Representations of Time in Late-Medieval Music

Philippa Ovenden
Yale University Graduate School of Arts and Sciences, pippaov@gmail.com

Follow this and additional works at: https://elischolar.library.yale.edu/gsas_dissertations

Recommended Citation
Ovenden, Philippa, "Representations of Time in Late-Medieval Music" (2021). Yale Graduate School of Arts and Sciences Dissertations. 102.
https://elischolar.library.yale.edu/gsas_dissertations/102

This Dissertation is brought to you for free and open access by EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Yale Graduate School of Arts and Sciences Dissertations by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.
Abstract

Representations of Time in Late-Medieval Music

Philippa Ovenden

2021

The late-medieval style that is characterized by complexity of rhythm, notation, and pitch is commonly referred to as the *ars subtilior*, the “more subtle art,” a term coined by Ursula Günther in 1963. Along with its stylistic attributes, the scope of this repertory has been defined chronologically and geographically, associated with Southern France and Northern Italy during the period c. 1380–1420. In recent years, scholars such as David Catalunya, David Fallows, Karl Kügle, Jason Stoessel, Anne Stone, and Anna Zayaruznaya have argued that the so-called *ars subtilior* should be expanded to incorporate a wider chronological and geographical purview. Responding to this work, this dissertation offers a solution to the problems associated with the *ars subtilior* by presenting a “conceptual genealogy” (Dutilh Novaes) of complex notations. Eschewing the chronological and geographical boundaries that are typically ascribed to *ars subtilior* repertory, as well as the term itself, this dissertation interrogates the ideas that underscore late-medieval notationally complex repertory. In doing so, it argues that a consideration of the constituent ideas of music-theoretical and practical representations of time in notation can provide glimpses into the mental habits of past people. These habits can reveal that notational systems that appear complex or unintelligible to a modern eye may have posed few challenges to a medieval reader.

Chapter 1 provides historical background to the late-medieval notations discussed throughout the dissertation. Problematizing the idea that there was a strict dichotomy between “atomist” and “divisibilist” theorizations of continua of musical time in early–mid fourteenth-century theory, it suggests that the plurality of ways of theorizing continua of
musical time in this period provided a conceptual background to the notationally and rhythmically intricate repertory that would be written down in the decades to come. Chapters 2 and 3 provide the first in-depth consideration of the work of the Italian theorist Johannes Vetulus de Anagnia, author of *Liber de musica*, whose treatise is translated into English in an appendix to the dissertation. Providing a new interpretation of Vetulus’s hierarchies of musical time, Chapter 2 illustrates that Vetulus synthesizes and exhausts a number of fourteenth-century music-theoretical systems. It argues that he provides a primarily speculative theory of music that nevertheless contends with some of the problems of the representation of musical time that would be explored in practice using complex notations. Chapter 3 expands on this work by discussing the theological and philosophical grounding of Vetulus’s theory. Revealing his mystical project to use music to describe a world in which all parts of reality were interconnected, it provides evidence for hitherto unknown connections between Vetulus’s work and that of Augustine of Hippo, Pseudo-Dionysius the Areopagite, and Ramon Llull. The final two chapters provide analyses of complex repertory. Chapter 4 argues that reading complex notations entails a distinct pattern of looking that prioritizes the observation of longer spans of notation. When such a reading habit is put into practice, some notations that appear inscrutable to a modern analyst arguably facilitate ease of reading. Detailing a new, emic understanding of mensuration, Chapter 5 provides evidence that medieval notations were at times chosen that could instruct musicians to count temporal units that were thought, but not uttered aloud. Through this, it argues that some late-medieval notationally complex repertory that has historically been described as “music for the eyes” may also productively be considered “music for the mind.”
Representations Of Time In Late-Medieval Music

A Dissertation

Presented to the Faculty of the Graduate School

Of

Yale University

In Candidacy for the Degree of

Doctor of Philosophy

By

Philippa Ovenden

Dissertation Director: Anna Zayaruznaya

June 2021
In memory

of

Julia Beynon
Contents

Acknowledgements

Abbreviations, Sigla

A Note on Translations and Examples

Indices of Tables and Figures

Introduction

Chapter 1: Units of Musical Time
  Breve Units
  Multiple Units
  Porphyrian Tree Diagrams
  Time in Aggregate
  Tewkesbury’s Trees
  Torkesey’s Triangle
  Conclusion

Chapter 2: Johannes Vetulus de Anagnia’s Hierarchies of Musical Time
  Vetulus’s Divisions and “Extensions” of Musical Time
  The “Proper” Divisions of Breves and Semibreves
  The “Improper” Divisions of Breves and Semibreves
  Trees of the tempora
  Troublesome Trees
  Vetulus Compared with his Contemporaries
  Expanded gradus systems
  Tempo
  Liber de musica and a Vitriacan Ars nova Witness
  Conclusion

Chapter 3: A Celestial Hierarchy of Music
  Vetulus’s Atomism
  Time as a Span
  Nine Choirs of Angels
  Llullian Trees
  Conclusion

Chapter 4: Reading Seemingly Complex Notations
  The Notational System of the Tractatus figurarum
  Traynour
  Guido’s Or voit tout en aventure
  Syncopation
  Syncopation and Coloration
  Antonio Zacara da Teramo’s Sumite karissimi
  Syncopation as a Mediating Group
  Jacob de Senleches’s En attendant esperance
Acknowledgements

Completing this dissertation has led me to engage with many exceptional people, and I am grateful to all who have generously shared their ideas, wisdom, and time throughout this process. It has been a joy to learn from my friends, colleagues, and mentors on both sides of the Atlantic over the past years, without whom this project would not have been possible.

To begin, I thank my advisor Anna Zayaruznaya for her support and encouragement. Anna’s guidance has helped me to communicate my thoughts more effectively in writing, and her feedback has made this project more accurate and comprehensible. I am thankful to her for motivating me to consider the broader implications of my research, and for encouraging me to learn Latin and to sing from medieval notations—skills that have transformed the way I think about music. Throughout the research phase, I had the good fortune of working closely with Rick Cohn. I am grateful to him for his careful and detailed comments, for challenging me to justify my views, and for the many enjoyable conversations about musical time that have improved this dissertation in countless ways. At the conclusion of the dissertation phase I benefited from receiving feedback from Anne Stone. I am thankful to her for her thoughtful comments and corrections, which helped me to see my work in a new light.

Participating in the Yale Medieval Song Lab (MSL) has played a formative role in my thinking on music, and I am indebted to all who have participated in this group. In addition to Anna, who founded the MSL, I thank Ardis Butterfield for recommending materials relating to medieval views on time, and for helping me to consider the bigger picture. Singing the St Nicholas Vigil at 2am will always remain a cherished memory, and I am thankful to Henry Parkes for all his advice. I also thank Nathan Martin for inspiring my interest in Arab music theory, and Jane Alden whose support and encouragement are always appreciated.
Exchanging ideas and feedback with my fellow early music specialists and friends has been an enriching experience. I am grateful to Henry Burnam for his work with the MSL, and for discussing his thoughts on meter and mensuration. Bri Dolce generously shared her work with me; I thank her for this, for the many informative discussions about medieval music, and for welcoming me generously into her home multiple times. To Liam Hynes-Tawa (理安無さん) I am grateful for patiently answering my questions about music theory, for practicing speaking in Latin, and for helping to proofread the translation of Vetulus’s *Liber de musica*. I thank Cat Slowik for the many interesting discussions that helped me to think through the ideas of the dissertation, and for her organization of worthwhile musical events. I am grateful to Will Watson for his constructive criticism on several parts of the dissertation, for helping me to learn to read medieval notations, and for answering my many questions. I also thank Theo Breen, Emily Korzeniewski, Áine Palmer, Pau Rius Valor, and Hallie Voulgaris for their valued feedback.

One of the most exciting aspects of research is learning about how others think about music. I am grateful to Margaret Bent for sharing her research on the notation of the Old Hall Manuscript ahead of publication and for opening the All Souls Seminars to all during the pandemic. For his comments on the utility of the term *ars subtilior* and for making his Ciconia font freely available, I am grateful to Michael Scott Cuthbert. I am thankful to Karen Desmond for sharing her work on fourteenth-century music theory, and for her research on des Murs and Jacobus, which inspired my interest in late-medieval scholasticism. Barbara Haggh-Huglo kindly shared the work of her late husband Michel Huglo; I am grateful to her for this and for drawing my attention to some very interesting Iberian lambda diagrams. I also thank Jason Stoessel for sending me his research materials and encouraging me to learn Latin.

Each chapter of the dissertation has benefitted from several rounds of feedback. I am thankful to Joe Mason, whose invaluable comments helped to improve Chapters 1 and 4. The
participants of the Yale Dissertation Colloquium read early drafts of Chapters 2 and 4. For their constructive criticisms and stimulating conversations throughout the degree I am grateful to Knar Abrahamyan, Stefanie Acevedo, Henry Balme, Clifton Boyd, Laura Brown, Andrew Chung, Holly Chung, Jade Conlee, Dan Cox, Nick Curry, Angharad Davis, Ginger Dellenbaugh, Josh Gailey, Marissa Glynias Moore, Tatiana Koike, Alexandra Krawetz, Matt Mendez, Brian Miller, John Klaess, Marco Ladd, Mark Rogers, Malcolm Sailor, Peter Selinsky, Zac Stewart, Amy Tai, and Miklós Veszprémi. I am grateful to Bronwen Garand-Sheridan for introducing me to her uncle Father Garand, with whom I was able to witness the Divine Office in person. I thank in particular my cohort, Michael Bruschi, Lin Georgis, Ethan Edl, Aaron Jackson, and Cat for their camaraderie and friendship. I also thank Christy Thomas Adams, who mentored me early in the program.

Presenting work at conferences and workshops led to many fruitful discussions that helped me to think through the ideas of the dissertation. I thank all the participants of the “Performing” panel at the 2020 Medieval and Renaissance Music Conference, the “Practicing Theory in the Fourteenth Century” panel at the 2020 American Musicological Society Annual Conference, and the participants of “Current Research in Fourteenth-Century Music” at the Università di Pavia in 2021. I benefitted from exchanging views on late-medieval notations with Uri Smilansky over a long Skype call, and I am grateful to him for his constructive criticisms that helped to refine materials that later became Chapter 4. I thank Susan Weiss and Adam Knight Gilbert for their observations which helped to improve Chapter 3; Emily Thornberry and Kristen Herdman for their questions on a presentation that grew out of Chapter 3; and the faculty and students of the Yale Medieval Studies Department for broadening my knowledge of the Middle Ages. I also thank Giulia Accornero for discussing her views on the medieval computus and algorism traditions.
In the summer of 2018 I was fortunate to receive financial assistance from the Mellon Foundation to participate in a writing workshop; I thank Jill Richards and Doug Rogers for their mentorship at this time. I am grateful to the members of my peer group, George Bayuga, Carole Delaitre, Emilie Egger, and Arthur Wang for their helpful comments on materials that became Chapter 1, and the participants of this workshop for their feedback. I am also thankful for financial assistance from the Samuel K. Bushnell Fellowship and the Langdon Laws Ricketts Fellowship.

Early in the degree, I benefited from comprehensive exams and coursework. Ian Quinn led the Dissertation Colloquium during the writing phase. I am thankful to him for his caring leadership during the pandemic, and for helping me to think more deeply about the conceptual principles of music notations. I am grateful to Gundula Kreuzer for all her efforts and assistance during coursework, comprehensive exams, and beyond, and Patrick McCreless for his patient guidance during the early years of the PhD. I thank Gary Tomlinson for his historiography seminar and helpful feedback on my prospectus; Bob Wason, whose seminar helped to establish my interest in the history of music theory; and David Charles for his engaging hylomorphism seminar. Learning Latin has opened up a world of medieval texts, and I am grateful to my Latin teachers John Dillon, Daniel Hadas, and the teachers and students of the Accademia Vivarium Novum for helping me to read and speak in Latin, as well as the Archaia Foundation for their financial support. I am thankful to Jess Peritz for her advice on abstracts, as well as Rebekah Ahrendt, John Graham, Daniel Harrison, Brian Kane, and Michael Veal for all their feedback during coursework. I also thank Emma Dillon, who nurtured my interest in medieval music with great patience and kindness while I was applying to Yale.

Teaching has played a central role in shaping my thinking on music, and I am grateful to all of my students for their thoughts and ideas. I thank James Hepokoski for his formative
Sonata Theory seminar and lectures on the history of Western music, and Grant Herreid for his inspiring teaching in the Yale Collegium and Baroque Opera Project. I also thank Richard Lalli for his advice early in the program, and Michael Rigsby for co-organizing a lecture recital on the music of the Codex Faenza.

The staff in the Yale University Library went out of their ways on numerous occasions to make my life easier. For all their patient assistance I am thankful to Richard Boursy, Zachary Haas, Emily DiLeo, Jane Meditz, Suzanne Lovejoy, Kathy Mansi, and Karl Schrom. I have also been fortunate to have been rescued from organizational disaster by the Yale Music Department staff on numerous occasions. I thank Kristine Kinsella in particular for all her help throughout the PhD and especially with the MSL, as well as Jennifer Gambaccini-Denillo, Bethany Hayes, and Sue Penny. I also thank Elaine Culmo for keeping us all safe during the pandemic.

One of the greatest pleasures of the degree has been benefitting from a lively intellectual environment in my home, and I thank Saurabh Pal and Cedric van Dijk for the conversations about philosophy in the kitchen. For their friendship I thank Elena Abad, Sara Cubarsi, Cecile Kuttler, Naomi Fujikawa, Alex McGery, Alex Paxton, Maria Ryan, and Ben Swartz.

My sister, Charlotte, was completing her own degree as I was mine, and I thank her for teaching me about real time atoms and discussing the habits of mind of modern science. I am also grateful to my parents Liz and Jeremy for all their sacrifices and encouragement. To Honglei and Lily I am thankful for all their assistance during the pandemic. I am particularly grateful to He, whose deep knowledge of medieval philosophy, theology, and Latin has made for many debates that have enriched this dissertation in countless ways. Lastly, I thank my late aunt Julia, who gave me a warm home near London and whose generosity made it possible for me to study music.
Abbreviations


18. Gordon K. Greene, ed. *French Secular Music*

Sigla

<table>
<thead>
<tr>
<th>Sigla</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE744</td>
<td>Berkeley, University of California Library, MS 744</td>
</tr>
<tr>
<td>BrII785</td>
<td>Brussels, Bibliothèque Royal Albert Premier, II 785</td>
</tr>
<tr>
<td>BuA47</td>
<td>Bologna, Civico Museo Bibliografico Musicale, A 47</td>
</tr>
<tr>
<td>Ch564</td>
<td>Chantilly, Musée Condé, MS 564</td>
</tr>
<tr>
<td>Cn54.1</td>
<td>Chicago, Newberry Library MS 54.1</td>
</tr>
<tr>
<td>CrD39</td>
<td>Catania, Biblioteca Riunite Civica e A. Ursino Recupero, D 39</td>
</tr>
<tr>
<td>Fl87</td>
<td>Florence, Biblioteca Medicea-Laurenziana, MS Mediceo Palatino 87</td>
</tr>
<tr>
<td>Fn70</td>
<td>Florence, Biblioteca nazionale centrale, MSS Magl. III, 70</td>
</tr>
<tr>
<td>FsI2211</td>
<td>Florence, Archivio del Capitolo di San Lorenzo, MS. 2211</td>
</tr>
<tr>
<td>FZc117</td>
<td>Faenza, Biblioteca comunale, MS 117</td>
</tr>
<tr>
<td>K92</td>
<td>Karlsruhe, Badische Landesbibliothek, Cod. St. Peter perg 92</td>
</tr>
<tr>
<td>Lbl28550</td>
<td>London, British Library, Add. MS 28550</td>
</tr>
<tr>
<td>Lbl57950</td>
<td>London, British Library, MS 57950</td>
</tr>
<tr>
<td>Mn1361</td>
<td>Madrid, Biblioteca Nacional de España, M1361</td>
</tr>
<tr>
<td>MOe5.24</td>
<td>Modena, Biblioteca Estense, α.M.5.24</td>
</tr>
<tr>
<td>Oh213</td>
<td>Oxford, Bodleian, MS. Canon. Misc. 213</td>
</tr>
<tr>
<td>Pn568</td>
<td>Paris, Bibliothèque nationale de France, Département des Manuscrits, Italien 568</td>
</tr>
<tr>
<td>Pn146</td>
<td>Paris, Bibliothèque nationale de France, Département des Manuscrits, fonds français 146</td>
</tr>
<tr>
<td>Pn6771</td>
<td>Paris, Bibliothèque nationale de France, Département des Manuscrits, n.a.f. 6771</td>
</tr>
<tr>
<td>Pn7372</td>
<td>Paris, Bibliothèque nationale de France, MS. lat. 7372</td>
</tr>
<tr>
<td>Pn7378A</td>
<td>Paris, Bibliothèque nationale de France, MS. lat. 7378A</td>
</tr>
<tr>
<td>Pu606</td>
<td>Pisa, Biblioteca Universitaria, MS 606</td>
</tr>
<tr>
<td>ScV5.2.25</td>
<td>Sevilla, Catedral Metropolitana, Biblioteca Capitular y Colombina, 5.2.25</td>
</tr>
<tr>
<td>SDVm42</td>
<td>Saint-Dié-des-Vosges, Bibliothèque Municipale, MS 42</td>
</tr>
<tr>
<td>Sm222C22</td>
<td>Strasbourg, Bibliothèque Municipale, 222 C. 22</td>
</tr>
<tr>
<td>TnJ.II.9</td>
<td>Turin, Biblioteca Nazionale Universitaria, MS J.II.9</td>
</tr>
<tr>
<td>Vat215</td>
<td>Rome, Biblioteca Apostolica Vaticana, Rossiano 215</td>
</tr>
<tr>
<td>Vat307</td>
<td>Rome, Biblioteca Apostolica Vaticana, Barberini lat. 307</td>
</tr>
<tr>
<td>Vat5322</td>
<td>Rome, Biblioteca Apostolica Vaticana, Barberini lat. 5322</td>
</tr>
<tr>
<td>Vnm200</td>
<td>Venice, Biblioteca nazionale Marciana, Lat. VI, 200 (=2757)</td>
</tr>
</tbody>
</table>
A Note on Translations and Examples

Unless otherwise stated, all of the translations and examples have been made for this dissertation. Transcriptions into score and modern notation are intended for guidance through the analytical examples only and are not intended to represent ideal translations of the songs discussed in this study. Every reasonable effort has been made to secure permissions to utilize images and text in this dissertation, and where these have been granted, they are noted in the footnotes.
Index of Tables

Chapter 1

Table 1: Des Murs’s *gradus* system................................................................. 41
Table 2: Transcription of table from Boethius’s *De institutione arithmetica* ........ 54

Chapter 2

Table 1: Vetulus’s largae and longae............................................................ 76
Table 2: Marchettan names compared to Vetulan names.............................. 84
Table 3: “Proper” divisions and extensions of breves and semibreves............ 91
Table 4: “Improper” divisions and extensions of breves and semibreves......... 102
Table 5: Des Murs’s *gradus* system in tabular form.................................. 122
Table 6: Mensural system of the *Rubrice brevis* compared with Vetulus’s ...... 124
Table 7: Vetulus’s music examples compared with those of Vat307 copy of a Vitriacan *Ars nova* witness......................................................... 133

Chapter 4

Table 1: Composite noteshapes in the *Tractatus figurarum* ....................... 198

Chapter 5

Table 1: Common dispositions of rests in each mensuration......................... 248

Index of Figures

Chapter 1

Figure 1: *Extract of De soto ‘l verde vidi I ochi vaghi* notated using the *quaternaria* division .... 34
Figure 2: The *via naturae* organization of semibreves according to Marchetto’s divisions. 35
Figure 3: Transcription of an extract of *De soto* showing the duration of notes in the shortest semibreves ................................................................. 36
Figure 4: Iambic rhythms in Franco’s versus des Murs’s notational systems .......... 40
Figure 5: Canonical Porphyrian tree ................................................................. 45
Figure 6: Marchetto’s Porphyrian trees ............................................................. 46
Figure 7: Visual representation of imperfection by remote parts in the *Ars cantus mensurabilis mensurata per modos iuris* ......................................................... 48
Figure 8: Tewkesbury’s tree diagram of the triplex longa .................................. 58
Figure 9: Torkesey’s triangle ............................................................................. 61
Figure 10: Translation of the dotted path of Figure 9 into mensural notation ....... 62
Figure 11: Torkesey’s triangle, as transcribed by Willelmus ............................. 63
Figure 12: *Cn54.1*, f. 9r ..................................................................................... 67

