____. "Tonality in Early Medieval Polyphony: Towards a History of Tonality." *The Music Forum* I, 35–98. New York: Columbia University Press, 1967.
- Sanders, Ernest H., and Peter M. Lefferts. "*Petrus de Cruce*." In *Grove Music Online*.
- Schenker, Heinrich. "Fortsetzung der Urlinie-Betrachtungen," translated by John Rothgeb as "Further Considerations of the Urlinie: I." In *Das Meisterwerk in der Musik I*, translated by Ian Bent and others, and edited by William Drabkin, as *The Masterwork in Music: A Yearbook, Volume I* (1925). New York: Cambridge University Press, 1994.

- _____. *Das Meisterwerk in der Musik* I and II. Munich: Drei Masken Verlag, 1925 and 1926, respectively.
- _____. *Der freie Satz* [1935] Translated and edited by Ernst Oster as *Free Composition*. New York: Longman, 1979.
- _____. *Harmonielehre* [1906], edited and annotated by Oswald Jonas, translated by Elisabeth Mann Borgese as *Harmony*. Chicago: University of Chicago Press, 1954.
- _____. *Kontrapunkt* [two volumes, 1910 and 1922], translated by John Rothgeb and Jürgen Thym as *Counterpoint*. New York: Schirmer Books, 1987.
- Schmalfeldt, Janet. "Towards a Reconciliation of Schenkerian Concepts with Traditional and Recent Theories of Form." *Music Analysis* 10, no. 3 (Oct., 1991): 233–87.
- Schmid, Hans, ed. *Musica et scolica enchiridis una cum aliquibus tractatulis adiunctis*. Munich: Verlag der Bayerischen Akademie der Wissenschaften, 1981.
- Schneider, Marius. *Geschichte der Mehrstimmigkeit: Historische und phänomenologische Studien*. Berlin: Gebrüder Bornträger, 1934; reprint ed., Tutzing: Hans Schneider, 1969.
- Schulenberg, David. "Modes, Prolongations, and Analysis." *The Journal of Musicology* 4, no. 3 (Summer, 1985–Summer, 1986): 303–29.
- Scriptores ecclesiastici de musica sacra potissimum, 3 vols. Edited by Martin Gerbert. St. Blaise: 1784; reprint edition. Hildesheim: Olms, 1963.
- Seay, Albert. "An Anonymous Treatise from St. Martial." *Annales musicologiques* 5 (1957), 13–42.
- Selinker, Larry, Mary Todd-Trimble, and Louis Trimble, "Rhetorical Function-Shifts in EST Discourse." *TESOL Quarterly* 12, no. 3 (Sep., 1978): 311–20.
- Sherr, Richard. "The Performance of Chant in the Renaissance and its Interaction with Polyphony." In Kelly, *Plainsong in the Age of Polyphony*, 178–208.
- Smith, F. Joseph. "Jacques de Liege: the Modes as Musical Patterns." *Revue belge de Musicologie/Belgisch Tijdschrift voor Muziekwetenschap* 34 (1980–81): 22–43.
- Smith, Robin. "Logic." In *The Cambridge Companion to Aristotle*, edited by Jonathan Barnes, 27–65. Cambridge: Cambridge University Press, 1995.
- Smits van Waesberghe, Joseph. *Muzikerziehung: Lehre und Theorie der Musik im Mittelalter. Musikgeschichte in Bildern, III/3*. Leipzig: VEB Deutscher Verlag für Musik, 1969.