Chapter 2

Figure 1: Italian *trecento* divisions ................................................................. 74
Figure 2: Tree of the greater perfect larga ....................................................... 77
Figure 3: Tree of the lesser perfect larga .......................................................... 77
Figure 4: Tree of the least perfect larga ............................................................ 78
Figure 5: Re branches of the tree of the greater larga ..................................... 80
Figure 6: Translation of re branches into mensural notation ............................ 80
Figure 7: Fa branches of the tree of the greater larga ..................................... 81
Figure 8: Translation of fa branches into mensural notation ............................ 81
Figure 9: Mi branches of the tree of the greater larga ..................................... 83
Figure 10: Translation of mi branches into mensural notation ........................ 83
Figure 11: Division of the least perfect breve of the greater extension into two
unequal parts ................................................................................................. 96
Figure 12: Tree of the greater perfect breve .................................................... 104
Figure 13: Tree of the lesser perfect breve ...................................................... 105
Figure 14: Tree of the least perfect breve ....................................................... 105
Figure 15: Tree of the greater perfect breve, lower mi branch ....................... 107
Figure 16: Figure 15 translated into mensural notation .................................. 108
Figure 17: Continuation of mi branch, quaternaria perspective ..................... 110
Figure 18: Figure 17 transcribed into mensural notation ................................. 110
Figure 19: Continuation of mi branch, senaria imperfecta perspective ............ 111
Figure 20: Figure 19 transcribed into mensural notation ................................. 112
Figure 21: Continuation of mi branch, octonaria perspective .......................... 113
Figure 22: Figure 21 transcribed into mensural notation ................................. 113
Figure 23: Continuation of mi branch, duodenaria perspective ...................... 114
Figure 24: Figure 24 transcribed into mensural notation ................................. 115
Figure 25: Problem divisions in the lesser perfect tempus .............................. 117
Figure 26: Vetulus’s atoms compared to Willelmus’s simplae in the triangle ..... 119
Figure 27: Figure 27 translated to include note names .................................... 120

Chapter 3

Figure 1: Vetulus’s tripartite model of hexachords and natural substances ...... 139
Figure 2: Marchetto’s Divisions of the tempus ............................................... 152
Figure 3: Vetulus’s divisions of the breves as triadic hierarchies ..................... 153
Figure 4: Vetulus’s “proper” divisions and extensions of the breve as triadic
hierarchies ..................................................................................................... 154
Figure 5: Vetulus’s “improper” divisions and extensions of the breve as triadic
hierarchies ..................................................................................................... 155
Figure 6: Tree of the least perfect breve ....................................................... 169
Figure 7: Llull’s Ladder of Ascent and Descent ............................................ 174
Figure 8: Llull’s elemental figures .................................................................. 177
Figure 9: Vetulus’s hexachordal figure ......................................................... 177
Figure 10: Hebrew anonymous c tree compared to Vetulus’s tree of the lesser perfect
larga ............................................................................................................... 180

Chapter 4

Figure 1: Extract of Philippus de Caserta’s De me dolour with transcription by Apel .... 183
Figure 2: The Four Prolations, minim equivalence ......................................... 192
Figure 3: The Four Prolations, breve equivalence ........................................ 192
Figure 4: Red coloration as it is discussed in the Libellus ................................ 194
Figure 5: Black full compared with void notation in the *Tractatus figurarum* ..................196
Figure 6: Superimposed mensurations using note-shapes ..............................................199
Figure 7: Example of *trenouer* under perfect *tempus* and major prolation in the epilogue to the *Tractatus figurarum* ..........................................................201
Figure 8: Four readings of the dragramae, semidragmae, and semiminim patterns of *Or voit*.................................................................206
Figure 9: Semiminims in context ......................................................................................210
Figure 10: Notation of *Or voit*, three mensurations ......................................................210
Figure 11: The three *duodena* divisions of Guido’s *Or voit* compared to Marchetto’s undifferentiated semibreves ..............................................................212
Figure 12: Syncopation in the *Ars cantus mensurabilis mensurata per modos iuris* ..........215
Figure 13: Notation of *Sumite karissimi* ........................................................................220
Figure 14: *Sumite karissimi* cantus, B section opening ..................................................221
Figure 15: Diplomatic transcription of Kurt von Fischer’s and F. Alberto Gallo’s edition of cantus, mm. 10–14 .................................................................222
Figure 16: Syncopation as a mediating group .................................................................224
Figure 17: Intermediary groupings in the opening of the A section of *Sumite karissimi* ....225
Figure 18: Relationship between notes in *En attendant esperance* .................................228
Figure 19: Semidragmae groupings in *En attendant esperance* .......................................229
Figure 20: Semidragmae in *En attendant esperance* transcribed into modern notation ......230
Figure 21: Relationship between void and red semidragmae in Senleches’s *En attendant esperance* ...........................................................................................................232

Chapter 5

Figure 1: Baude Cordier’s *Belle, bonne, sage* .................................................................235
Figure 2: *Belle, bonne, sage*, detail ..............................................................................236
Figure 3: Old versus new void notes in cantus of *Belle, bonne, sage* .........................236
Figure 4: Extract of the opening of the cantus of *Fuiions de ci* .......................................248
Figure 5: Syncopations of Figure 4 ................................................................................250
Figure 6: A section of *Fuiions de ci* with triple units marked .........................................251
Figure 7: Ambiguity in opening of the cantus of *Fuiions de ci* ........................................254
Figure 8: Opening of the cantus of *Se j’ay perdu* ..........................................................259
Figure 9: Proportional relationships between notes in *Se j’ay perdu* .............................259
Figure 10: Alternative notation of Figure 8 ....................................................................260
Figure 11: Figure 9 mapped onto the ski-hill graph .........................................................262
Figure 12: Extract of da Bologna’s *Que pena maior* .....................................................265
Figure 13: Proportional relationship among notes in Figure 12 .......................................266
Figure 14: Figure 13 translated onto the ski-hill graph ....................................................268
Figure 15: Preparation for void coloration in the cantus ..................................................270
Figure 16: Extract *Je ne puis avoir plaisir* .................................................................271
Figure 17: Notation of *Je ne puis avoir plaisir* .............................................................272
Figure 18: Figure 17 translated onto the ski-hill graph ....................................................273
Figure 19: *Je ne puis avoir plaisir* opening of cantus ....................................................274
Figure 20: Disruption of the breve unit ...........................................................................275
Figure 21: *Je ne puis avoir plaisir*, alternative notation ..............................................276
Figure 22: Rhythmic preparation in *Je la remire sans mesure*, contratenor ....................278
Figure 23: Power’s *Et in terra*, extract of opening .........................................................281
Figure 24: Relationships between black full notes, void notes, and notes following
sign at the opening of the triplex of Power’s *Et in terra*.................................282
Figure 25: Figure 24 translated onto the ski-hill graph ........................................282
Figure 26: Alternative notation of Figure 23...........................................................283
Figure 27: Notational preparation in Power’s *Et in terra* ......................................284
Introduction

In the first of four Questiones written in the later fourteenth century an anonymous author asks “utrum musica sit scientia?” [whether music is a kind of knowledge?]\(^1\) After the customary straw man refutation, he states that music is indeed a kind of knowledge, and therefore a philosophical discipline.\(^2\) As a discipline, music incorporates the threefold Boethian division of music as *musica mundana* [music of the spheres], *musica humana* [human music], and *musica instrumentalis* [instrumental music]. He also foregrounds music’s status as an *ars* or “liberal art.” Knowledge of music is acquired through reason and demonstration, but also experience; it is a kind of knowledge that entails speculation, but also practical facility. One’s ability to perform and contemplate music together are influenced by a permanent and habitual state of knowing about music: the musical *habitus*. Performing and thinking about music in turn play a role in forming the musical *habitus*, and thereby shaping the mind.\(^3\) The anonymous author’s testimony draws attention to the inseparability of practical and speculative music from the perspective of a late fourteenth-century thinker. Music forms the mind as much as the mind forms music, and with it the habits of thought that define knowledge.

---

\(^1\) The only copy of this treatise can be found in *Ph7372*. John Murdoch attributed the *Questiones* to Blasius of Parma (c. 1345–1416), who lectured in natural philosophy at the universities of Bologna and Padua in the late fourteenth century. John E. Murdoch, “Music and Natural Philosophy: Hitherto Unnoticed *Questiones* by Blasius of Parma (?),” *Manuscripta* 2 (1976), 119–36. Cecilia Panti supports Murdoch’s claim that this is a university text, but is cautious to ascribe authorship to Blasius. Cecilia Panti, “Una fonte della ‘Declaratio musicae disciplinae’ di Ugolino da Orvieto: Quattro anonime ‘Questiones’ della tarda Scolastica,” *Rivista italiana di musicologia* 24, no. 1 (1989), 3–4. Panti has hypothesized that the treatise was composed in or near Padua near the end of the fourteenth century for a course at the University of Padua by an author who had studied at the University of Paris. Cecilia Panti, “The First ‘Questio’ of MS Paris, B.N. Lat. 7372: ‘Utrum musica sit scientia’,” *Studi medievali* 33 (1992), 270, 275.

\(^2\) As Murdoch has argued, the concept of *scientia* in the medieval sense is inseparable from the idea of philosophical study. John E. Murdoch, “From Social into Intellectual Factors: An Aspect of the Unitary Character of Late Medieval Learning,” in *The Cultural Context of Medieval Learning: Proceedings of the First International Colloquium on Philosophy, Science and Theology in the Middle Ages, September 1973* (Dordrecht and Boston: D. Reidel, 1975), 273.

That there should be a reciprocal relationship between speculative music theory and the practice of making music provides a starting point for this dissertation, which argues that late-medieval philosophical doctrine shaped musical practices, but also that the philosophical mindsets of musicians were in turn shaped by the music they performed, composed, and speculated about. Investigating this reciprocal relationship through the lens of representations of musical time, it offers a “conceptual genealogy” of the notationally and rhythmically complex repertory of the later fourteenth and fifteenth centuries. As Catarina Dutilh Novaes has observed, a conceptual genealogy is one that focuses on “concepts, issues, and arguments,” and analyzes philosophical texts without focusing on textual authorship. It thus develops analytical philosophic techniques, whilst incorporating a contingent historicist perspective in which a concept may acquire numerous layers of meaning at a given time, and result from multiple lines of influence. Emphasizing the reciprocal influence of practice and theory upon one another, the conceptual genealogy constitutes a form of “historically informed philosophical analysis.” It favors a diachronic approach over the synchronic approach of its sibling, the archaeology.

This dissertation applies such a system of investigation to the history of late-medieval music, interrogating the ways in which notationally complex repertory is and was conceived of, both in modern scholarship and in historical theory. It presents a conceptual genealogy that considers the ideas that are instantiated in various ways in songs and theoretical texts,

---


7 Dutilh Novaes, “Conceptual Genealogy,” 92.
positing that the mentalities of medieval readers can be glimpsed by studying such ideas.\(^8\)

Through this, the dissertation rethinks the concept of complexity itself, and argues that notations that have historically been perceived to be complex may have presented little challenge to contemporaneous readers. By habituating themselves to less complex notations that were nevertheless undergirded by similar principles, medieval readers would have formed conceptual frameworks that would have prepared them to read those that are more complex. These conceptual frameworks would have encompassed not only factual knowledge of the late-medieval notational systems themselves, but also ways of looking and thinking.\(^9\)

The notationally novel style that forms the focal point of this dissertation is referred to by musicologists today as the so-called \textit{ars subtilior}, the “more subtle art.” First used in Ursula Günther’s seminal article of 1963, the term \textit{ars subtilior} was coined initially to rewrite the framework of discourse surrounding the rhythmically complex music of the later Middle Ages. Formerly, Willi Apel had referred to the notation of this repertory as “mannered notation.”\(^10\) As Günther noted, associating late-medieval repertory with a movement in visual art from the sixteenth century was anachronistic, but also reinforced the idea that the style was abnormal, excessively academic, and therefore unperformable.\(^11\) In making use of the term \textit{ars subtilior}, Günther wished to replace the negative connotations of the term mannerism.

\(^8\) This resonates with Rob Wegman’s observation that the aesthetic tastes of medieval people would have differed from those of a modern person. He provides the example of “sweetness,” which he suggests was an attribute of compositions that was of importance to fifteenth-century theorists, but that is little valued by musicologists today. Rob C. Wegman, “Sense and Sensibility in Late-Medieval Music: Thoughts on Aesthetics and ‘Authenticity’,” \textit{Early Music} 23, no. 2 (1995), 300–7; Rob C. Wegman, “‘Musical Understanding’ in the 15th Century,” \textit{Early Music} 30, no. 1 (2002), 52–60.

\(^9\) Emma Dillon has also observed that manuscripts are “incomplete witnesses to sound,” and that unwritten musical practices can be uncovered by considering not only what manuscripts convey, but also how they do so. Emma Dillon, “Music Manuscripts,” in \textit{The Cambridge Companion to Medieval Music}, ed. Mark Everist (Cambridge: Cambridge University Press, 2011), 291.


with an expression that acknowledged the development of the characteristics of the older *ars nova* style that took place towards the end of the fourteenth century. Günther cited the use of the term by Trebor in his ballade *Quant joyne cuer* as evidence that the term *subtilitas* was applied to repertory of this style. In this she followed Nino Pirrotta, who had already observed that it was utilized by Senleches in his ballade *Fuiions de ci* and virelai *En ce gracieux temps*. Both authors also cited the well-known testimony of the anonymous author of the *Tractatus figurarum*, a theoretical treatise that contains a novel system for the notation of rhythmically complex music. Writing in the late fourteenth century, the author compares the motet *Tribum/Quoniam*, which he states epitomizes an outdated style, with *Apta/Caro*, which he states was composed in an “artem magis subtilior,” i.e. a “more subtle manner.”

Despite the testimony of these medieval authors, the term *subtilitas* was not used exclusively to describe the music of the later fourteenth and fifteenth centuries, nor was it always used in association with repertory that would be today regarded as belonging to the *ars subtilior* style. As Desmond has argued, the term *subtilitas* was regarded as a “desired

---

12 Günther, “Das Ende der Ars Nova,” 112.
16 Günther also acknowledged that Jacobus, author of the *Speculum musice*, described the *ars nova* style using the term *subtilitas*, citing this as an example of the use of the term in the earlier fourteenth century. Günther, “Das Ende der Ars Nova,” 112. However, Zayaruznaya has recently argued that the *Speculum musice* was written over several decades possibly into the 1350s or beyond, which would push the date of his use of this term further towards the present. Anna Zayaruznaya, “Old, New, and Newer Still in Book 7 of the *Speculum musice*,” *Journal of the American Musicological Society* 73, no. 1 (2020), 95–148.
compositional aesthetic” of the *ars nova* repertory of the middle of the fourteenth century. She cites the testimony of Jacobus, author of the *Speculum musicae*, who was critical of the aesthetic of *subtilitas*, which he set in opposition to *utilitas* [utility]. Writing in his *Ars (musice)* of c. 1355, the Dutch theorist Johannes Boen also associated *subtilitas* with the contemporaneous practice of “fracturing,” whereby notes were split apart to create complex syncopated textures. Boen associated this style of performance with younger singers. Desmond further observes that late thirteenth-century music theorists such as the Anonymous of St Emmeram and Lambertus used the term *subtilitas* to describe plicas. These observations call into question the premise that *subtilitas* was associated primarily with the complex repertory of the end of the fourteenth and early fifteenth centuries.

As Günther observed, the *ars subtilior* has at times been regarded not only as a style, but also as an epoch. Günther herself subscribed to this view, and proposed that the *ars subtilior* was a musical manifestation of the turmoil caused by the Schism (1378–1417).

---


23 Günther, “Das Ende der Ars Nova,” 117. In this she followed Nino Pirrotta, who had already suggested that the term *subtilitas* was used by contemporaneous authors to describe the virtuosic repertory that was composed in the Avignon Papal court during the Schism. Pirrotta, “‘Dulcedo’ e ‘subtilitas’,” 127.
the *ars subtilior* is an epoch has been problematized by Anne Stone,\(^24\) and the association between the *ars subtilior* and the Schism has now been widely abandoned.\(^25\) Nevertheless, the chronological boundaries of the *ars subtilior* are still often drawn between the later fourteenth and the early fifteenth centuries.\(^26\) In recent years, these boundaries have begun to be questioned, with scholars such as Karl Kügle and David Fallows expanding the chronology of the *ars subtilior* further into the fifteenth century.\(^27\) Stone has also observed that some of the complex proportions associated with *ars subtilior* repertory are discussed in treatises that were copied in the 1350s, including the Vitriacan *Ars nova* witness copied in *Pn7378A* and John of Tewkesbury’s *Quatuor principalia musicae*, dated by Luminita Florea Aluas to 1351.\(^28\) Most recently, Anna Zayaruznaya has argued that the “first glimmers” of the notational complexity associated with the *ars subtilior* began to be seen in the 1350s.\(^29\) Her chronology rests upon the

\(^24\) She observes that musicologists historically have conceived of epochs in order to reinforce the idea that there were composers of epoch-making caliber, such as Guillaume de Machaut or Guillaume Dufay. Anne Stone, “Ars subtilior,” in *The Cambridge History of Medieval Music*, ed. Mark Everist and Thomas Forrest Kelly (Cambridge: Cambridge University Press, 2018), 1125–6.


\(^27\) Kügle has argued that certain musical attributes associated with what scholars today refer to as the *ars subtilior* continued to be popular until at least the 1430s on account of his new dating of *TnJ.II.9*, which he suggests was copied in the 1430s. Karl Kügle, “Glorious Sounds for a Holy Warrior: New Light on Codex Turin J.II.9,” *Journal of the American Musicological Society* 65, no. 3 (2012), 641. Fallows suggests that the complexity associated with the *ars subtilior* may be seen in music composed at the end of the fifteenth century. David Fallows, “The End of the Ars Subtilior,” in *Basler Jahrbuch für historische Musikpraxis*, ed. Dagmar Hoffmann-Axthelm (Basel: Amadeus, 1996), 21–40.


observation that older and newer musical styles coexist, just as younger and older generations
live together and subscribe to different ways of theorizing music.30

The boundaries of the *ars subtilior* have at times also been circumscribed geographically; the style has been associated primarily with areas of Northern Italy and Southern France. This assessment is based on the provenance of the two major sources of repertory associated with the *ars subtilior*, namely *Ch564* and *MOe5.24*, both of which are believed to have been copied in Northern Italy in the early fifteenth century.31 To this may be added *TnJ.II.9*, which Karl Kügle has recently argued was also copied in Italy.32 Despite the Italian provenance of these sources, the *ars subtilior* continues to be regarded as an inherently French style, with Avignon in particular viewed as a center of *ars subtilior* composition and

---


31 As early as 1868, Delisle suggested that *Ch564* was copied by an Italian scribe from a French exemplar. Yolanda Plumley and Anne Stone, eds. *Codex Chantilly: Bibliothèque du Château de Chantilly*, MS. 564: Facsimilé, vol. 1 (Turnout: Brepols, 2008), 109. This view was revived by Ursula Günther. Ursula Günther, “Unusual Phenomena in the Transmission of Late Fourteenth-Century Polyphonic Music,” *Musica disciplina* 38 (1984), 107. The dating of *Ch564* remains uncertain. Stone and Plumley have suggested that it was copied prior to c. 1420. Ibid., 181. More recently, Francesca Manzari has suggested that the codex may have been copied closer to the turn of the century on the basis of marginal drawings that she suggests may have been created by an artist who worked for Boniface IX in Rome. Francesca Manzari, “The International Context of Boniface IX’s Court and the Marginal Drawings in the Chantilly Codex (Bibliothèque du Château, MS. 564),” *Recercare* XXII, no. 1–2 (2010), 17–33. Stone dates the later layer of *MOe5.24* to the 1420s. Anne Stone, ed., *The Manuscript Modena, Biblioteca Estense, a.M.5.24: Commentary* (Lucca: Libreria musicale italiana, 2005), 102.

32 Kügle, “Glorious Sounds,” 646. A further source of notationally intricate repertory of Northern Italian provenance is *Pn6771*, which is believed to have been copied in the late fourteenth or early fifteenth century. Kurt von Fischer proposed that the manuscript was of Venetian origins. Nigel Wilkins revised von Fischer’s description and suggested that Padua was also a viable candidate for provenance. Kurt von Fischer, “The Manuscript Paris, Bibl. nat., nouv. acq. frç. 6771 (Codex Reina=Pr),” *Musica disciplina* 11 (1957), 47; Nigel Wilkins, “A Revised Description (Paris, Bibl. Nat., Ms. N.A.Fr. 6771),” *Musica disciplina* 17 (1963), 64.
performance. A number of alternative hypotheses have nevertheless been proposed. Among these, Stone has argued that the practices associated with the *ars subtilior* were much more widespread than has previously been thought, and provides evidence for a center for performance of complex repertory in Paris. This claim is backed up by Yolanda Plumley, who has provided evidence for links between *ars subtilior* repertory and the French princely courts surrounding Paris. She argues that because late-medieval musicians underwent frequent travel, we should exercise caution when attempting to define musical style on the basis of geographical location. Renata Pieragostini has provided evidence that *Cn54.1*, a major source of the *Tractatus figurarum* and Senleches’s *La harpe de melodie*, a ballade that contains a variety of special noteshapes and is presented in the shape of a harp, was compiled by English Augustinian friars in Pavia during the Schism. This points towards further musical exchange between England and Northern Italy during this period. David Catalunya has also argued that *ars subtilior* repertory was present in Spain. He provides the example of an embellished polyphonic Amen to a monophonic Credo copied in *Mn1361*.  

---

33 Ursula Günther, “Zur Biographie einiger Komponisten der Ars Subtilior,” *Archiv für Musikwissenschaft* 21, no. 3/4 (1964), 172–99. Smilansky argues that the *ars subtilior* was a French style of composition that was disseminated widely. Smilansky, “The Ars Subtilior as an International Style,” 227–32. Jason Stoessel has problematized the idea that the *ars subtilior* should be defined in terms of its perceived “Frenchness” or “Italianness” because this results from the application of anachronistic notions of nationhood that would be alien to medieval people. Jason Stoessel, “Revisiting *Aï, mare, amice mi care*: Insights into Late Medieval Music Notation,” *Early Music XL*, no. 3 (2012), 466. Ardis Butterfield has provided an alternative perspective to the notion that modern ideas of nationhood should be used in historical studies of medieval literature by considering the complex and mutually constitutive nature of Anglo-French relations during the Hundred Years War. See: Ardis Butterfield, *The Familiar Enemy: Chaucer, Language, and Nation in the Hundred Years War* (Oxford: Oxford University Press, 2009).


The *ars subtilior* has further been defined through a consideration of its compositional features, that is as a style that privileges complexity on a variety of levels that may include rhythm, pitch, notation, and text. Attributes of notational complexity include the use of canons—texts that inform a reader how a section of a song should be realized, either transparently or in the form of a riddle—as well as the use of so-called “special” noteshapes—namely the various forms of dragmae—and proportion signs. Further examples include the use of extensive chromaticism—as can be found in Solage’s *Fumeux fume*—and rhythmic complexity, with or without the use of special noteshapes, achieved through the extensive use of syncopations.

A number of explanations for the proliferation of notational complexity in this repertory have been offered. Citing the testimony of the anonymous author of the *Tractatus figurarum*, as well as the parallels between the notated *ars subtilior* repertory and contemporaneous counterpoint treatises, Stone has suggested that the style may be regarded as the “more precise art,” and one that originated in an unwritten tradition of performance. This supports the hypothesis that the music associated with the *ars subtilior* was

---


performed prior to the codification of this repertory in manuscripts. Stone further argues that the complex rhythms of the *ars subtilior* arose out of the combining of the principle of the fixed duration of the minim in French repertory with the fixed breve unit of Italian repertory. She suggests that this results in a rhythmic texture that lacks a stable time-unit, and instead may be built upon an abstract pulse.

The association between *ars subtilior* repertory and performance practice has been examined by a number of scholars. Refuting the idea that the *ars subtilior* was principally a ludic or mathematical style, Daniel Leech-Wilkinson has suggested that this repertory was conversely shaped by the demands of performance. He suggests that notations were at times chosen to shape articulation. Donald Greig has proposed that such notations may be regarded as a “palimpsest,” of an “original possibly more simple set of instructions, overlaid through a process of elaboration and notational game-playing.” One of his primary concerns is to provide instructions to possible performers, who he advises to embellish *ars subtilior* compositions. Uri Smilansky has studied modern attitudes towards *ars subtilior* repertory through the lenses of recordings and performances. He provides a new “working model” for the definition of the *ars subtilior*, arguing that any definition of the style must take into account the attributes of the medieval experience of performance, such as memorization and a “a self-conscious striving against normative expectations.” Emphasizing the social context of the style, he argues that notated *ars subtilior* songs would have been used for their potential to

bolster “social value,” and that they would have appealed to amateurs for their striking visual appearances.46

A final method by which scholars have attempted to define the ars subtilior is through contemporaneous philosophical doctrine. The most comprehensive study of the philosophical background of the ars subtilior to date has been undertaken by Dorit Tanay. Tanay argues that the ars subtilior may be seen as a manifestation of the intense interest in mathematics that was seen in the fourteenth century, a phenomenon that John E. Murdoch has referred to as “measure mania.”47 She explains the complexity of late-medieval repertory as a manifestation of subtilitates motu, “subtleties concerning motion,” a branch of mathematics that was concerned with limit decisions,48 i.e. the question of when a motion begins and ends and whether this motion is limited intrinsically or extrinsically. Such limit decisions were at times presented in the form of logical sophisms, whereby philosophers considered the fine distinctions between the limits implied in the various tenses of Latin. Tanay argues that the linguistic games of logical sophisms are analogous to the rhythmic puzzles of ars subtilior repertory.49 The “ad hoc” rhythmic figures of the ars subtilior, she suggests, may be compared

---


48 Tanay, Noting Music, 207–45.

to the interpretative ambivalence found in humanist writings such as those of Petrarch.\textsuperscript{50} She further suggests that the \textit{ars subtilior} was influenced by Ockham’s nominalism, as well as his theory of \textit{cognitio intuitiva} [intuitive cognition], whereby knowledge of the existence of objects in the world was believed to be derived through direct observation.\textsuperscript{51} In her association between the \textit{ars subtilior} and nominalism, she is joined by Stone, who argues that the rich sensory experience afforded by \textit{ars subtilior} notations is consistent with the emphasis placed on sensory perception in nominalist philosophy.\textsuperscript{52}

As the reader will observe, I have avoided using the term \textit{ars subtilior} throughout this dissertation.\textsuperscript{53} This choice stems from a desire to consider some of the characteristics of late-medieval theory and repertory without being constrained to define or justify the perceived \textit{ars subtilior}. It leads the scope of my project to be once more narrow and broader than a true study of what is today regarded to be the \textit{ars subtilior} would be. Attributes that are broader include the project’s chronological purview, which ranges from roughly the first few decades of the fourteenth century into the first few decades of the fifteenth.\textsuperscript{54} The notational styles

\footnotesize


\textsuperscript{52} Stone, “Writing Rhythm,” 267, 290–1. Nino Pirrotta has also suggested that there were links between late-medieval complexity and nominalism. Pirrotta, “‘Dulcedo’ e ‘subtilitas’,” 127.

\textsuperscript{53} I occasionally use the term in reference to the work of scholars who use it, or to discuss its utility.

\textsuperscript{54} Tanay also takes a conceptual approach to the study of the \textit{ars subtilior}, and as such similarly advocates for the blurring of the chronological boundaries surrounding the style. Tanay, \textit{Noting Music}, 212.
that I consider are also more varied than those of a study of the so-called *ars subtilior*; neither all of the repertory nor the all of the theoretical treatises that I consider would typically be associated with the *ars subtilior* style. For instance, Chapter 1 of the dissertation considers the work of theorists who wrote in the early–mid fourteenth century. None of the music-theoretical systems set out in this chapter would be regarded as belonging to the *ars subtilior* in its traditional sense. The chapter provides a background to the theoretical ideas that would play a constitutive role for later notationally complex repertory. It posits that theoretical systems that are often viewed as being radically different or opposite to one another can nevertheless be undergirded by similar ideas.55

Further reinforcing this, Chapters 2–3 consider the output of the eccentric music theorist Johannes Vetus de Anagnia, whose treatise *Liber de musica* is translated in the appendix to this dissertation. His work illustrates how a conservative notational system can be used to represent a highly complex array of rhythmic values. I suggest that his ideas about musical time may be seen to be analogous to the kinds of rhythmic complexity that would later be codified using novel notations.56 His work provides a rich example of the application of late-medieval *musica speculativa* [speculative music] to mensural notation, and illustrates the

55 Arthur O. Lovejoy observes this phenomenon in his classic study of the history of ideas: “It is true that, just as chemical compounds differ in their sensible qualities from the elements composing them, so the elements of philosophical doctrines, in differing logical combinations, are not always readily recognizable; and, prior to analysis, even the same complex may appear to be not the same in its differing expressions, because of the diversity of the philosophers’ temperaments and the consequent inequality in the distribution of emphasis among the several parts, or because of the drawing of dissimilar conclusions from partially identical premises.” Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (New York: Harper Torchbooks, 1960), 4.

56 This work builds upon Stone’s call to avoid drawing strict stylistic boundaries between the so-called *ars nova* and *ars subtilior*. “I want throughout to emphasize plurality of theoretical treatments; the extent of the unwritten record; and the flux of notational practice, all of which conspire against a neat distinction between the practices that we have labeled Ars nova and Ars subtilior.” Anne Stone, “The Ars Subtilior in Paris,” 376. Plumley has also argued that the “milieu of cultivation” of the *ars subtilior* and *ars nova* styles was not necessarily distinct. Plumley, “An ‘Episode in the South’?” 116.
reciprocal influence of ideas derived from philosophy and music theory on a mid-century writer.

Seen another way, the scope of my project may be said to be narrower than other studies that consider the complex repertory of the later Middle Ages. For instance, in Chapters 4 and 5 I consider a selection of songs that illustrate a handful of conceptual principles that have been associated with *ars subtilior* repertory, rather than providing a broad overview of all of the various attributes of the perceived late-medieval *ars subtilior* style. In part, this was a practical choice determined by space. However, I also hope that my project will help to emphasize that the complex notations of the supposed *ars subtilior* style at times served markedly different functions. For example, in Chapter 4 I will argue that some notations that are regarded as complex would have facilitated ease of reading. This illustrates that notation may serve as a locus of engagement between the notator and musician, and draws attention to the contrasting ways of reading that are demanded by late-medieval notational systems. Chapter 5 refines this idea, providing a new framework for understanding mensuration, and arguing that the flexibility of novel notations was at times harnessed to indicate to musicians how music is to be heard in the mind, not only uttered aloud. I conclude by reflecting on the study of historical music as a practice of forming the habits of mind that shape our own beliefs, as well as those of past people.

That there should be to some extent conceptual homogeneity between the perceived *ars nova* and *ars subtilior* styles on the one hand, and a lack of homogeneity within the *ars subtilior* style itself on the other, I would suggest, calls into question the idea that a strict boundary should be drawn between the repertory of the early–mid fourteenth century and

---

57 For an alternative approach, see: Smilansky, “Rethinking Ars Subtilior.”

58 These notations may be contrasted with the cryptic canons that were at times used to provide notational interest in rhythmically simpler compositions. This accords with Stone’s observation that a tidy definition of the so-called *ars subtilior* is impeded because of the various kinds of complexity that are incorporated within the perceived style. Stone, “Ars subtilior,” 1134.
the music that was codified post c. 1380. At a time where the chronology of fourteenth-century music is being rewritten,\textsuperscript{59} it seems appropriate to reconsider how we think of stylistic change, and to ask whether there may be greater continuity between the ideas inherent within late-medieval styles that have historically been isolated from one another, particularly when the same ideas are realized using different notational systems. The chronology of fourteenth-century music is not the primary focus of this dissertation. Yet I hope that the conceptual approach taken here will contribute to other studies that have problematized the idea that the musical styles of the later Middle Ages occurred sequentially, and that have questioned the utility of the term \textit{ars subtilior} to define a distinct late-medieval style and epoch.

Chapter 1: Units of Musical Time

At the opening of *Metaphysics* Book X, Aristotle provides four definitions for the *unitas*, the “unity” or “unit.”¹ In the first sense, the unity is a continuous thing, simple and indivisible in its being. In the second sense, it is a “whole”; it has a natural and definite form or shape. It occupies the same space and time. In the third sense, the unity is one in number, and is synonymous with an individual. In the fourth, it is conceptually unified; it is one insofar as it is known to be so. The fourth unity is a universal in the Aristotelian sense, i.e., a general concept acquired from particular things within which it is instantiated.² Uniting all of these *unitates* is the concept of indivisibility. As Aristotle explains, the *unitas* serves as the measure or unit of all things. It enables humans to know the most primary and perfect manifestation of things. Yet while *unitates qua unitates* are indivisible, they are divisible insofar as they exist in the world. This is because everything in reality is still infinitely divisible.³

As this brief summary of Aristotle’s views on the concept of unity shows, there is no one way to define, or translate the term *unitas*. Embracing the multifarious meanings of both of the English words “unit” and “unity,” the term *unitas* points towards the various concepts that undergird the idea of being one or unified. It also illustrates that the divisibility of a subject is predicated not only upon its being, but also the way in which it is perceived. A bowl

---


of water may be seen to be an indivisible whole insofar as it is a full and complete bowl of water. However, one may also regard this bowl of water as divisible into each of the individual water droplets that it contains. From this perspective, the water droplets themselves may be viewed as indivisible *unitates*. If one subscribes to Aristotle’s belief that reality as a whole is infinitely divisible, the droplets themselves may be seen, from a different perspective, to be divisible into infinite regress. We can ask further questions of the bowl of water and consider whether it is formed from the accumulation of water droplets, or whether we arrived at the droplets through division of the water into parts.

Combining the continuum of time and sound with the discrete durations of individual notes, music provides an ideal site for the exploration of questions pertaining to the divisibility of continua. During the fourteenth century—a time when the study of music was believed to encompass mathematical speculation as much as sounded performance—there was intense debate about the nature of musical time. Comparing musical time to general time, theorists asked whether these two kinds of time were divisible, and if so to what extent. They pondered whether shorter timespans grouped together to form longer ones, or whether shorter timespans were derived through the division of longer ones. Offering contrasting opinions about how musical time is measured, some theorists argued that the duration of the breve was a unit of measurement and thus represented a minimally short span of musical time. Others suggested that it was the minim that took on this role, or that the spans of a number of different notes could be used as units of measurement depending on the context. In asking such questions, they at times referred to philosophical doctrine to justify their views, comparing the spans of musical notes to the various kinds of unified wholes as described by
Aristotle and Boethius. At others they deferred to the limitations of musical performance to define the units of measurement of musical time. In this chapter, I discuss three different prevailing ways of rationalizing indivisibility in music-theoretical treatises of the early–mid fourteenth century. In the first, breve units are prioritized, in the second multiple units are theorized, and in the third the span of a short note serves as a minimal counting unit for others. I suggest that these differing ways of theorizing musical time can be seen to be analogous to the process of reading music notation. For instance, when breve units are prioritized, a reader must observe the duration of a breve unit in its entirety to even ascertain how musical rhythms are to be read. Similarly, when multiple units are prioritized, one must observe a range of notes to determine rhythm. Systems that prioritize a minimal counting unit appear in tandem with theories in which the duration of a note is determined by its shape. Further, I will illustrate that these differing conceptual perspectives influenced the way in which theorists represented hierarchies of musical notes diagrammatically. Where longer durations are prioritized and shorter timespans are derived primarily through division, theorists draw diagrams with longer notes above shorter ones. On the other hand, where theorists argue that the spans of shorter notes are grouped together to form longer ones, they appear above longer notes in diagrams. This

---

5 Musicians and theorists have wondered whether there are shortest units of duration in rhythm, or minimal intervallic units in pitch for millenia. They have asked whether these minimal units are the same in our minds, our voices, and on the folio in notation. For example, in the fourth century BCE Aristoxenus theorized a chronos protos, or “primary time unit,” that formed the basis of the three types of rhythmic activity he identified: speech, melos and bodily movement. Lewis Rowell, “Aristoxenus on Rhythm,” *Journal of Music Theory* 23, no. 1 (1979), 72. In the fourteenth-century Arnulf de St Ghislain described “atoms” of pitch: minimal intervallic inflections that arose in performances by the most virtuosic female singers. Christopher Page, “A Treatise on Musicians From ?c. 1400: The ‘Tractatus de differentiis et gradibus cantorum’ by Arnulf de St Ghislain,” *Journal of the Royal Musical Association* 117, no. 1 (1992), 16. For further discussion of Arnulf’s treatise, see: Elizabeth Eva Leach, “‘The Little Pipe Sings Sweetly While the Fowler Deceives the Bird’: Sirens in the Later Middle Ages,” *Music & Letters* 87, no. 2 (2006), 191.
develops the work of Karen Desmond, who has argued that the shape of diagrams reflected the conceptual underpinnings of music-theoretical systems.\(^6\)

Although I here outline three distinct overarching methods of theorizing musical time, and with these differing ways of reading the contextual music notations of the fourteenth century, these perspectives are not mutually exclusive. In each of the systems described here both division and grouping are present, even if one is prioritized over the other. It is particularly important to bear this in mind when considering how music might have been performed. For example, even though the breve may be seen as a unit of measurement for all other notes, this does not mean that musicians would have always counted breve units. That each of the systems discussed in this chapter should incorporate similar ideas instantiated in different forms is in keeping with the ways in which ideas are instantiated in philosophy. As Arthur O. Lovejoy has observed, it is typically not the components of philosophical systems that are original, but rather their “patterns,” that is the order in which these components are arranged.\(^7\) Arguably, the same can be said for the differing theorizations of musical time outlined in this chapter.

That there was some overlap conceptually between the division and grouping of musical time problematizes the idea that a strict dichotomy existed between divisibilist and so-called “atomist” theorizations of musical time, whereby the continuum of musical time is believed to be formed of indivisible and autonomous minimal parts.\(^8\) Most music theorists subscribed to the Aristotelian concept that time itself is infinitely divisible.\(^9\) As I will discuss in

---


\(^7\) Lovejoy, *The Great Chain of Being*, 3.

\(^8\) Tanay has proposed that a number of fourteenth-century theorists conceived of atoms of musical time and that these atoms were similar in kind to the atoms of the ancient Greeks. As I will discuss in further detail below, I contend that these theorists conceived of mathematically indivisible spans of musical time, but not atoms in the Greek sense. Tanay, *Noting Music*, 122–6.

\(^9\) Tanay, *Noting Music*, 105. Tanay has argued that all late-medieval theorists were Aristotelians, and therefore believed that general time was infinitely divisible.
Chapter 2, a number of fourteenth-century theorists did advocate for a theory of general time as a composite of indivisible “spans” of motion. The theorists who subscribed to this view all did so in order to argue that there is a close association between musical and general time. Their belief in “atomistic” time thus originates in a desire to foreground the formative power of music and the interconnectedness of musical and general time, rather than a specifically “anti-Aristotelian” position as can be found in the work of the majority of late-medieval indivisibilists.

**Breve Units**

In Book 1 of his *Speculum musicae* (c. 1330s–1350s), the fourteenth-century music theorist Jacobus provides the following definition of time:

> Tempus, ut dicitur quarto Physicorum, est numerus motus secundum prius et posterius. Qui enim in motu (qui de numero successivorum est) numerare potest prius et posterius et distinguere inter illa, tempus apprehendit.