- Sobrinho, Ramón, and Maria Encina Cortizo. "Relationships between Verbal Intonation and Gregorian Melody in the First Mode Introiti." In *Secondo Convegno Europeo di Analisi Musicale*, edited by Rossana Dalmonte and Mario Baroni, 189–201. Studi e Testi 1. Trent: Università degli Studi di Trento, 1992.
- St. Gallen, Stiftsbibliothek, Cod. Sang. 390–91. www.e-codices.unifr.ch (accessed November 27, 2013).
- Stahl, William Harris, and Richard Johnson. *Martianus Capella and the Seven Liberal Arts*, vol. I. New York: Columbia University Press, 1971.
- Straus, Joseph N. *Introduction to Post-Tonal Theory*, 3rd ed. Englewood Cliffs, NJ: Prentice-Hall, 2005.
- Strunk's Source Readings in Music History, Revised Edition*. Leo Treitler, general editor. New York: Norton & Company, 1998.
- Sullivan, Blair. *The Classical Analogy between Speech and Music and Its Transmission in Carolingian Music Theory*. Tempe, AZ: Arizona Center for Medieval and Renaissance Studies, 2011.
- TML AGRRUD 17GF http://www.chmtl.indiana.edu/tml/16th/AGRRUD_17GF.gif (Agricola, *Rudimenta graphics*).
- TML ALCMUS TEXT. http://www.chmtl.indiana.edu/tml/6th-8th/ALCMUS_TEXT.html (*De octo tonis*, GS I:26–27).
- TML ANO11TRA TEXT http://www.chmtl.indiana.edu/tml/15th/ANO11TRA_TEXT.html (Anonymous XI, *Tractatus de musica plana et mensurabili*, CS 3:416–75).
- TML ANOLAF TEXT http://www.chmtl.indiana.edu/tml/12th/ANOLAF_TEXT.html (Seay's Anonymous St.-Martial).
- TML ANOOTT TEXT http://www.chmtl.indiana.edu/tml/14th/ANOOTT_MLBLL763.html (Lansdowne anonymous metered treatise).
- TML ANOQS TEXT http://www.chmtl.indiana.edu/tml/15th/ANOQS_TEXT.html (*Questiones et solutiones*).
- TML ANOTOT 32GF http://www.chmtl.indiana.edu/tml/15th/ANOTOT_32GF.gif (Salzburg *Tractatus de octo tonis* graphic summary).
- TML ANOTOT MSAVI44 http://www.chmtl.indiana.edu/tml/15th/ANOTOT_MSAVI44.html (Salzburg *Tractatus*).

TML BOEMUS5 TEXT http://www.chmtl.indiana.edu/tml/6th-8th/BOEMUS5_TEXT.html
(Boethius, *Musica* Book 5).

TML CARTRA TEXT http://www.chmtl.indiana.edu/tml/15th/CARTRA_TEXT.html
(Anonymous Carthusian Monk).

TML COCCOM TEXT http://www.chmtl.indiana.edu/tml/16th/COCCOM_TEXT.html
(Coclicus, *Compendium*).

TML COCTET3 TEXT http://www.chmtl.indiana.edu/tml/16th/COCTET3_TEXT.html
(Cochlaeus, *Tetrachordum musices* Book 3).

TML CONNOV TEXT http://www.chmtl.indiana.edu/tml/15th/CONNOV_TEXT.html (Conrad
von Zabern, *Tractatus*).

TML CZEDMP TEXT http://www.chmtl.indiana.edu/tml/17th/CZEDMP_TEXT.html (Czerey,
De musica plana).

TML FINPRA TEXT http://www.chmtl.indiana.edu/tml/16th/FINPRA_TEXT.html (Finck,
Practica musica).

TML FRAACM TEXT. http://www.chmtl.indiana.edu/tml/13th/FRAACM_TEXT.html (Franco,
Ars Cantus Mensurabilis).

TML GAFEXT TEXT http://www.chmtl.indiana.edu/tml/15th/GAFEXT_TEXT.html (Gafurius,
Extractus).

TML GLADOD1 TEXT http://www.chmtl.indiana.edu/tml/16th/GLADOD1_TEXT.html
(Glarean, *Dodecachordon* Book 1).

TML GLADOD2 TEXT http://www.chmtl.indiana.edu/tml/16th/GLADOD2_TEXT.html
(Glarean, *Dodecachordon* Book 2).

TML HEYDAC2 TEXT http://www.chmtl.indiana.edu/tml/16th/HEYDAC2_TEXT.html
(Hayden, *De arte canendi* Book 2).

TML HUCHAR TEXT http://www.chmtl.indiana.edu/tml/9th-11th/HUCHAR_TEXT.html
(Hucbald, *Musica*, GS I: 103–25).

TML JACSP6B TEXT http://www.chmtl.indiana.edu/tml/14th/JACSP6B_TEXT.html (Jacobus,
Speculum Book 6).

TML JOHMUS TEXT http://www.chmtl.indiana.edu/tml/9th-11th/JOHMUS_TEXT.html
(*Johannis Cottonis musica*, GS 2:230–65).

TML NICCOM TEXT http://www.chmtl.indiana.edu/tml/15th/NICCOM_TEXT.html (Petrus de Amalfia, *Compendium*).

TML ODODIA TEXT www.chmtl.indiana.edu/tml/9th-11th/ODODIA_TEXT.html (*Dialogus de musica*, GS I:251–64).

TML ORNMUS1 TEXT http://www.chmtl.indiana.edu/tml/16th/ORMUS1_TEXT.html (Ornithiparchus, *Musice Active*).