Time, as is said in *Physics* IV, is a number of motion according to the before and after. For in motion (which is of the number of successive things), he who can number the before and after and distinguish them grasps time.

---

10 For the Italian theorist Johannes Vetulus de Anagnia—the protagonist of Chapters 2 and 3—this appears to have been rooted in his Augustinian theological views.


Jacobs takes his definition of time, as he states himself, from Aristotle’s *Physics*, Book IV.\(^{14}\) According to this definition, time is “a measure of motion with respect to the before and after.”\(^{15}\) Motion occurs with respect to one of Aristotle’s ten categories,\(^{16}\) and pertains not only to physical reality, but also to the states of being in potentiality and actuality.\(^{17}\) Since motion is attached to the notion of change, Aristotle argues that it possesses no being outside of something that is moving or changing.\(^{18}\) Undergoing constant change, motion constitutes the “progress of the realizing of a potentiality, qua potentiality.” In the context of time, this is defined as “the process of coming into existence or passing out of it.”\(^{19}\) Thus, according to Aristotle, time is inseparable from motion, as it flows continuously from the past to the future. As a continuous motion, time is infinitely divisible.\(^{20}\) The before-and-afterness of time is comparable to motion’s before-and-afterness in magnitude. Yet although time is associated with motion, it is also distinct from it. It is the non-spatial dimension of motion; “that by which motion can be numerically estimated.”\(^{21}\) Aristotle fashions a tripartite model for the measure of motion. Motion is measured by time. Time is the “countable thing” that enables a

\(^{14}\) In the fourteenth century, most music theorists followed Aristotle in defining time as the numbering of motion of the before and after, and believed that time was an infinitely divisible continuum. A number of theorists also referred to time as a *mora* or “span” of motion of the before and after, emphasizing the durational extension of the present. In Chapter 3, I will discuss this alternative interpretation in reference to the work of Johannes Vetulus de Anagnia.


\(^{16}\) These are substance, quantity, quality, relation, place, date, posture, state, action, and passion.


person to measure motion. Number is the unit of measurement with which time’s numbering property is made possible.\textsuperscript{22}

In the extract above, Jacobus elaborates the Aristotelian definition of time, stating that a person who counts or “numbers” the before and after of motion “grasps” time. The Latin term that he uses to describe this process—\textit{apprehendo -ere}—can be translated in several different ways, but in general projects a sense of mentally grasping, coming to understand, perceiving, or learning.\textsuperscript{23} In the context of Jacobus’s comments above, the word implies a sense of comprehension or perception, an attribute that Jacobus further elucidates as follows:

\begin{quote}
Verum est quod in motu bene est prius et posterius et successio, etiamsi non sit anima illa numerans et attendens, sed illud ad completam rationem temporis non sufficit nisi adsit anima numerans illa, ut est dictum. Addit igitur tempus, super motum, prius et posterius in ipso motu numerata, et ideo dicitur tempus mensura motus.\textsuperscript{24}
\end{quote}

It is true that in motion there is indeed the prior and posterior and succession, even if the soul is not present numbering and paying attention, but this does not suffice for time in its entirety unless the soul is present numbering it, as has been said. Therefore time adds on top of motion the before and after numbered in this motion, and for this reason time is said to be the measure of motion.

In this account, Jacobus follows Aristotle in stating that although time is associated with motion, it is not motion itself. Together, number and motion form time. Since number is an attribute that arises through the counting or measuring of the soul, time itself cannot exist unless a mind is present that counts it.\textsuperscript{25} In this, Jacobus departs from Aristotle, who had stated (hesitantly) that time could exist without being counted by a subject. For Aristotle, time

\begin{flushright}
\textsuperscript{22} Aristotle, \textit{Physics}, IV, 217b–220a, 382–395
\end{flushright}

\begin{flushright}
\end{flushright}

\begin{flushright}
\end{flushright}

\begin{flushright}
\textsuperscript{25} As Trifogli has observed, this was the position of Ibn Rushd (d. 1198 CE), whose commentaries on Aristotle’s \textit{Physics} exercised strong influence over late-medieval debates about time. Trifogli, \textit{Oxford Physics}, 221–30.
\end{flushright}
that exists independently of the mind is an “objective thing” insofar as it possesses the potential of being enumerated by us subjectively, thereby bringing it into conceptual actuality as the time that we know.\textsuperscript{26}

As Dorit Tanay has argued, theorists such as Jacobus distinguished between general time and musical time.\textsuperscript{27} This resulted from musical time’s association with sound, and its measurement using rhythmic notation in the context of \textit{musica mensurabilis} or “measurable” music. Codifying a musical sound using rhythmic notation implies that a sound spanning a temporal duration has extension, and affords this notationally abstracted sound the status of a concrete thing. As soon as music is notated, it is transformed into a visual representation of the flow of musical sound. By being rationalized as a physical line, it continues to represent time, but is no longer the same as time, which in the Aristotelian sense can have no extension. Jacobus describes this process as follows:

\begin{quote}
Dicendum quod, licet tempus materialiter et absolute sumptum et ut continuum dividi possit in quot volueris partes aequales ut in duas, tres, quattuor, sic ceteris, non tamen ut per notulas significatur musicas, ut saepe dictum est. […] Important enim notulae quaelibet determinatas temporis morulas et in hoc inter se distinguuntur, licet in hoc generaliter conveniant quod tempus important ad modum quo annus, mensis, dies, quadrans, hora, momentum, uncia, atomus.

Item notulae musicae non videntur tempus pure continuum importare sed discretum et numeratum ad determinatas partes applicabile vel applicatum, ut supra declaratum est, et per Modernos confirmatum, etiam per illum qui has novem ponit conclusiones.\textsuperscript{28}
\end{quote}

\textsuperscript{26} “The question remains, then, whether or not time would exist if there were no consciousness; for if it were impossible for there to be the factor that does the counting, it would be impossible that anything should be counted; so that evidently there could be no number; for a number is either that which has actually been counted or that which can be counted. And if nothing can count except consciousness, and consciousness only as intellect (not as sensation merely), it is impossible that time should exist if consciousness did not; unless as the ‘objective thing’ which is subjectively time to us, if we may suppose that movement could thus objectively exist without there being any consciousness. For ‘before’ and ‘after’ are objectively involved in motion, and these, \textit{qua} capable of numeration, constitute time.” \textit{Physics} IV.XIV.223a, t. Wicksteed and Cornford.

\textsuperscript{27} Tanay, \textit{Noting Music}, 32–3.

It must be said that although time, taken materially and absolutely, may be divided like a continuum in as many equal parts as you like, as in two, three, four, and so on, [the *tempus*] as signified by musical notes [may] not [be so divided], as has been pointed out repeatedly. […] For all notes convey determinate stretches of time, and are distinguished from each other in this respect, yet they generally agree on this point that they convey the *tempus* in the same way as the year, the month, the day, the quarter, the hour, the moment, the twelfth part, the atom.

Also, musical notes do not seem to convey purely continuous time, but discrete and numbered time applicable or applied to determinate parts, as demonstrated above, and as confirmed by the moderns, even by the [teacher] who posits those nine conclusions.29

According to Jacobus, the foundational difference between musical and general time is rooted in the question of indivisibility. General time is infinitely divisible. Musical time, on the other hand, is indivisible insofar as it is associated with notes, which are unified wholes. Thus musical time, like the time of the calendar—i.e., time that has been assigned arbitrary durations for the purpose of the measurement of temporal spans—is discrete.30

As Karen Desmond has argued, Jacobus’s belief that musical time is discrete was influenced by his interpretation of the so-called “latitude of forms thesis.”31 Debates pertaining to the latitude of forms thesis centered on the question of how the forms of substances changed qualitatively, where a substance is a composite of matter and form. The classic example of this is a person: their flesh may be regarded as the matter of the body, while their soul may be regarded as the form of the body.32 Philosophers discussed whether

---


31 Desmond, *Music and the moderni*, 175.

32 See Chapter 3 for a discussion of Vetus’s unorthodox opinions on the relationship between the matter and form of a person.
there could be a latitude to forms, i.e., a range within which the quality or quantity of forms could vary.\textsuperscript{33} The varying parts of a latitude were termed \textit{gradus} or degrees.

Although there were various interpretations of the latitude of forms thesis, two major trends predominated. Advocates of the “succession” theory argued that each substance incorporated only one perfect and complete substantial form, and that any part that was added to or subtracted from this form would result in its destruction. In the early–mid fourteenth century, the best-known advocate of the succession theory was the English theologian Walter Burley (ca. 1275–1344). Edith Sylla has observed that this theorization of the latitude of forms thesis was analogous to the theory of substantial change—i.e., a theory that questioned how substances come to change into other things—called the “unity of form” thesis. The Dominican friar Thomas Aquinas (1225–1274) is one of the best-known adherents of this theory. He argued that substantial change took place by means of a succession of different forms.\textsuperscript{34} According to this interpretation, any change to a substantial form results in its destruction and the creation of a new form.

Advocates of the second interpretation of the latitude of forms thesis, termed the “addition” theory, argued that parts could be added and subtracted from substantial forms, providing that this took place between minimal and maximal limits. Scot John Duns Scotus (1265/66–1308) is the most famous advocate of the addition theory.\textsuperscript{35} The addition theory is equivalent to the Scotist “plurality of forms” thesis, according to which a substance can take on more than one substantial form at any given time.\textsuperscript{36}


\textsuperscript{34} Sylla, “Medieval Concepts,” 231.


\textsuperscript{36} Sylla, “Medieval Concepts,” 231.
Desmond has argued that music theorists engaged with these two interpretations of the latitude of forms thesis, utilizing these differing ways of rationalizing substances in their descriptions of music notation.\footnote{Desmond, Music and the moderni, 175–83.} She sets in opposition the theoretical accounts of Jacobus and Jean des Murs, a French astrologer and music theorist who authored a number of influential treatises in the early–mid fourteenth century, including the \textit{Notitia artis musice}.\footnote{Jean des Murs was a French music theorist, astronomer, and mathematician active in Paris. His \textit{Notitia artis musice} was formerly dated to 1319/1321 by Ulrich Michels. However, Karen Desmond has argued that the \textit{Notitia} might have been compiled over a more protracted period, and that the \textit{Conclusiones} of Book II were probably composed separately from the first part of the treatise. In her recent monograph, Desmond has discussed des Murs’s music-theoretical output within the wider intellectual context of his mathematical output. Ulrich Michels, \textit{Die Musiktraktate des Johannes de Muris} (Wiesbaden: F. Steiner, 1970), 2. Desmond, Music and the moderni, 70–114. Tanay has also argued that des Murs adapted the latitude of forms thesis to mensural notation. Tanay, \textit{Noting Music}, 89–91.} According to Desmond, Jacobus’s work applies the succession theory of the latitude of forms to music notational systems, while des Murs’s is an adaptation of the addition theory. I will return to des Murs’s theorization of musical continua below.

Jacobus’s adherence to the succession theory is illustrated by his belief that all notes, like all substances, are formally perfect, and that both the shape of a note—its \textit{figura}—and its signification—the sound that results when it is sung—are formally perfect and whole. This also explains why he believed that musical time was discrete; according to this definition, notes are substantially prior and whole, and thus indivisible.\footnote{Desmond, Music and the moderni, 182.} This means that musical time is discrete insofar as it is associated with notes. The general time of the notes (and the world around them) is still infinitely divisible.

Desmond has further suggested that Jacobus’s adherence to the succession theory accords with the notational system that he employed in the \textit{Speculum musice}. To understand this, it is first necessary to consider some technical details of this system. A conservative writer,
Jacobus advocated for a Post-Franconian or “Petronian” notational system. In this system, notes such as longae \( \text{L} \) can be perfect, and contain three parts, or imperfect, and contain two parts. According to Jacobus, imperfect longae (worth two breves \( \text{B} \)) can appear only when accompanied by a breve. This is because the existence of a longa as imperfect, rather than perfect, is contingent upon its juxtaposition with a breve. Together these notes fill out a triple unit of musical time, called a perfection. In this case, a perfection would be equal in duration to a perfect longa, or three breves. Jacobus writes that the presence of a breve by the side of a longa shows that this note is imperfect, as follows:

\[
\text{Sic ergo dictum illud commune intelligatur quod brevis juncta longe ipsam imperficit, id est, ipsam in tali situ esse imperfectam ostendit.} \quad 41
\]

In this way, therefore, one can understand the general premise that the breve beside a longa imperfects the latter, that is, it shows it to be imperfect in that location [but does not make it imperfect]. \( 42 \)

The imperfect longa described in this passage is not imperfected by the breve, as is the case in des Murs’s system outlined below. Following the idea stipulated by adherents of the succession theory that parts may neither be added nor subtracted from forms, Jacobus states that perfect and imperfect longae are formally distinct, and therefore cannot be changed by the imposition of another note. This is because such a change would result in the addition of a part to the form of the note, and through this the destruction of the note’s form and the creation of a new one. For Jacobus, the breve situated beside the imperfect longa thus merely

---


shows that it is imperfect, and that together they complete the perfect longa unit. He did not believe that the breve had the ability to act upon the longa through removal of a part of it.

No change to the substantial form of the longa—its being an imperfect longa, rather than any other kind of note—is possible within this conceptual framework. Such a change would occur only if the longa were to be destroyed and recreated as an entirely new note. Thus although imperfect and perfect longae share a name, these notes are formally distinct from one another.

Jacobus applied a similar rule to the treatment of semibreves. In the post-Franconian system he favored, breves are divided into undifferentiated semibreves, i.e., semibreves that look the same but differ in duration depending on the context. According to Jacobus, the appearance of a semibreve by itself is unthinkable, since semibreves are by nature parts of the breve, not autonomous notes. As Desmond has discussed, Jacobus offers a number of reasons for his position, explaining that solitary semibreves possess the wrong shape to stand alone, and that they constitute a part of musical time that cannot be used in place of the whole. In other words, semibreves only appear in groups adding up to the time of the breve. They cannot appear by themselves. In a group of two semibreves, the first is worth one-third of the


44 Jacobus illustrates his belief that two substances that share a name are not necessarily similar to one another formally with the amusing example of the various uses of the word “dog.” He suggests that perfect and imperfect longae are as different from one another as the barking animal is from the constellation Canis maior [the greater dog] or the dogfish. “Sicut enim hec dictio canis equivoce fuerit, pro animali latrabilis, pro sidere celeste et pro pisce marino. Non quod unquam sidus celeste fuerit animal latrabile, vel piscis marinus. Et quod unum istorum in aliud mutetur, sic eadem figura nec fuerit pro longa perfecta, nec per imperfecta non quod una illarum unquam in aliam convertatur per cujuscumque notule adjunctionem.” Jacobus, *Speculum musicae*, vol. 7, ed. Bragard, 425. “Like when the expression “dog” is taken equivocally for the barking animal, for the heavenly constellation [Canis major], and for the marine fish [Mustelus canis]—not that the heavenly star was ever a barking dog, or a marine fish, [nor] that one of them may be changed into another. Thus the same figure is taken neither [exclusively] for the perfect nor for the imperfect longa—not that one of them could ever be converted into the other by placing some note beside them.” Jacobus, *The Mirror of Music*, trans., Wegman, 68 (slightly modified).

brevé and is called a minor semibreve. The second is worth two-thirds of the breve and is called a major semibreve. This may be contrasted with the notational system of des Murs (to be outlined in further detail below), where breves may be imperfected by a solitary semibreve that removes one-third of the breve’s duration, rendering it imperfect. The iambic rhythm represented by Jacobus’s minor–major semibreve pair could thus alternatively be notated as a semibreve–imperfect breve pair in the system of des Murs.

The idea that short notes are incomplete, and that the breve constitutes a minimal unit of measurement for musical time is also encountered in the Italian trecento notational system, as codified by Marchetto of Padua in his Pomerium. Parallels can be found between Jacobus’s and Marchetto’s theories in a number of regards. For instance, both authors follow the Aristotelian definition of time as the “measure of motion,” and an infinitely divisible continuum. Both authors further distinguish between musical time and general time. Like Jacobus, Marchetto observes that musical tempus is associated with the breve.

Reflecting the practical nature of his treatise, Marchetto follows the thirteenth-century theorist Franco of Cologne in defining the musical tempus as a “minimum in plenitudine vocis” [least in the fulness of sound], and the “prima mensura et ratio mensurandi totum

Nota bene in Vetulus’s Liber de musica, to be discussed in Chapters 2 and 3, the terms semibrevis maior “greater semibreve” and semibrevis minor “lesser semibreve” have different connotations.


“Tempus est mensura motus (per Philosophum, quarto Physicorum)” da Padova, Pomerium, ed. Vecchi, 75–6. [Time is the measure of motion (according to the Philosopher in Physics IV)].
ipsum cantum” [first measure and cause of being measured of everything that is sung].\(^4\) For Marchetto, the *tempus* is the span of time equal to the perfect breve. Anything shorter than the *tempus* is by default “imperfect,” and anything longer “more-than-perfect.” Marchetto provides a number of justifications of this view. He places emphasis on the role of performance in determining the duration of the breve, as well as its role as a unit of measurement for all other notes. The breve’s status as perfect arises in part as a result of the process of proper inhalation and exhalation of the lungs, and the favorable full-voiced sound that ensues.\(^5\)

Marchetto elaborates this further, arguing that the physicality of performance should take precedence over the limitations of thought in determining the duration of the counting unit of the mensural hierarchy. He proves this in a dialogue with a critic with whom Marchetto spars over the nature of the musical *tempus*. The critic is described in dismissive terms as “quidam” [some person].\(^6\) The critic’s first objection to the perfect *tempus* occupying the role of the minimal counting unit for musical time stems from the claim that the


\(^5\) “Quando ergo plene dicta instrumenta concurrunt ad formationem vocis et decenter, non nimis nec parum, tunc fiet plenitudo vocis. Et istud fiet quando cum canna pulmonis seriose et decenter impleta anhelitu cum decenti inflatione ventris ad hoc exprimendum, emittitur anhelitus feriteque sic auditum quod ad plenum percipit, proferens hunc prolatum sonum sive vocem in sui ipsius seu in alterius proferentis pectore ceu in quodam tintinnabulo resonare. Illud ergo minimum tempus in quo potest plenitudo vocis formari, modo superius declarato, est primum tempus a quo tota musica mensuratur secundum magistrum Franconem.” da Padova, *Pomerium*, ed. Vecchi, 78. “Therefore, when the said organs work together fully and properly, neither too little nor too much, to produce a sound, then a fullness of sound will be made. And this will occur when the windpipe of the lungs has been filled properly and seriously with a full breath with the proper inflation of the stomach in order to exhale. The breath is let out and strikes the hearing sense which perceives it fully, causing this drawn out sound or voice in its own chest or in another to resonate as if in a bell. Therefore this least span of time in which a fullness of sound can be formed, as I noted above, is the first *tempus* in which all music may be measured according to Magister Franco.” Ralph Clifford Renner, “The *Pomerium* of Marchettus of Padua: A Translation and Critical Commentary” (MA Diss., Washington University, 1980), 65–6 (modified).

\(^6\) Sucato suggests that the critic at times alludes to the theory associated with Philippe de Vitry. Sucato, “Introduzione,” 223.
limitations of the voice should not determine the unit of measurement of musical time. This is because he can measure time in his mind:

[Quidam]: Tu dicis, tempus musicum est quod est minimum in plenitudine vocis, quam dicis formari decenter per instrumenta; et dicis hoc tempus esse mensuram cantus. Sed contra ego possum mensurare et tempus formare sine ipsa voce vel solum cum sono vel cum instrumentis vel breviter cantando organice vel rithimice vel solum cum imaginatione mea; ergo tale tempus, quod tu dicis, non est mensura et primum omnium aliorum.\textsuperscript{52}

[Some person]: You say that the musical \textit{tempus} is a “least in the fullness of sound,” which you say is formed properly by instruments; and you say that this \textit{tempus} is the measure of song. But on the contrary I can measure and form the \textit{tempus} without this voice or a sound, but instead with my imagination alone; therefore this \textit{tempus} about which you speak is not the measure of all others.

The critic here opposes Marchetto’s claim that the musical \textit{tempus} is the least in the fullness of sound on the grounds that the unit of measurement for musical time should not be limited by performance, but instead by the imagination.

To comprehend this statement, it is important to note that in the fourteenth century the meaning of the Latin word \textit{imaginatio}, or “imagination” differed from its sense in modern English. At this time, it was generally believed that the imagination was a part of the soul that turned sensory information into an image called the phantasm.\textsuperscript{53} The phantasm was an image of a perceived object that could be made intelligible to the intellect. As such, the imagination in the medieval sense did not serve to create images independently of perceived physical reality as implied by the critic (and as one might use the term “imagination” today), but rather as a mediator between the sensible (sensed) and intelligible (thought). It appears that Marchetto followed this definition because he responds to the critic by observing that the mind’s activities are predicated upon the “natural” limitations of the human voice; “nostra

\textsuperscript{52} da Padova, \textit{Pomerium}, ed. Vecchi, 80.

\textsuperscript{53} For a study of the medieval notion of imagination, see: Michelle Karnes, \textit{Imagination, Meditation, and Cognition in the Middle Ages} (Chicago: University of Chicago Press, 2011).
imaginatio mensurat quicquid mensuratur in cantu,” [our imagination measures whatever is measured in song].\textsuperscript{54} The measurement of music in the mind was thus secondary to its sounded reality in performance.

Marchetto also refutes the critic’s claim that the imperfect \textit{tempus} ought to serve as a measure for musical time, stating that it is the briefest sound that can be uttered with a full voice. He turns to Aristotle as an authority for his rebuttal, citing the status of the perfect \textit{tempus} as a unit of measurement for musical time, as follows:\textsuperscript{55}

\begin{quote}
Dicimus secundum magistrum Franconem quod musice loquendo tempus est id quod est minimum in plenitudine vocis; et hanc diffinitionem sic probamus. Unumquodque perfitur minimo sui genera (per Philosophum, decimo Metaphysicae), et hoc est clarum. Nam unitas quae est minimum et principium numeri perficit totum ipsum numerum.\textsuperscript{56}

We say according to Magister Franco that, speaking of music, the \textit{tempus} is that which is least in the fullness of sound. And we prove this definition like this: Everything is perfected by the smallest part of its genus (according to the Philosopher, in the tenth book of \textit{Metaphysics}), and this is evident. For the \textit{unitas}, which is the smallest and the first number, perfects the whole number.
\end{quote}

Citing \textit{Metaphysics X}, Marchetto compares the perfect breve to the \textit{unitas}, i.e., a mathematical unit of measurement. He states that the smallest part of a genus will “perfect” all of the other species within a genus, comparing this to the way in which a minimal unit perfects a whole


\textsuperscript{55} At the opening of his \textit{Pomerium}, Marchetto states that he has enlisted the assistance of Brother Syphantis de Ferraria with the philosophical arguments of his treatise. This draws attention to Marchetto’s incomplete knowledge of the Aristotelian arguments that he cites. da Padova, \textit{Pomerium}, ed. Vecchi, 27; Eleonora M. Beck, \textit{Giotto’s Harmony: Music and Art in Padua at the Crossroads of the Renaissance} (Florence: European Press Academic Publishing, 2005), 55. As Dyer has observed, late-medieval theorists did not customarily study in depth the authoritative texts that they referenced. Because there was no fixed correlation between the difficulty of texts and the number of times that they would be read in lectures, students would at times hear only once dense philosophical texts, such as those by Aristotle. As such, theorists’ knowledge of philosophy was at times haphazard. I discuss this in further detail in Chapters 2–3 in relation to the work of Johannes Vetulus de Anagnia. Joseph Dyer “Speculative ‘Musica’ and the Medieval University of Paris,” \textit{Music & Letters} 90, no. 2 (2009), 184.

number. What he means here is that the unit of number, which is analogous to the number “1,” groups to form all other, larger numbers. In this part of the *Metaphysics*, Aristotle does not state explicitly that the least in any genus perfects all other parts of the genus. However, he does state that the minimum is the “beginning and measure” of motion, which in the context of music was for Aristotle a microtone. Division demonstrates the lower limits of substances, and therefore the boundaries of their beings. Adapting this principle to a late-medieval musical context, Marchetto argues that the *tempus* serves as a unit of measurement because it is a perfection. Because the perfect *tempus* is the shortest complete and perfect utterable sound, the durations of all other notes are derived from it.

The status of the *tempus* as an ontologically prior unit of measurement for musical time is reflected in the *trecento* notational system. Similar to the post-Franconian system of Jacobus outlined above, breves are not imperfected by juxtaposed semibreves in Marchetto’s *Pomerium*. Instead, Marchettan semibreves appear in groups that sum up to the span of a breve. This is also mirrored by the way in which one must read the notation: because of the contextual nature of the notational system set out in the *Pomerium*, a reader must at times observe an entire breve’s worth of notes in order to ascertain the rhythm of a passage. In the *Pomerium*, I would suggest, an analogy may thus be drawn between the temporal unit of measurement favored by Marchetto and the process of reading music.

To illustrate this, consider the extract of *De soto ‘l verde vidi I ochi vaghi*, a madrigale copied in *Vat215*, f. 1r shown in Figure 1. This passage is copied under the so-called *quaternaria*

---


59 “Unity is the measure of all things, because we learn of what the substance is composed by dividing it, in respect of either quantity or form. Hence unity is indivisible, because that which is primary in each class of things is indivisible.” Aristotle, *Metaphysics*, X1053a20–23. Translation from: Aristotle. *Metaphysics*, vol. 1 trans. Jeffrey Henderson (Boston, MA: Harvard University Press, 2014), 9.
division. I will discuss Marchetto’s various divisions in further detail in Chapter 2. However, for now it suffices to know that in the basic form of this division, breves are divided into four undifferentiated semibreves, i.e., semibreves that are not distinguished by either an ascending or descending stem, but that nevertheless vary in duration.\footnote{Few repertorial examples of what may be described as “pure” Marchettan notation exist. Nevertheless, \textit{Vat215} is the most complete source of early \textit{trecento} repertoire that makes use of Marchettan principles, without necessarily being dogmatic about adherence to the system. A manuscript of possible Paduan origins, the codex is dated by Nino Pirrotta to c. 1370. Michael P. Long attributes the differing styles of the codex to three eras of composition (1325–35, 1335–45, and 1345 onwards). Pirrotta has refuted this claim, observing that the three stylistic layers of the codex can be attributed to the differing compositional personalities exhibited in the codex. Nino Pirrotta, ed., \textit{Il Codice Rossi 215=the Rossi Codex 215: Roma, Biblioteca Apostolica Vaticana: Ostiglia, Fondazione Opera pia don Giuseppe Greggiati: Studio introduttivo ed edizione in facsimile} (Lucca: Libreria musicale italiana, 1992), 71, 111; Michael Paul Long, “Musical Tastes in Fourteenth-Century Italy: Notational Styles, Scholarly Traditions, and Historical Circumstances” (PhD diss., Princeton University, 1980), 210–2.}

Figure 1: Extract of \textit{De soto ’l verde vidi I ochi vaghi} notated using the \textit{quaternaria} division\footnote{\textit{Vat215}, f. 1r. Used by courtesy of the Biblioteca Apostolica Vaticana.}

As can be seen in Figure 1, dots of division demarcate groups of semibreves that add up to the span of a breve. Because one may write up to four semibreves in the \textit{quaternaria} division, it is sometimes necessary to vary the length of semibreves so that they may fill out the time of the breve. There are two methods of determining the duration of notes. Where all semibreves are stemless lozenges they are said to be drawn \textit{via naturae} [the way of nature], and may be interpreted by referring to prior knowledge of a set of notational patterns that
Marchetto sets out in the *Pomerium*. The undergirding principle of these patterns is that semibreves closest to the beginning of the breve unit are shorter than those at the end.\(^{62}\)

Figure 2 illustrates the patterns of the *quaternaria* division. Where two semibreves in the *quaternaria* division are written, these are each worth half of a breve; where three are drawn, the first two are half as long as the third; all are equal where four semibreves are drawn.

Figure 2: The *via naturae* organization of semibreves according to Marchetto’s divisions

<table>
<thead>
<tr>
<th>Quaternaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
</tr>
<tr>
<td>●</td>
</tr>
<tr>
<td>●</td>
</tr>
</tbody>
</table>

Figure 3 shows again the extract of *De soto ‘l verde vidi I ochi vaghi*, this time with annotations illustrating the duration of every note. Breve-units are demarcated by the vertical dashed lines. The numerals 1–4 indicate how many of the shortest semibreves are contained within each note. As one may see in bb. 2 and 6, where three semibreves are placed for a breve in *quaternaria*, the first two will be shorter than the third. In b. 5, one can also see that a descending stem has been appended to the first semibreve of this group, leading it to be doubled in length, and disrupting the *via naturae* patterns shown in Figure 2. Semibreves that

\(^{62}\) Marchetto provides philosophical justification for this, arguing that the thing that is last in the natural order always perfects the whole. He appeals to the authority of Aristotle to uphold this claim, stating that “finis enim est causa causarum et omnibus causis nobilior (per Philosophum, secundo Physicorum).” “The end [of a thing] is [its] cause of causes and the most noble of all (Aristotle, book II of the *Physica.*”) da Padova, *Pomerium*, ed. Vecchi, 102; trans. Beck, *Giotto’s Harmony*, 57.
have stems added to them in this way were said to be drawn *via artis* [the way of artifice]. An ascending stem shortens a note, while a descending stem lengthens it, in relation to other notes.

**Figure 3:** Transcription of an extract of *De soto* showing the duration of notes in the shortest semibreves

That one must at times observe an entire breve’s worth of semibreves in order to even determine the duration of notes in this system finds its parallel, I would suggest, in Marchetto’s assertion that the breve should act as a unified whole. His philosophical explanation—that the perfect breve is an *unitas*—provides justification for this contextual notational system in which the division of the breve into parts is prioritized unambiguously over the grouping of its parts into the breve. In this system a semibreve devoid of context is truly meaningless: it is a part without a whole, literally and conceptually.

The above analysis provides a simple example of the application of the Marchettan *quaternaria* division in practice; in total, Marchetto theorizes the division of the breve into twelve semibreves (and beyond). As a result of this, it is at times necessary to count up to

---

63 Giulia Accornero has recently argued that connections may exist between the *via artis* and *via naturae* ways of theorizing the representation of musical time and the computus tradition. Giulia Accornero, “*Via artis* and *Via naturae* in Marchetto’s Pomerium: New Insights From Computus Sources,” *Current Research in Fourteenth-Century Music: International Graduate and Postgraduate Conference* (Università di Padova, March 8, 2021).
twelve notes to even determine the duration of semibreves in Marchetto’s notational system. Perhaps resulting from the impracticality of this system, early trecento music scribes often deviated from Marchetto’s “natural” patterns of the division of semibreves. Both ascending and descending stems were added to semibreves frequently in order to clarify the rhythmic organization of semibreves within a breve unit.

Although Marchetto theorizes the perfect breve or tempus as an indivisible unit of measurement, like Jacobus, he argues that the general time within which the tempus is situated is still infinitely divisible. Yet while everything can be infinitely divisible in potentiality, in the context of music the divisibility of the breve is still determined on a localized level by the virtuosity of singers. He provides the example of Peter, whose dry throat prevents him from singing more than three semibreves in the time of the breve. Peter’s limitations, he claims, cannot rob God and the angels (and presumably Marchetto himself) of their knowledge of more adept singers who sing more breves.\(^{64}\)

The existence of parts within the breve (incomplete by themselves) led Marchetto to argue that all breves in a perfection contain within themselves either implicitly or explicitly the value of all of the parts of their division.\(^{65}\) The same is true of the semibreves themselves. Since Marchetto theorizes semibreves that can differ in duration depending on the context, these notes also at times contain implicitly shorter semibreves. He describes this process as follows:

\[
\text{Quidquid mensurant plures notae explicite, totum mensurant pauciores implicite; nam de ratione totius divisibilis est quod tantum in se contincant partes pauciores implicite, quantum plures continent explicite: sicut tres partes lineae, in quas dividitur tota linea, tantum continent implicite, quantum facerent duodecim explicite, si in}
\]


\(^{65}\) This observation is in tension with Tanay’s assertion that Marchetto may be regarded as an “atomist.” Medieval theorists did not typically acknowledge that atoms could have parts. Tanay, *Noting Music*, 123.
duodecim divideres ipsam. Tantum ergo mensurant de partibus temporis perfecti implicite tres vel sex notae, quantum duodecim explicite.\textsuperscript{66}

Whatever many notes measure explicitly, a smaller number of parts measure the whole implicitly, for from the idea of a divisible whole, it is [the case] that a smaller number of parts contain in themselves as much implicitly as a larger number [of parts] contain explicitly, as [for example] the three parts of a line into which the whole line is divided contain as much implicitly as twelve would explicitly if it were divided into twelve. Therefore, three or six notes fill out as many of the parts of the perfect *tempus* implicitly as twelve [do] explicitly.\textsuperscript{67}

In the extract, Marchetto explains that a perfect *tempus* that contains implicitly within it twelve parts may be filled out explicitly by three or six notes.\textsuperscript{68} These three or six notes contain within them implicitly the value of all of the twelve potentially available parts of the perfect *tempus*. Like the span of the breve itself, these parts are prior and whole. While the number of notes contained within a breve may vary, providing that the duration of the breve itself does not change, the breve will still contain within itself the same number of parts in potentiality. This illustrates, I would suggest, that Marchetto’s preference for the ontologically indivisible breve unit did not exclude the possibility that a breve could also be known as the sum of its parts. The being of a perfect breve *qua* perfect breve is inseparable from its status as a span of time and a collection of parts, as much as the existence of each semibreve is predicated upon its position within a collection of notes that add up to the span of a breve.

---


\textsuperscript{67} Renner, “The *Pomerium* of Marchettus of Padua,” 133–4 (modified).

\textsuperscript{68} Marchetto also theorizes an imperfect *tempus* that is two-thirds the duration of the perfect *tempus*. I discuss Marchetto's divisions further in Chapter 2 in relation to the work of Johannes Vetulus de Anagnia.
Multiple Units

While Jacobus may be said to be an adherent of the succession theory of the latitude of forms thesis, des Murs may be said to follow the addition theory of the latitude of forms thesis. Recall that adherents of the addition theory believed that the quality of forms could vary within a latitude, and that substances could therefore possess a plurality of forms. Within each latitude, qualitative changes to forms were believed to take place within maximal and minimal limits. This facilitated the categorization of the formal and material limitations of substances. The formal minimal limits of substances came to be known as minima naturalia (natural minimums) and the maximal limits maxima naturalia (natural maximums). Although minima naturalia were described in a number of different ways in the Middle Ages, most fourteenth-century philosophers believed that the minimum naturale constituted the lower limit of a latitude of a substance.

Des Murs’s beliefs about the formal limits of substances influenced his mensural theory. As Desmond has outlined, des Murs wrote that each note possessed two forms. The first—a natural form—is the sound itself. The second—a mathematical form—is the measurement of the sound. Like Jacobus, des Murs believed that the shape of a note—its figura—was formally perfect. However, because he believed that the sound that was signified by a written note was attributed to it only accidentally, and since part of a note’s substantial form could be removed or added from it, he believed that imperfection could be enacted

---

69 Tanay, Noting Music, 125; Desmond, Music and the moderni, 175–83.

70 Two different interpretations of such a minimum naturale were proposed; one in which the minimum naturale is viewed as an extensive minimum, a “minimum quod non,” and the other in which the minimum naturale is viewed as an intensive minimum, a “minimum quod sic.” For a detailed discussion of this, see John E. Murdoch, “The Tradition of minima naturalia,” in Late Medieval and Early Modern Corpuscular Matter Theories, ed. Christoph Herbert Lüthy, John Emery Murdoch, and William Royall Newman (Leiden: Brill, 2001), 114–8.

71 Desmond, Music and the moderni, 175–79.
upon a note. Unlike Jacobus’s breve, which merely shows that a longa next to a breve is imperfect, des Murs’s breve could transform a perfect longa into an imperfect longa through imperfection. Similarly, whereas in Jacobus’s system an iambic rhythm taking up the time of a breve could only be written using two juxtaposed undifferentiated semibreves, in des Murs’s system this could be written as a semibreve followed by a breve, imperfected by the semibreve. Figure 4 compares these two systems:

Figure 4: Iambic rhythms in Jacobus’s versus des Murs’s notational systems

<table>
<thead>
<tr>
<th>Duration in semibreves</th>
<th>*</th>
<th>*</th>
<th>•</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacobus</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Des Murs</td>
<td>*</td>
<td></td>
<td>■</td>
</tr>
</tbody>
</table>

As is well known, des Murs devised an innovative method of notation, termed the *gradus*, i.e., “degree” or “step” system. Set out in the *Notitia artis musice*, the *gradus* system is

---

72 “Quoniam ergo vox tempore mensurata unionem duarum formarum, naturalis scilicet et mathematicae, comprehendit, licet quod ratione alterius fractio non cessaret, tamen propter aliam vocis divisionem necessarium est alcubi terminari. Nam sicut omnium natura constantium positus est terminus et ratio magnitudinis et augmenti sic parvitas et diminuti. Demonstrant enim naturales, quod natura ad maximum et minimum terminatur. Vox autem est per se forma naturalis iuncta per accidens quantitati. Igitur oportet cam habere terminos fractionis, quorum latitudinemem nulla vox quantacumque frangibilis valeat praeterire. Hos autem terminos volumus comprehendere ratione.” Jean des Murs, “Notitia artis musicae et Compendium musicae practicae,” in Jean des Murs, *Notitia artis musicae et Compendium musicae practicae*, and Petrus de Sancto Dionysio, *Tractatus de musica*, ed. Ulrich Michels (Dallas: American Institute of Musicology, 1972), 69. “Seeing, on the other hand, that sound measured by time consists in the union of two forms, namely the natural and the mathematical, it follows that because of the one its division never ceases, while because of the other its division must necessarily stop somewhere; for just as nature limits the magnitude and increase of all material things, so it also limits their minuteness and decrease. For natural things demonstrate that nature is limited by a maximum and a minimum. Sound, moreover, is in itself a natural form to which quantity is attributed accidentally. Therefore, it is necessary for there to be limits of division beyond which no sound, however fractionable, may go. These limits we wish to apprehend by reason.” Jean de Murs, “Notitia artis musicae, Book Two: Musica practica,” in *Source Readings in Music History*, ed. and trans. Oliver Strunk (New York and London: W. W. Norton & Company, 1998), 263 (modified).
predicated upon the principle that the latitude of possible musical notes can be categorized into different degrees, or *gradus*. Des Murs’s *gradus* system includes a more extensive range of noteshapes than Jacobus’s post-Franconian notational system, notably including stemmed minims ♩. As is illustrated in Table 1, the shortest note of each successive degree (or *gradus*) of notes is equivalent to the longest of the next degree. The longest note in each *gradus* is worth three of the shortest notes of its own *gradus*. The note between the shortest and longest notes in a *gradus* is worth two of the shortest notes in its *gradus*.²³

Table 1: Des Murs’s *gradus* system²⁴

<table>
<thead>
<tr>
<th>Duration in minims</th>
<th>First gradus</th>
<th>Second gradus</th>
<th>Third gradus</th>
<th>Fourth gradus</th>
</tr>
</thead>
<tbody>
<tr>
<td>81</td>
<td>Longissima ♦</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Longior ♦</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Longa ♦</td>
<td>Perfecta ♦</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Imperfecta ♦</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Brevis ♦</td>
<td>Brevis ♦</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Brevior ♦</td>
<td>Parva ♦</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Brevissima ♦</td>
<td></td>
<td>Minor ♦</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Minima ♦</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As Murdoch has noted, the use of terms such as *gradus*, *latitudo*, and comparatives such as *brevior*, *brevissima*, *longior*, *longissima*, were used typically by fourteenth-century philosophers who were engaging with the latitude of forms thesis, and this is the language that des Murs

---

²³ Sylla states that philosophers commonly constructed *gradus* that were composed of three parts. Sylla, “Medieval Concepts,” 252.

used to name his notes. Further, because des Murs was an adherent of the addition theory of the latitude of forms, his gradus in themselves share properties of the latitude of musical sound in its entirety. The latitude of sound incorporates all notes and is limited minimally by the minim and maximally by the longissima. The minim serves as a unit of measurement for the latitude in its entirety. At the same time, each gradus is bounded minimally and maximally, and has its own unit of measurement for the notes within its own gradus. The longa serves as the minimal threshold of the first gradus, the brevis of the second gradus, and so on. The minim serves as a unit both for the fourth gradus and the mensural hierarchy in its entirety. In his application, des Murs thus describes the nature of the minim from three different perspectives. It is a minimal threshold of a divided continuum, a unit of

---

75 Murdoch, “From Social into Intellectual Factors,” 232. Language such as this is found in Jacobus’s treatise and in Johannes Vetulus de Anagnia’s Liber de musica.