TML PETTRAC TEXT http://www.chmtl.indiana.edu/tml/13th/PETTRAC_TEXT.html. (Petrus de Cruce, *Tractatus*).

TML SPANQUA TEXT http://www.chmtl.indiana.edu/tml/16th/SPANQUA_TEXT.html (Spangenberg, *Quaestiones*).

TML THEMUS TEXT http://www.chmtl.indiana.edu/tml/9th-11th/THEMUS_TEXT.html (Theogerus, GS II:183–96).

TML TINLDN TEXT http://www.chmtl.indiana.edu/tml/15th/TINLDN_TEXT.html (Tinctoris, *Liber de natura et proprietate tonorum*, edited by Seay).

TML TINNAT TEXT http://www.chmtl.indiana.edu/tml/15th/TINNAT_TEXT.html (Tinctoris, *Liber de natura et proprietate tonorum*, CS 4:16–41).

TML UGDEC1A TEXT http://www.chmtl.indiana.edu/tml/15th/UGODEC1A_TEXT.html (Ugolino, *Declaratio* Book 1).

TML UGODEC3B TEXT http://www.chmtl.indiana.edu/tml/15th/UGODEC3B_TEXT.html (Ugolino, *Declaratio* Book 3).

TML WOLENC3 TEXT http://www.chmtl.indiana.edu/tml/16th/WOLENC3_TEXT.html (Wollick, *Enchiridion*).

Treitler, Leo. “‘To Worship that Celestial Sound’[:] Motives for Analysis.” *The Journal of Musicology* 1, no. 2 (April 1982): 153–170; reprinted in Treitler, *Music and the Historical Imagination*.

Treitler, Leo. “Music Analysis in an Historical Context,” *College Music Symposium* 6 (1966): 75–88; reprinted in Treitler, *Music and the Historical Imagination*.

Treitler, Leo. “Sinners and Singers: A Morality Tale” (review of *Re-envisioning Past Musical Cultures: Ethnomusicology in the Study of Gregorian Chant* by Peter Jeffery), *JAMS* 47, no. 1 (Spring 1994): 137–71.

Treitler, Leo. “The ‘Unwritten’ and ‘Written Transmission’ of Medieval Chant and the Start-Up of Musical Notation.” *The Journal of Musicology* 10, no. 2 (Spring 1992): 131–91.

- Treitler, Leo. "The Early History of Music Writing in the West," *JAMS* 35 no. 2 (Summer 1982): 237–79; reprinted in Kelly, *Oral and Written Transmission*.
- Treitler, Leo. *Music and the Historical Imagination*. Cambridge, MA: Harvard University Press, 1989.
- Turco, Alberto. "Melodie-tipo e timbri modali nell'Antiphonale romanum," *Studio gregoriani* 3 (1987): 191–241.
- Ugolini Urbevetanis Declaratio musicae disciplinae*. Edited by Albert Seay. CSM 7/1–2, (1959–60).
- University of East Anglia Project CURSUS, An Online Resource of Medieval Liturgical Texts, <http://www.cursus.uea.ac.uk/ed/c3794> (accessed March 8, 2010).
- Vollaerts, J. W. A. *Rhythmic Proportions in Early Medieval Ecclesiastical Chant*. Leiden: E. J. Brill, 1958, repr. 1960.
- Wiering, Frans. "Internal and External Views of the Modes." In Judd, *Tonal Structures*, 87–107.
- _____. *The Language of the Modes: Studies in the History of Polyphonic Modality*. New York: Routledge, 2001.
- Willi Apel. *Gregorian Chant*. Bloomington: Indiana University, 1958.
- Witkowska-Zaremba, Elżbieta. "Sebastian z Felsztyna." In *Grove Music Online*.
- Wollick, Nicholas. *Enchiridion Musices*. Paris: 1512. Reprint Geneva: Minkoff, 1972.
- Yudkin, Jeremy. "Notre Dame Theory: A Study of Terminology, Including a New Translation of the Music Treatise of Anonymous IV." PhD diss., Stanford University, 1984.
- Zarlino, Gioseffo. *Le Institutioni Harmoniche* (Venice, 1558), Part IV translated by Vered Cohen as *On the Modes*, edited with an introduction by Claude V. Palisca. Music Theory Translation Series 7. New Haven: Yale University Press, 1983.
- Zuckerkandl, Victor. *Sound and Symbol: Music and the External World*. Translated by Willard R. Trask. Bollingen Series XLIV. New York: Pantheon Books, 1956.
- _____. *The Sense of Music*. Princeton, NJ: Princeton University Press, 1959.