76 Sylla has noted that in some interpretations of the addition theory, the degrees of latitudes behave in a similar manner to latitudes in that they are both “qualitative distances.” Sylla, “Medieval Concepts,” 260.

77 This observation has led Dorit Tanay to argue convincingly that des Murs’s minim is a minimum naturale of musical sound. However, Tanay also suggests that fourteenth-century minima naturalia are comparable to Greek atoms. “Jehan’s minima is a minim of nature, or better, an atom of time in the Greek sense, that is not a sizeless entity like a point or an instant, but the smallest perceptive positive duration.” Tanay, Noting Music, 125. Although medieval minima naturalia are similar to some kinds of Greek atoms insofar as they have an extension, these two minimal particles are not conceptually the same. Ancient Greek philosophers such as Democritus and Epicurus believed that atoms were prior, autonomous, and indivisible particles out of which the world was formed. Minima naturalia, on the other hand, are not truly prior and autonomous, since they represent the lower thresholds of formal substances. When they are associated with a mathematical quantity, they can be used as a unit of measurement—such as des Murs’s minim. However, they are still ontologically divisible into a new species of substance. For a summary of Democritus’s and Epicurus’s atomism, see: Bernhard Pabst, Atomtheorien des lateinischen Mittelalters (Darmstadt: Wissenschaftliche Buchgesellschaft, 1994), 8–13.

78 “Secundum priores figura quadrilatera, aequilatera, reciangula, caudata dextrorsum sursum vel deorsum in secundo gradu imperfectum significat pariter et perfectum, hoc est ternarium et binarium. Eadem figura non caudata significat unitatem, sed eadem significans unitatem in secundo gradu, ternarium et binarium significat in terto. Figura vero quadrilatera, aequilatera, obtusiangula unitatem significat in eodem.” des Murs, Notitia artis musicae, ed. Michels, 76. [According to the above, a square, equilateral, rectangular figure with an ascending or descending stem to the right in the second gradus signifies either a perfect (ternary) or an imperfect (binary) note. The same figure without a stem signifies the unitas, but the same figure signifying the unitas in the second gradus signifies a ternary and binary note in the third. A square, equilateral, obtuse-angled figure signifies the unitas in the same (gradus).]
measurement for the fourth *gradus*, and a unit of measurement for the mensural hierarchy in its entirety.\(^{79}\)

Just as Marchetto’s and Jacobus’s descriptions of musical notes as units or unities may be seen to be analogous to the process of grouping together semibreves during reading, so can des Murs’s description of the lower threshold of each *gradus* be equated to the process of reading. This is because the localized contextual nature of des Murs’s system—in which imperfection can be applied to notes in all four *gradus*—demands that a reader shifts their attention between several different note levels to determine their durations. Whereas in Jacobus’s and Marchetto’s systems the reader had to measure an entire breve unit’s worth of semibreves in order to determine the duration of each individual note, the reader in des Murs’s system must consider the relationship between notes in each of the four *gradus* to determine rhythmic patterns.

*Porphyrian Tree Diagrams*

Desmond has hypothesized that the visual representation of time in Jacobus’s and des Murs’s systems may also be compared with one another. She suggests that des Murs’s tabular representation of musical time is illustrative of his move away from the theorization of distinct species of notes towards a system in which time was viewed as a line. The line diagram may thus be said to portray the “additive” nature of des Murs’s theorization of musical time, which came to fruition in the so-called dot of addition.\(^{80}\) In contrast to the dots of division present in the systems preferred by Jacobus and Marchetto, which demarcated

---

\(^{79}\) Although the minim is the minimal threshold of musical sound, we may surmise that its division would result in the creation of a formally distinct substance.

\(^{80}\) Desmond, *Music and the moderni*, 197.
breve units, des Murs’s dots of addition could be added to imperfect notes to increase their length, resulting in a perfect note.

Desmond suggests that Jacobus’s theorization of discrete notes corresponds to the visual representation of distinct species of notes as codified in the Porphyrian tree. The Porphyrian tree diagram is a visual representation of Aristotle’s categories as set out by Porphyry in his *Isagoge* or introduction to Aristotle’s *Categories* (late third century). Figure 5 shows a “canonical” Porphyrian tree. The canonical Porphyrian tree proceeds downwards connecting logical terms. As Ian Hacking observes, it descends because it is modelled on the tree of life, and thus is similar in shape to the human body. The roots may therefore be said to stand in for the head. In the center of the diagram sit the genera, and on either side species of each genus. The species of the higher genera become the genera of the lower species. Thus, substance is a genus divided into corporeal and incorporeal species. The corporeal species then becomes the genus of body, which is divided into animate and inanimate species, and so on.

---

81 Jacobus does not include a Porphyrian tree diagram in his treatise. Desmond’s hypothesis is thus based upon the testimony of Petrus de Picardia, who described the work of a certain Johannes de Burgundia as a “tree.” Again, no tree diagram has survived that represents de Burgundia’s work. Desmond provides a reconstruction of what this tree diagram would look like from Petrus’s description. Desmond, *Music and the moderni*, 187–97. That Petrus neglected to include a tree diagram does not undermine the hypothesis that he was describing a Porphyrian tree, since Porphyry himself did not include a tree diagram in his *Isagoge*.

82 The first known tree of Porphyry to be labelled as such can be found in a *Tractatus* (also known as *Summulae logicales*), attributed to Peter of Spain. Hacking terms this kind of tree diagram (shown in Figure 5) a “canonical” tree diagram. See: Ian Hacking, “Trees of Logic, Trees of Porphyry,” in *Advancements of Learning Essays in Honour of Paolo Rossi*, ed. J.L. Heilbron (Florence: L.S. Olschki, 2007), 244.


Among fourteenth-century music theorists, Marchetto of Padua included a Porphyrian tree diagram in his *Pomerium* to represent his mensural hierarchy. He is explicit about the origins of his diagram, and includes beside his musical tree an incomplete canonical Porphyrian tree, shown in Figure 6. Here, Marchetto places the musical *tempus* (the span of the breve) in the position of substance, and provides two species of substance—perfect and imperfect. These species are then divided into parts. To the left, the upper layer contains six semibreves (divided into three groups of two semibreves), which Marchetto terms the *senaria perfecta* division. In the lower layer, the perfect *tempus* is divided into nine semibreves.

---


86 Desmond has also observed that Marchetto draws a Porphyrian tree of noteshapes. Desmond, *Music and the moderni*, 195.
which Marchetto terms the \textit{novenaria} division. To the right, the imperfect \textit{tempus} is first divided into four semibreves, representing the \textit{quaternaria} division. It is again divided into six semibreves, but this time distributed into two groups of three semibreves. Marchetto terms this the \textit{senaria imperfecta} division.

Figure 6: Marchetto’s Porphyrian trees\textsuperscript{87}

Marchetto’s tree descends from that which is predicabale of many (breves) to the individual (the shortest semibreves), and sets in opposition the perfect and imperfect as the two manifestations of the musical \textit{tempus}. This mirrors the opposition of the corporeal and incorporeal as depicted in the Porphyrian tree. Marchetto’s tree of the musical hierarchy of notes is also accompanied by a tree of Porphyry depicting the binary opposition of corporeal

\textsuperscript{87} Adapted from da Padova, \textit{Pomerium}, ed. Vecchi, 148.
and incorporeal substances, as extracted from the “canonical” Porphyrian tree of Peter of Spain. Marchetto thus applies the tree of Porphyry to his musical hierarchy without qualification.

Another music-theoretical application of the Porphyrian tree, I would suggest, can be found in the *Ars cantus mensurabilis mensurata per modos iuris*, a late fourteenth-century source of possible Florentine provenance, which is notable for the integration of legal terms into its text. Expanding on the *gradus* system of des Murs, the author describes initially five simple notes—the maxima ♪, longa ■, breve ▼, semibreve ♩, and minim ♪. Like des Murs, he refers to the latitude of forms thesis to justify limiting the mensural hierarchy to these five notes:

“Probatur in naturalibus: datur maximum et minimum” [This is proven in natural things: a maximum and minimum are given]. The name of the minim determines again its status as an ontological minimum of musical sound. He further uses comparatives to describe the four degrees by which a note may be imperfected (remotely or closely), stating that imperfection may be “propinqua” [close], “remota” [remote], “remotior” [more remote], and “remotissima” [most remote]. At the fourth degree of imperfection—in his terms the “most remote”—the minim alone imperfects the maxima. Figure 7 shows the anonymous author’s visual representation of remote imperfection. At the very top of the diagram, the author writes each kind of note that exists in his mensural system. Moving down the diagram, each

---

88 Anonymous, *Ars cantus mensurabilis mensurata per modos iuris* = *the Art of Mensurable Song Measured by the Modes of Law: A New Critical Text and Translation on Facing Pages, with an Introduction, Annotations, and Indices verborum and Nominum et rerum*, ed. and trans. C. Matthew Balensuela (Lincoln: University of Nebraska Press, 1994), 23–43. Balensuela argues that the appearance of the motet *Rex Karole/Leticie pacis/Virgo prius* in the *Ars cantus mensurabilis mensurata per modos iuris* points towards a date after 1375/6. The provenance of this treatise is unknown. However, Balensuela has observed that some attributes of the treatise, such as the musical examples, may point towards Italian and specifically Florentine provenance. Ibid., 82–3.


note in the trunk of the tree is imperfected by the notes on either side of it. As one proceeds
down the tree, notes become progressively shorter. Thus, at the top of the tree, the longest
note of the author’s system—the maxima—can be imperfected by minims, semibreves,
breves, and the longa. Moving down the tree, the longest note that could imperfect the
maxima—the longa—is itself imperfected, this time by minims, semibreves, or the breve. The
breve is then imperfected by minims, or the semibreve, which is itself finally imperfected by
the shortest note of the system—the minim.

Figure 7: Visual representation of imperfection by remote parts in the *Ars cantus mensurabilis
mensurata per modos iuris*91

---

91 This diagram is edited in Anonymous, *Ars cantus mensurabilis*, ed. and trans. Balensuela, 124, and is
copied in *BrII785*, ff. 12r–13r.
Drawn in the form of an inverted tree, the anonymous author’s diagram, I would suggest, is an adaptation of the tree of Porphyry. At the top of the tree is positioned the genus of the maxima, which can be imperfected below and on either side by shorter notes to form various species of maximae. These are not visibly present on the diagram, but are instead imagined by the reader, who can infer them from the shorter notes drawn on the diagram. To this extent the anonymous author’s diagram deviates from the canonical Porphyrian tree, where species are stated explicitly on either side of the genus. As one continues to descend the tree, the longa—which before stood in for the imperfect maxima—itself becomes a genus, and is imperfected by the notes beside and below it once more. Again, the reader must infer the existence of these various species of longa from the shorter, imperfecting notes. The same process is undertaken with the breve, and the semibreve.

That the anonymous author of the *Ars cantus mensurabilis mensurata per modos iuris* should have chosen to represent imperfection by remote parts using Porphyrian tree diagrams illustrates that such diagrams were used to represent a notational system that bears close similarity to that of des Murs. As a staunch advocate of the *gradus* system, the anonymous author of the *Ars cantus mensurabilis mensurata per modos iuris* applies all of the rules of imperfection and dotting that des Murs had in his treatise, and expands on them. This calls into question the idea that the Porphyrian tree was used specifically by theorists who had conceived of distinct species of notes, such as Jacobus. Further, as I will discuss in greater detail in the following section and again in Chapters 2–3, fourteenth-century theorists put to use different kinds of tree diagrams when representing musical notes. Not all of the tree diagrams drawn in late-medieval theoretical treatises may be regarded as Porphyrian tree diagrams in the traditional sense. In the following section, I consider in further detail the

---

92 Balensuela observes that there are similarities between this tree and the Tree of Consanguinity, a tree that was commonly used in legal treatises. Balensuela, “Introduction,” 66. This type of tree may be regarded as a subset of the Porphyrian tree. Verboon, “The Medieval Tree of Porphyry,” 107.
relationship between the shape of fourteenth-century diagrams and theorists’ beliefs about the nature of the continuum. I will suggest that diagrams that are drawn with longer notes at the top appear to have been used to represent continua where division is prioritized over grouping, whereas diagrams in which shorter notes are drawn at the top imply grouping, and thus the formation of longer timespans through the accumulation of shorter notes.

**Time in Aggregate**

For authors such as des Murs, the minim’s status as the minimal limit of musical time was inseparable from its being as the counting unit of musical time. The very name “minima,” i.e., “the smallest” implies that no musical sound shorter than the minim can exist. Thus, des Murs’s minim was believed to be an ontologically prior minimally brief musical sound. As new notes shorter than the minim began to be used, they became the subject of controversy among theorists. They challenged the idea that the term “minim” and the minimally short sound were inseparable. The minim’s role both as a conceptual minimal perceivable and performable duration of sound, and a minimal span of musical time began to be questioned.

Music theorists of the later Middle Ages devised a number of solutions to the philosophical problems presented by the existence of notes briefer than the minim. Some theorists argued that the minim as a minimally brief sound should be distinguished from the minim as a written noteshape. According to these theorists, this is because the name minim
was associated with the noteshape arbitrarily, as a result of custom.93 Others did away with the idea that the name “minim” was ontologically prior, and stated instead that the shortness of notes was “relative.” An example of this can be found in the work of the anonymous author of the *Omnis ars sive doctrina*, a mid-century source that was copied beside Johannes Vetulus de Anagnia’s *Liber de musica*.94 The author states that the perceived ontological “smallness” of noteshapes may be compared to that of rocks: among large rocks, a small rock will look small. However, if these larger rocks are to be divided into tiny pieces, the small rock will now appear larger in comparison with what were before larger rocks.95 The same can be said of notes, whose sizes are relative. He discusses this example to advocate for the use of notes shorter than the minim, including the semiminim, and the “semiminimissima.”96

---

93 The fourteenth-century English theorist Johannes Hanboys subscribed to this view. He believed that the term “minim” could be applied only to the shortest note, but that this did not have to be drawn in the shape of a minim ♪. This led him to rename the new “smaller” noteshapes. His eight types of note are as follows: larga ♫, longa ♬, breve ♦, semibreve ♦, minor ♦, semiminor ♦, and minima ♦. The absolute duration of the note named “minim” was not relevant to Hanboys, only its context within the mensural hierarchy, suggesting that for him the minim was conceptually, but not physically indivisible. Johannes Hanboys, “Summa,” in Robertus de Handlo, *Regule and Johannes Hanboys, Summa: A New Critical Text and Translation on Facing Pages, with an Introduction, Annotations, and Indices verborum and nominum et rerum*, ed. and trans. Peter M. Lefferts (Lincoln and London: University of Nebraska Press, 1991), 188–93.

94 This treatise was dated to ca. 1380 by Cecily Sweeney. However, Francesca Mazari and Jason Stoessel’s new dating of *Vat307* (to be discussed further in Chapter 2) would also place the *Omnis ars sive doctrina* in the 1350s–60s or earlier. Sweeney dated the *Omnis ars sive doctrina* on account of its similarities to the English theorist John of Tewkesbury’s *Quatuor principalia musicae*. This treatise has also subsequently been redated to 1351 by Luminita Florea Aluas. Gilbert Reaney suggested that this anonymous author may have compiled *Vat307*. Cecily Sweeney, “Introduction,” in Anonymous, *De musica mensurabili*, ed. Cecily Sweeney; Anonymous, *De semibrevis caudatis*, ed. André Gilles and Cecily Sweeney, Corpus scriptorum de musica, vol. 13 ([Rome]: American Institute of Musicology, 1971), 9; Aluas, “The ‘Quatuor principalia musicae’,” 5–7; Gilbert Reaney, “The Question of Authorship in the Medieval Treatises on Music,” *Musica disciplina* 18 (1964), 16; Francesca Manzari and Jason Stoessel, “The Intersection of Anglo-French Culture and Angevin Illumination in a Fourteenth-Century Ars Nova Miscellany: A New Dating of Biblioteca Apostolica Vaticana, Barb. Lat. 307 and Sankt Paul im Lavanttal, Archiv des Benediktinerstiftes, MS. 135/6,” *Miscellanea Bibliothecae Apostolicae Vaticanae* XXV 25 (2019), 13.

95 Anonymous, *De musica mensurabili*, ed. Sweeney, 54.

Debates about the status of the minim as an ontologically prior minimal musical sound also provoked questions about its autonomy and agency. Whereas before writers such as des Murs had viewed the minim primarily as a *minimum naturale*, i.e. a minimal threshold of the divided continuum of musical sound, others began to experiment with the idea that the shortest musical sound served as an autonomous mathematical counting unit for all other sounds. This gave rise to the innovative practice of writing notes whose durations are no longer contextual, but instead can be determined by their shape. However, the authors who argued that a minimal counting unit was used to measure the duration of every sound did not exclude divisibility. While the English authors to be discussed below prioritized grouping, they devised systems in which timespans could be conceived of via grouping, division, or the combination of both at any level of the mensural hierarchy. Ultimately, this flexibility would be harnessed by later writers who would write complex rhythms.

As I have indicated throughout this chapter, for most theorists, short particles of sound were perceived to be indivisible only insofar as they were conceived of as mathematical units or wholes. Many theorists justified their beliefs by appealing to the authority of Aristotle. In his well-known definition of number from *De institutione arithmetica*, Boethius described the *punctum* (the point, which he earlier termed the *unitas*). Like Aristotle’s mathematical

---

97 This may be seen as an extension of the idea inherent within des Murs’s system that each *gradus* possesses its own counting unit. The idea of multiple units is replaced with the notion that the duration of only the shortest note serves as a counting unit. Because this counting unit is autonomous, the range of possible ways of grouping units of musical time is expanded to encompass all of the various durations within the temporal continuum. As I will discuss in Chapter 2, this was taken to extremes by Johannes Vetus de Anagnia.

98 “Est igitur unitas vicem obtinens puncti, intervalli longitudinisque principium; ipsa vero nec intervalli nec longitudinis capax, quemadmodum punctum principium quidem lineae est atque intervalli, ipsum vero nec intervallum nec linea.” Boethius, *De institutione arithmetica libri duo*, ed. Godofredus Friedlein (Leipzig: B. G. Teubner, 1867), 87. “Therefore unity has the potential of a point, the beginning of interval and longitude, it is not capable of interval or longitude, just as the point is the beginning of the line and the interval, although it is itself neither interval nor line.” Michael Masi, ed. and trans. *Boethian Number Theory: A Translation of De institutione arithmetica* (Amsterdam: Rodopi, 1983), 129.
counting unit, Boethius’s *unitas* is an imperceptible and indivisible particle that has no extension. Since it has no length, it is said to be a perpetual potential becoming of a line or space:

> Constat punctum ipsum sine ulla corporis magnitudine vel intervalli demensione, cum et longitudinis et latitudinis et profunditatis expers sit, omnium intervallorum esse principium et natura insecabile, quod Graeci atomon vocant, id est ita deminutum atque parvissimum, ut eius pars inveniri non possit. Est igitur punctum primi intervalli principium, non tamen intervallum, et lineae caput, sed nondum linea.

A point exists without the magnitude of a body or the dimension of an interval, since it is bereft of length, width, and depth. It is the beginning of all intervals and indivisible by nature, and the Greeks call it atom; it is so diminished and very small that parts of it cannot be found. Therefore the point is the beginning of the first interval, but it is not an interval; it is the head of the line, but not yet a line.

From this definition, Boethius proposes two alternative ways of understanding mathematical reality—multitude and magnitude. Multitude, which pertains to arithmetic, is formed from the accumulation of an infinite number of discrete, indivisible particles, commencing from the singularity. Magnitude, which pertains to geometry, is an infinitely divisible continuum that is limited maximally. The *unitas* serves as the unit of the multitude—the number “1.” It is also the durationless coming-to-be of a line and the beginning of magnitude—the number “0.” Table 2 provides a reproduction of Boethius’s table of *unitates* from *De institutione*.

---

99 Boethius, *De institutione arithmetica libri duo*, ed. Friedlein, 89.

100 Masi, ed. and trans. *Boethian Number Theory*, 130 (modified).

Here, the *unitas* as the numeral “1” serves as a unit for numbers that are powers of two and three and their products.\(^{102}\)

Table 2: Transcription of table from Boethius’s *De institutione arithmetica*\(^{103}\)

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>12</td>
<td>24</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>18</td>
<td>36</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>54</td>
<td>108</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>81</td>
<td>162</td>
<td></td>
<td></td>
<td>243</td>
</tr>
</tbody>
</table>

The idea that the *unitas*, and thereby number, constituted the beginning of things, is ubiquitous in treatises of the medieval neo-Pythagorean tradition.\(^{104}\) As I outlined above, Aristotle also theorized multitude and magnitude in his *Metaphysics*, and it is possible that his work also played a role in shaping the music-theoretical discourse of the fourteenth century.\(^{105}\)

\(^{102}\) As Table 2 illustrates, the indivisible *unitas* can be grouped together into powers of two and three and their products. Numbers in the first row of the table represent powers of two, and numbers at the bottom of the table powers of three. Adjacent numbers in the columns represent a proportion of 3:2. As is well known, this diagram originated in Nicomachus’s *Introduction to Arithmetic*. For a discussion of applications of Nicomachus’s arithmetic to proportional systems, including this table, see: Jay Kappraff, “The Arithmetic of Nicomachus of Gerasa and Its Applications to Systems of Proportion,” *Nexus Network Journal* II (2000), 41–55.


\(^{104}\) Andrew Hicks has shown that this is largely thanks to translations by Calcidius, Macrobius, and Martianus Capella. Andrew Hicks, “Pythagoras and Pythagoreanism in Late Antiquity and the Middle Ages,” in *A History of Pythagoreanism*, ed. C. A. Huffman (Cambridge: Cambridge University Press, 2014), 422.

However, I limit my discussion here to Boethius because his works played such an important role in the medieval musical curriculum.106

A discussion of the minim as a unit in the Boethian sense appears in a number of treatises, among them the Quatuor principalia musice, an encyclopedic music theory treatise that was completed by 1351.107 Aluas attributes the treatise to John of Tewkesbury, a highly educated Franciscan monk writing in Oxford. In accordance with contemporary custom, Tewkesbury provides comprehensive discussions of both plainsong and mensural music. In outlining the differences between these two types of music, among a number of attributes including rhythm or the lack thereof, he asserts that plainsong is “continuous,” while mensural music is “discrete.” He explains that plainsong constitutes a “magnitude,” while mensural music is a composite of minimal parts or units, i.e., a “multitude.” This juxtaposition is a direct reference to Boethius’s own definition of magnitude and multitude from De institutione arithmetica.108

That Tewkesbury’s minim is equivalent to the unit of a multitude is affirmed in his description of the limited decrease of the multitude ad finitum, and its infinite expansion in infinitum.109 The minim acts as the lower limit of multitude, or a unit of measurement equivalent to the number “1.” Although the continuum of musical sound can increase indefinitely insofar as it is a mathematical quantity, Tewkesbury nevertheless observes that the limits of human breath may suffice as a natural limit for sung sound. The longest utterable

106 Rico presents evidence for this in his dissertation. See: Gilles Rico, “Music in the Arts Faculty of Paris in the Thirteenth and Early Fourteenth Centuries” (PhD diss., Oxford University, 2005).
108 Tanay has argued that Tewkesbury’s model is not wholly faithful to Boethius. She states that in Boethius’s model there is no prohibition against mixing the discrete and continuous. These two concepts are set up in opposition to one another by Tewkesbury. Musica plana and musica mensurabilis are mathematically opposed in the Quatuor principalia. Tanay, Noting Music, 119.
109 Aluas, “The ‘Quatuor principalia musicae’,” 651.
note is thus the triplex longa. Tewkesbury still rejects the semiminim, or any sound briefer than the minim, on a point of principle. This is, first, because he believes that musical sounds are bounded minimally by the natural limitations of the human voice. This briefest utterable sound, he claims, is a *vox minima* [minimal sound], and is represented most commonly by the minim figure ♩. Although Tewkesbury states that the minim is an indivisible, minimally brief sound, he also claims that the minim figure ♩ does not have to sign this sound. In his view, the shape of this figure itself is effectively arbitrary, and notes representing briefer sounds can be drawn. However, the minim sound that would result from this division would continue to be the same as before. Division of this minimal sound cannot take place, since this would result in a sound that would be too difficult to pronounce. Second, he argues that the minim’s unequivocal association with the unit of multitude prohibits its division. Therefore, his

---

110 “Horum igitur praedictorum exempla, in arboribus sequentibus manifestantur, incipiendo a minima et crescendo per binarium et ternarium numerum, usque ad maximam perfectam, que triplex longa vocatur. Non dico eam esse maximam, quia non posset fieri maior, cum musica mensurabili in quantitate sit discreta et crescit in infinitum; sed dico eam esse maximam, eo quod voci hominis sufficit in cantu mensurabili tam diu sub uno accentu et cum uno anelitu continuare.” “Examples of the aforesaid are manifest in the subsequent trees, beginning from the minima and increasing by the binary and ternary number all the way to the perfect maxima, which designates a ‘triplex longa.’ I do not say that it is a maxima because another, larger one cannot be made (as mensurable music is discrete in quantity and increases *in infinitum*). But I say that it is a maxima because it suffices to the human voice in mensurable song as long as it is continued under one accent and with one breath.” Aluas, “The ‘Quatuor principalia musicae’,” 404, 669. All translations of Tewkesbury’s *Quatuor principalia* in this dissertation are by Aluas.

111 “Forte dicet aliquis quod minima potest dividi, quia est quantitas; dico quod non est quantitas sed principium quantitatis. Dict fort hoc corpus, demonstrando figuram. Igitur divisibilis; dico quod figure est representatio vocis, et vox minime indivisibilis est. Sed illa figura depicta in libro, dividì potest.” “Perhaps someone says that the minima can be divided because it is a quantity. I say that it is not a quantity, but the beginning of a quantity. Perhaps he says: this is a body—which condition is demonstrated by a shape—therefore divisible. I say that a shape is a representation of a sound and the sound of the minima is indivisible. But that shape which is depicted in a book can be divided.” Aluas, “The ‘Quatuor principalia musicae’,” 380, 655.
objection to the divisibility of the minim is predicated upon both practical and philosophical grounding.  

_Tewkesbury’s Trees_

Like Marchetto and the anonymous author of the _Ars cantus mensurabilis mensurata per modos iuris_, Tewkesbury represents his hierarchies of musical time through the use of tree diagrams. As I will illustrate, Tewkesbury’s trees differ conceptually from these authors’ diagrams, further indicating that tree diagrams were put to a variety of uses by fourteenth-century music theorists. Tewkesbury places a long note at the root of each tree. As one looks up through its branches, notes get progressively shorter. For example, in Figure 8, a triplex longa is divided into three simplex longae, six breves, eighteen semibreves, and finally thirty-six minims. As the diagram shows, Tewkesbury orders notes from short to long descending (or long to short ascending) in the tree. While longer notes can theoretically increase in size infinitely and vary in duration, the leaves remain constant.

---

112 Tewkesbury criticizes theorists who state that the minim can be divided. Specifically, he targets those who represent a _sesquitertia_ proportion (4:3) by drawing minims and semiminims. This practice is discussed in a number of treatises, including the _Tractatus figurarum_, the _Omnis ars sive doctrina_, the _Ars cantus mensurabilis mensurata per modos iuris_, the second treatise of the Berkeley manuscript (BE744), and John Pipudi’s _De arte cantus_, where such semiminims are called “additae.” Anonymous, _The Berkeley Manuscript University of California Music Library, MS. 744 (Olim Phillipps 4450)_ , ed. and trans. Oliver B. Ellsworth (Lincoln and London: University of Nebraska Press, 1984), 124–5. Karen M. Cook, “Theoretical Treatments of the Semiminim in a Changing Notational World c. 1315–c. 1440” (PhD diss., Duke University, 2012), 122.

113 Tanay has suggested that Tewkesbury’s mensural theory is “atomistic,” since he believes that musical time is formed from the accumulation of indivisible particles. I am in general agreement with this assessment, to the extent that Tewkesbury’s minims are prior and autonomous in the context of the mensural hierarchy. However, I think it is unlikely that Tewkesbury would have regarded himself as an atomist. Nor does he provide a comprehensive theorization of the atom (or mention the atom) in his treatise. Tanay, _Noting Music_ , 86.
Figure 8: Tewkesbury’s tree diagram of the triplex longa

Tewkesbury’s tree diagrams may be contrasted with those of Marchetto and the anonymous author of the *Ars cantus mensurabilis mensurata per modos iuris* because they grow upwards. One of the most prolific users of upwards-growing tree diagrams was the Italian theorist Johannes Vetulus de Anagnia, author of *Liber de musica*. A further example can be found in the work of an anonymous student of Johannes Vaillant whose treatise is copied in *Fn70*. As I argue in Chapter 3, Vetulus’s ascending tree diagrams appear to have been modeled on the diagrams of the thirteenth-century Catalan mystic Ramon Llull, whose *Arbor scientiae* was replete with ascending tree diagrams. While it is unclear whether Tewkesbury was influenced by Llull in his decision to draw ascending trees, the orientation of his diagrams does seem to point towards a prioritizing of the formation of continua of musical sound from the accumulation of short timespans. In the case of Tewkesbury, this minimal unit is the minim. Such orientation is also found in the work of the fourteenth-century English theorists Willelmus and Johannes Torkesey, to be discussed below. These authors again condone the theorizing of longer timespans through the grouping of shorter notes. This may

---


115 Aluas, “The ‘Quatuor principalia musicae’,” 404, 669.
be contrasted with the work of theorists such as Marchetto, des Murs, and the anonymous author of the *Ars cantus mensurabilis mensurata per modos iuris*, all of whom represent musical time descending from longer to shorter notes and prioritize the formation of notes through the division of longer timespans into shorter ones, as evinced in particular by Marchetto’s preference for the breve unit, and the *gradus* system itself, whereby musical time is viewed as a latitude.

Although Tewkesbury favors the grouping of minims to form longer notes, he again does not draw a strict dichotomy between grouping and division. He follows Franco (as Marchetto did) in stating that the breve is a “least in the fullness of sound,” and that one may choose to represent shapes beginning with the longa, since this is the “simplest” note. While he does not state that shorter notes are ontologically incomplete as Jacobus and Marchetto did, his shorter notes are nevertheless “not in the fullness of sound,” emphasizing the centrality of the role of the breve as the musical *tempus*. The same is true in Vetulus’s system. Because his theoretical approach is all-encompassing, it incorporates the idea that there is a minimally short unit by which all sounds are measured—the atom. He combines this atomist approach with an expanded version of the *gradus* system, but at the same time emphasizes the importance of the breve as a unit of measurement. The idea that musical time may be formed both through the division of longer timespans into shorter ones, and the accumulation of shorter timespans to form longer ones, is thus present in these authors’ treatises, even though musical sounds are measured mathematically by minimal counting units. I now turn to two more English authors who measure musical time in this way, and who devised systems in which the durations of notes can be ascertained by observing their shapes.

---

116 Aluas, “The ‘Quatuor principalia musicae’,” 379.

117 Aluas, “The ‘Quatuor principalia musicae’,” 403.
Johannes Torkesey’s *Trianguli et scuti declaratio de proportionibus musicae mensurabilis* [An Exposition of the Triangle and the Shield on the Proportions of Mensural Music] is a short but influential treatise written in England some time in the fourteenth century.\(^{118}\) Little is known about Torkesey, since he left behind no biographical information. Neither Willelmus’s nor Torkesey’s treatises are dated, although both are presumed to have been written sometime in the mid-fourteenth century. Six types of notes are described in *Trianguli et scuti*. Breaking away from the conventions of des Murs, these are drawn from short to long in the following order—\(\textit{simpla} \bullet, \textit{minim} \circ, \textit{semibreve} \star, \textit{breve} \square, \textit{longa} \triangleleft, \text{and } \textit{larga} \triangledown\). The existence of the \(\textit{simpla}\), i.e., a note that depicts a duration shorter than the minim, is not questioned. In imitation of Boethius’s table, which represents the proportional relationships among the powers of two and three and their products (see Table 2), Torkesey draws all notes within a triangle.

Boethius’s table maps neatly onto the mensural hierarchy of the fourteenth century, since the durations of all notes are determined through various permutations of the triple and duple groupings of notes, i.e., perfections and imperfections. Figure 9 shows Torkesey’s triangle.

---

Torkesey’s triangle presents a hierarchy of noteshapes that are systematized as powers of two and three and their products up to a limit. Proceeding from the *simpla* at the top of the triangle in Figure 9, notes to the left are multiplied by two, and notes to the right by three. The number of triple groupings within a given note determines the extent to which it is “perfect.” Torkesey’s triangle is distinct among fourteenth-century notational practices in distinguishing the exact duration of notes in terms of *simplae* using dots. Every note that is not uniformly imperfect is assigned a dot or dots, which determines its value in *simplae*, and the number of duple and triple groupings within it. Thus, a dot above a note shows that it is perfect at one degree (i.e., one of the groupings of notes it contains is triple), below the note that it is perfect at two degrees, both above and below by three degrees and with two dots.

---

below by four degrees. All notes to the right of the triangle are uniformly perfect. They bear a single dot to their right, demonstrating that they contain only notes whose durations in *simples* are powers of three. All notes to the left of the diagram are imperfect and are left undotted.

As is illustrated in Figure 9, students who wish to use the triangle can trace a path through it to visualize the mensural hierarchy they wish to employ, considering its relationships with other paths that lead through the triangle. Such lines must be traced either straight down the graph, or follow the lines diagonally to the right. Figure 10 provides a translation of the dotted path traced through Figure 9.

Figure 10: Translation of the dotted path of Figure 9 into mensural notation

<table>
<thead>
<tr>
<th>72</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

In Willelmus’s *Breviarium regulare musicae*, a later contemporaneous English source, Torkesey’s model for the representation of musical time is also adopted. Willelmus repurposes Torkesey’s triangle and reflects on the conceptual underpinnings of the mensural hierarchy. Willelmus adds one additional note to the system above the level of the larga—the largissima. He renames Torkesey’s minim the minuta, and provides two alternative names for the *simples*—crocheta and minima. Figure 11 provides a transcription of the triangle as adapted by Willelmus in his *Breviarium regulare musicae*. The principal difference between the two triangles
is the addition of the largissima in Willelmus’s version. The orientation of the triangle is also more conducive to a reading of the graph as a visual representation of the various paths that can be traced through the combination of all duple and triple units. The position of the *simpła* at the center of the diagram removes any temptation on the part of the reader to revert to completely imperfect time inadvertently, since all paths leading diagonally downwards to the left or right are correct.

Figure 11: Torkesey’s triangle, as transcribed by Willelmus

---


Both Torkesey’s and Willelmus’s diagrams represent notes descending from shorter to longer ones, an orientation that I suggest demonstrates their preference for the grouping of a minimal counting unit (the *simpla*) to form longer spans of time.\footnote{122} Willelmus further emphasizes this point by permitting changes to the *simpla* that result in the increase of its size by a multiple of itself, and at the same time prohibiting any changes to this note that might result in its division or increase in size by a fraction of itself.\footnote{123} He uses the indivisibility of the *simpla* to justify a number of common notational practices. These include alteration, which leads to the doubling in length of a note. Alteration of the *simpla* is allowed, presumably because it does not presuppose division of the indivisible unit (altered $\dot{\cdot} = \dot{\cdot} + \cdot$).\footnote{124} Dotting of the *simpla*, which would increase the length of this note by half of its value, is proscribed. Since Willelmus’s musical time is formed through the grouping of discrete particles, dotting of the *simpla* would presuppose the existence of a note lasting half of its duration, which is impossible if the *simpla* is indivisible ($\dot{\cdot} = \dot{\cdot} + ?$). Similarly imperfection, which occurs when one-third of the value of a perfect note is removed, is also prohibited in the case of the *simpla*. Perfection, like dotting, results in half of the value of a note being added to it, and is also forbidden for the *simpla*.\footnote{125} In all of these examples, Willelmus allows the *simpla* to be grouped

\footnote{122} This corresponds to the derivation of longer geometrical spans from the monad, as represented in Boethius’s diagram (following Nicomachus).

\footnote{123} “Simpla neque perfecta dicitur neque imperfecta sed principium indivisibile omnium subsequentium.” Willelmus, “Breviarium regulare musicae,” ed. Reaney, 28. [The *simpla* is said to be neither imperfect nor perfect, but is the indivisible beginning of all subsequent (notes).]

\footnote{124} Willelmus, “Breviarium regulare musicae,” ed. Reaney, 25–6. Alteration occurs typically when two notes of the same type are placed between two longer notes. The second of the two notes is lengthened in order that together the two notes will be worth a perfection. For example the following sequence of notes $\bullet \bullet \bullet$ (breve, semibreve, semibreve, breve) will each be worth 3 1 2 and 3 semibreves respectively.

\footnote{125} Willelmus also prohibits plication of the *simpla*. Like imperfection, perfection and dotting, this leads a note to be divided into parts. Opinions over the exact signification of the plica differ, but in general terms it is a small stroke that appears typically on a longa or breve. It signals the insertion of an ornament similar to a passing note.
together to form longer notes, but divided neither through increase in its size by part of itself, nor through decrease in its size. For Willelmus, the *simpla* retains its indivisibility throughout.

Despite this, Willelmus also describes the derivation of musical sounds through division. Following Aristotle, he argues that the continua of time and sound are both infinitely divisible. Willelmus renames the *simpla* the minima to reflect the customs of his contemporaries, who believe that this note represents the physical limitations of vocal technique. Any note that is shortest within the mensural hierarchy should bear this name, since the word “minima” itself implies that it is the briefest sound that can be sung. Because time is infinitely divisible, the only plausible objection to the existence of a note shorter than the minim is that such a note would be too brief to be sung. Thus, although Willelmus’s *simpla* is the indivisible “principium” (beginning or foundation) of all notes, he explains that even its brevity may be surpassed through practice and artifice. The theorization of an indivisible

---

126 Torkesey also argues that the continuum of musical sound may be derived through division. "Praeterea sciendum est quod per modum numeri, id est arithmetice procedendo, descendimus a simpla usque ad largas, sed per modum musicae mensurabilis ascendimus a largis dividendo usque ad simplam impartibilem." Torkesey, "Trianguli et scuti," ed. Reaney, 59. [Moreover, it should be known that in the way of number, that is in proceeding arithmetically, we descend from the *simples* up to the largae, but in the way of mensural music we ascend from the larga dividing up to the indivisible *simples*.]


128 “Unde ut conformem me modernis, pono crochetum seu simplam vel minimam. Non quia ea minor non possit esse, sed quia data mensura debita longarum, brevium, non bene humana voce minor pronuntiatur perceptibilis. Et ex hoc patet solummodo obiectio modernorum. Quia arguunt contra crochetum per hoc quod minima nulla est minor. Respondeo quod Odington non vocavit illam notam minimam sed minutam, quia posuit quod minor possit esse. Vel aliter respondetur quia tunc dicebatur minima illo tempore divisa, sed nunc voco crochetum minimam, licet iam artificio et usu cantores moderni ad minorem divisionem vocis pervenerunt, scilicet ad crochetam.” Willemus, “Breviarium regulare musicae,” ed. Reaney, 25. [Therefore, so that I conform with the *moderni*, I call this a crochet or *simples* or minim. Not because a smaller note could not exist, but because with the given measure of the longae and breves a perceptibly smaller note cannot be uttered well by the human voice. And from this the single objection of the *moderni* is evident. For they argue against the crochet through this [line of reasoning]: that nothing is smaller than the minim. I respond that Odington did not call this note the minim but rather the minuta, because he posited that a smaller note could exist. Or otherwise, it is said that because the note that was at that time called the minim has been divided, but now I call the crochet the minim, singers today have attained yet smaller divisions of sound through artifice and practice, namely the crochet.]
note facilitates the creation of a mensural hierarchy in which all notes share a common unit. It implies mathematical, but not physical indivisibility.

Torkesey’s and Willelmus’s system of dotting was never used in practice, yet despite this some of the conceptual principles that they examined were adopted by later authors. Specifically, the idea that notes can be formed by the accumulation of shorter parts, and that the duration of a note could be determined from its appearance, came to fruition in some of the notational systems of the later fourteenth and early fifteenth centuries to be discussed in Chapters 4 and 5 of this dissertation. That Willelmus’s and Torkesey’s theory was known to the composers, theorists, and perhaps even the performers who wrote, discussed, and performed notationally complex repertory is supported by the appearance of Willelmus’s version of Torkesey’s triangle in Cn54.1, a manuscript that houses both a copy of the Tractatus figurarum—a late fourteenth-century theoretical source of English provenance that provides a novel system of notation—and the famous copy of Jacob de Senleches’s La harpe de melodie that is copied in the form of a harp.¹²⁹

¹²⁹ Lucia Marchi has suggested that this composition may have been included in the manuscript to establish links between theory and practice. Lucia Marchi, “Music and University Culture in Late Fourteenth-Century Pavia: The Manuscript Chicago, Newberry Library, Case MS 54.1,” Acta musicologica 80, no. 2 (2008), 162.
As I will discuss in detail in Chapter 4, in the system outlined in the *Tractatus figurarum* notes are at times derived through the accumulation of minimally short parts that group together. In Jason Stoessel’s terms these may be called “arithmetic” noteshapes. At others, they are formed through the superposition of contrasting divisions of the breve. Stoessel calls these “proportional” noteshapes. Responding to the theory of the *Tractatus figurarum*, Anne Stone has also argued that one of the defining characteristics of complex notational systems is the combination of breve equivalence present in Italian notation with the minim equivalence of the French system. Taking into account the various systems of division discussed in this chapter, I would suggest that this observation may be expanded to embrace the more general principle that notes may be derived through the grouping or division of any part of the

---

131 Stone, “Che cosa c’è di più sottile riguardo l’ars subtilior?” 26. Breve equivalence occurs when the duration of the breve is constant and the duration of shorter notes changes to accommodate the breve. Similarly, minim equivalence occurs when minims are equal and longer notes change in duration to accommodate the minim. I will discuss the concept of equivalence in further detail in Chapter 4.
hierarchy of musical time, and that a musician may also divide or group any kind of note when counting. The systems of the various authors discussed in this chapter thus provide a conceptual background to the experimental rhythms and notations that would be written down in the later fourteenth and early fifteenth centuries. I will return to this idea in Chapter 5, where I argue that scribes harnessed the flexibility of their new notational systems to instruct singers to mentally group or divide musical time in order to navigate rhythmically intricate music. In the following two chapters, I discuss the work of Johannes Vetulus de Anagnia, who integrated the theories discussed in this chapter into a novel hierarchy of musical time, exhausting the rhythmic possibilities afforded by them by extending them to their limits. In doing so he fashioned a system that incorporates the same extremes of rhythmic complexity that would be represented in practice using complex notations. Vetulus achieves this using a set of five simple noteshapes. I suggest that this results from his speculative approach to the study of music.

---

132 This accords with Stone’s assertion that the notationally complex music of the later Middle Ages served as a locale in which the connection between a stable temporal unit (the *tempus*) and musical rhythm was broken down. This is because the extreme mensural intricacy of such pieces would have compelled a performer to switch constantly between different time-units, rather than holding a single stable unit in their mind. Stone suggests that this would have reinforced the idea that the musical *tempus* was an abstract concept, rather than a concrete value, with respect to the rhythms of a given song. Stone, “Writing Rhythm,” 290–1.
Chapter 2: Johannes Vetulus de Anagnia’s Hierarchies of Musical Time

At some time in the mid fourteenth century, an Italian theorist named Johannes Vetulus de Anagnia [Little Old John of Anagnia] wrote a Latin music treatise about mensural notation entitled Liber de musica [The Book on Music].¹ After a brief passage about plainsong Vetulus sets out an explicitly atomistic method for mensural subdivision based on the Italian trecento divisions, best-known from Marchetto of Padua’s early fourteenth-century Pomerium. This culminates in six tree diagrams. In the second part, Vetulus turns to notation. He codifies and refines his mensural system with music examples, demonstrating his theoretical knowledge of common mensural practices, such as alteration, imperfection, and the treatment of rests, before professing some unorthodox views about the use of dots of addition to create syncopations and the rule similis ante similem perfecta [like before like is perfect].²

Three versions of Vetulus’s treatise are known to have survived. The only known complete fourteenth-century copy resides in Vat307, a repository of a number of other more widely-copied fourteenth-century texts. In addition to some fragments, the manuscript

---


² Dots of addition did not exist in early fourteenth-century Italian notation, and were considered a later French import. The rule similis ante similem decrees that like notes before like notes are always perfect where these can potentially be perfect without addition of a dot according to the mensuration.
contains a major copy of a Vitriacian *Ars nova* witness,\(^3\) as well as the *Omnis ars sive doctrina*, formerly attributed to Theodoricus de Campo. A partial copy of a subsection of *Liber de musica* “Quid sit prolatio” [What is an utterance?] is found in a fifteenth-century miscellany of other theoretical works.\(^4\) A complete version of *Liber de musica* can also be found in a copy of *Vat307* made for Padre Martini in the eighteenth century.\(^5\)

*Liber de musica* takes pride of place in *Vat307*; it is located at the very opening of the miscellany. Vetulus is referred to by name several times, as “Magistri Jo. de Anagnia,” (f. 1r) “Magister Johannis Vetuli de Anagnia” (f. 16v), and “Reverendi Magistri Johannis Vetuli de Anagnia musicae doctoris” [Reverend Magister Johannes Vetulus de Anagnia, learned in music] by the author of the *Omnis ars sive doctrina*, who praises Vetulus’s rejection of the imperfection of rests.\(^6\)

No evidence can be found in any of the copies of *Liber de musica* or the remaining treatises in *Vat307* that would enable a secure dating of this work. Nevertheless, a number of dates have been proposed. In his edition of *Liber de musica*, Frederick Hammond provides comprehensive summaries of the datings of *Vat307* and *Liber de musica* up to 1977. Hugo Riemann dated *Liber de musica* to c. 1325, while Hüschen dated the treatise to sometime between Marchetto’s *Pomerium* (for Hüschen c. 1309) and Prosdocimus de Beldemandis’s work

\(^3\) Sarah Fuller famously argued that the *Ars nova* is a “phantom” treatise that did not actually exist, and that the nebulous collection of fourteenth-century treatises that claim to transmit the theory of Philippe de Vitry were formed by de Vitry’s disciples, not by de Vitry himself. Sarah Fuller, “A Phantom Treatise of the Fourteenth Century? The *Ars nova*,” *The Journal of Musicology* 4, no. 1 (1985–1986), 23–50. More recently, Karen Desmond has countered Fuller’s claims by arguing that these treatises are based on a now-lost *Ars vetus et nova* by de Vitry. Karen Desmond, “Did Vitry Write an *Ars vetus et nova*?” *The Journal of Musicology* 32, no. 4 (2015), 441–93.


In 1964, Gilbert Reaney dated Vat307 to c. 1400. Two years later Alberto Gallo suggested that Liber de musica was written c. 1360, and that Vetulus may have been the notary Johannes Vetulus de Anagnia mentioned in a document composed August 16, 1372. No concrete evidence exists that would confirm this claim. Frederick Hammond consulted art historian Millard Meiss in his dating, who tentatively suggested that Vat307 was compiled in the later fourteenth century. Marco Gozzi has suggested that Liber de musica was written “two or three decades later” than Gallo’s estimate. In a recent art-historical study, Francesca Manzari and Jason Stoessel have argued for an earlier dating of Vat307 on the grounds that decorations in the treatise are characteristic of the mid fourteenth-century mixing of the French and central Italian styles. They also cite the absence of the later fourteenth-century Florentine illumination practices and Northern-Italian late-gothic influences typical of exemplars in the collections of popes Urban VI (1378–1389) and Boniface IX (1389–1404) as evidence for an earlier dating of the manuscript. This would provide a terminus ante quem for Liber de musica of the c. 1350s–60s.

Liber de musica follows a standard pattern of negotiation between institution and innovation: overt and covert appeals to authority are utilized to justify a novel, atomistic notational system that combines Marchetto’s trecento system of divisions with the gradus system as discussed by Jean des Murs. In addition to music theorists, such as Franco of Cologne, the

7 Hugo Riemann, Geschichte der Musiktheorie (Hildesheim: G. Olms, 1961), 520.
9 F. Alberto Gallo, La teoria della notazione in Italia dalla fine del XIII all’inizio del XV secolo, Antiquae musicae italicae subsidia theoretica (Bologna: Tamari, 1966), 66.
13 Lefferts has also observed that Vetulus employs the gradus system. Lefferts, “An Anonymous Treatise,” 238–9.
principal authorities of the treatise include the Bible, Augustine of Hippo, Aristotle, and Boethius. In Chapter 3, I will argue that Vetulus was also influenced by the work of the thirteenth-century Catalan mystic Ramon Llull, and Pseudo-Dionysius, who authored a number of texts including *De coelesti hierarchia* [On the Celestial Hierarchy]. These authors’ works grant celestial and philosophical justification to Vetulus’s project, and ground his theoretical work in a long tradition of Neoplatonist writings. The philosophical implications of Vetulus’s project are the topic of the next chapter of this dissertation.

The present chapter discusses the music-theoretical innovations of Vetulus’s *Liber de musica*. I provide a number of revisions to invaluable earlier work on the treatise. First, I explicate the notational system set out in *Liber de musica*, including Vetulus’s mensural hierarchy and tree diagrams, and unpack Vetulus’s expansion of the *trecento* divisions of Marchetto of Padua. My work demonstrates that above a layer of atoms of musical time worth 5/36 second lie two overlapping mensural hierarchies. The first “proper” hierarchy is grouped from three minims worth three, four, and six atoms, while the second “improper” hierarchy is grouped from three minims worth two, three, and four atoms. In the latter part of the chapter, I compare Vetulus’s system to those of contemporaneous theorists’, including Torkesey’s triangle, the *gradus* system, the divisions of the anonymous author of the *Rubrice brevis*, and the music examples of the *Vat307* version of the Vitriacan *Ars nova* witness. In doing so, I argue that Vetulus crafts a system that combines and exhausts the concepts inherent within these central fourteenth-century musical texts, but that his motivation is impractical, and primarily speculative.

Despite the speculative leanings of Vetulus’s work, his system preempts some of the concepts inherent in the complex repertory of the later fourteenth and earlier fifteenth centuries (to be discussed in Chapters 4 and 5), namely the exploration of all of the possible combinations of duple and triple rhythmic groupings, the assigning of a single duration to
many different kinds of note, and the idea that many different ways of dividing up temporal spans may occur simultaneously, a process that Vetulus terms the “mixing” of divisions. As I will discuss further below, he also develops the idea that spans of musical time may be grouped or divided at any level by representing his mensural hierarchies using tree diagrams. Vetulus’s work may thus be seen to exhaust the possibilities offered by the notational systems of the first half of the fourteenth century, while simultaneously looking forward to the innovations that would be codified in the novel notations of the later fourteenth and early fifteenth centuries. This invites us to consider whether the concepts inherent within later complex repertory might have been present earlier than the first notationally complex pieces were written down, and further that the theoretical practices associated with the *ars nova* coexisted with those of later notationally complex repertories.

**Vetulus’s Divisions and “Extensions” of Musical Time**

Vetulus’s mensural hierarchies expand on the *trecento* divisions, transmitted most notably by Marchetto of Padua in his *Pomerium* (c. 1319). Notes in Marchetto’s system can be either imperfect (and contain two parts) or perfect (and contain three parts). Imperfect breves are two-thirds as long as their perfect equivalents. Breves are divided into between two and twelve undifferentiated semibreves (semibreves that look the same, but nevertheless differ in

---

14 That Vetulus’s speculative activities should engage with practice accords with Hicks’s observation the *musica speculativa*–*musica activa* divide was largely fictitious. As I will discuss further below, Vetulus’s work emphasizes connections between practice and speculation on multiple levels. Andrew Hicks, *Composing the World: Harmony in the Medieval Platonic Cosmos* (Oxford: Oxford University Press, 2017), 69. The terminological distinction between *musica speculativa* and *musica activa* is believed to have been established in the twelfth century as a result of the Latin translations of Al-Farabi’s *Classification of the Sciences*. Ibid., 69. Al-Farabi’s discussion of *musica speculativa* and *musica activa* is edited in the following with a German translation: Al-Farabi, *De scientiis: Secundum versionem Dominici Gundisalvi=Über die Wissenschaften: Die Version des Dominicus Gundissalinus*, ed. and trans. Jakob Hans, Josef Schneider (Freiburg im Breisgau: Herder, 2006), 154–161.

duration). Each division is assigned a name that describes the number of parts that are contained within the breve unit. In the binaria division, the breve unit contains two parts. In the ternaria division it contains three parts, in the quaternaria four, and so on (see Figure 1). Two methods for dividing the breve into six semibreves are described. In the senaria perfecta division the breve is divided into three imperfect semibreves, each worth two shorter semibreves—the equivalent of French perfect tempus with minor prolation \(<3,2>\). In the senaria imperfecta division the breve is divided into two perfect semibreves, each worth three shorter semibreves, the equivalent of French imperfect tempus with major prolation \(<2,3>\).

Figure 1: Italian trecento divisions

<table>
<thead>
<tr>
<th>Tempus</th>
<th>Perfect</th>
<th>Imperfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>First division</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ternaria</td>
<td>♦♦</td>
<td>♦</td>
</tr>
<tr>
<td>Binaria</td>
<td>♦♦</td>
<td></td>
</tr>
<tr>
<td>Second division</td>
<td>♦♦♦♦♦♦♦♦</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
</tr>
<tr>
<td>Senaria perfecta</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
</tr>
<tr>
<td>Quaternaria</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
</tr>
<tr>
<td>Novenaria</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
</tr>
<tr>
<td>Senaria imperfecta</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
</tr>
<tr>
<td>Third division</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
</tr>
<tr>
<td>Duodenaria</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
</tr>
<tr>
<td>Octonaria</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
<td>♦♦♦♦♦♦♦♦♦♦</td>
</tr>
</tbody>
</table>

16 I use this notation throughout the dissertation to describe the number of parts into which notes are divided. The first number describes the number of parts into which longer notes (such as breves) are divided, and the second number describes the number of parts into which shorter notes (such as semibreves) are divided. At times, a modus level will be included to indicate the division of longae into breves. Apel uses a similar notation in the following: Apel, The Notation of Polyphonic Music, 99.

17 Vetulus appears to use the names of these two divisions interchangeably at times. Note that because Marchetto’s imperfect breves are two-thirds the length of his perfect breves, the senaria imperfecta breves would also theoretically have been two-thirds the length of his senaria perfecta breves. This may be contrasted with French practices, and Vetulus’s application, whereby minims are equal and thus also the two breves containing six minims.

18 Figure adapted from: da Padova, Pomerium, ed. Vecchi, 72.
As I discussed in Chapter 1, a defining characteristic of this notational system is the way in which semibreves are distinguished from one another in duration, i.e., either by appealing to the reader’s prior knowledge of a pattern (termed the via naturae [way of nature]), or by the addition of stems (termed the via artis [way of artifice]). Departing from the “pure” Marchettan system of notation, Vetulus distinguishes longer and shorter parts of the breve from one another by including stemmed minims, and by dividing the octonaria and duodenaria breves into shorter breves. He also theorizes longae and largae.

Vetulus develops the idea that notes may be divided into between two and twelve parts, and explores the possibilities afforded by the proportional relationships among Marchetto’s semibreves. Expanding this system, which applies only to the breves, Vetulus describes divisions of both largae and breves. In Vetulus’s system, perfect largae always contain three longae, while imperfect largae contain two. Each imperfect and perfect larga can be greater, lesser, or least. The designations greater, lesser, and least determine the duration of a larga in breves. The greater perfect larga contains twelve breves, the lesser perfect larga nine, and the least perfect larga six. The greater imperfect larga contains eight breves, the lesser imperfect larga sixs, and the least imperfect larga four (see Table 1).

Vetulus describes the division of each of his largae into longae and breves, but does not divide his longae into greater, lesser, and least divisions. Instead longae can be simplex, duplex, or triplex. Perfect longae always contain three breves, while imperfect longae

---

19 The name “larga” is used by English theorists such as Willelmus and Torkesey, who also expanded the gradus system of Jean des Murs (see below). Lefferts, “An Anonymous Treatise,” 238–9. A further similarity between Vetulus’s work and that of an English theorist can be found in his description of the triplication of the longa, which was discussed by John of Tewkesbury in his Quatuor principalia (1351). Desmond, “Did Vitry Write an Ars vetus et nova?” 448.

20 Compare, for example, the perfect and imperfect breves, which are in 3:2 proportion, as well as the senaria perfecta and novenaria semibreves (3:2 proportion) and the quaternaria and senaria imperfecta semibreves (3:2) proportion. The novenaria and duodenaria semibreves are in 4:3 proportion, as are the senaria imperfecta and octonaria semibreves.

21 The default is simplex and should be assumed unless otherwise stated.
contain two.\textsuperscript{22} Duplex and triplex longae are derived by the doubling or tripling, respectively, of a perfect or imperfect longa. As Vetulus observes, there is some overlap between the durations of the largae and the longae, which at times may contain the same number of breves. For instance, the duplex perfect longa is equal in duration to the least perfect larga and the lesser imperfect larga. Table 1 shows the divisions of the largae and longae.

Table 1: Vetulus’s largae and longae\textsuperscript{23}

<table>
<thead>
<tr>
<th>Perfect larga</th>
<th>Imperfect larga</th>
<th>Perfect longa</th>
<th>Imperfect longa</th>
<th>Breves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greater</td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Lesser</td>
<td>Triplex</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Least</td>
<td>Greater</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Lesser</td>
<td>Duplex</td>
<td>Triplex</td>
<td>6</td>
</tr>
<tr>
<td>Least</td>
<td>Simplex</td>
<td></td>
<td>Duplex</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Simplex</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

As Table 1 shows, greater, lesser, and least largae bear a proportional relationship to one another: a least larga (perfect or imperfect) is worth half of a greater larga. A lesser larga is worth three-quarters of a greater larga, and a least larga is worth two-thirds of a lesser larga.

\textsuperscript{22} He also describes the semi-larga, a note worth half of a larga.

\textsuperscript{23} Hammond’s table of the largae and longae can be found in the following: Hammond, “Introduction,” 21. He describes the greater, lesser, and least perfect largae; the greater imperfect larga; the duplex imperfect and perfect longae; and the perfect and imperfect longae. He also includes the semilarga, a note that is worth half of a larga, and that for Hammond is worth six breves. All of the values of the largae and longae that Hammond includes in his table correspond to my own. Expanding on Hammond’s work, I also include the lesser and least imperfect largae, as well as the perfect and imperfect triplex longae. Further, Hammond writes in his table the duration of each note in atoms. In order to arrive at the value in atoms of each larga and longa, he assumes that the breve is worth seventy-two atoms, i.e., that it is a greater breve of the greater extension (see below). I have elected to exclude the durations in atoms of the largae and longae from my table because Vetulus does not specify which value for the breve is used to determine their durations.
Vetulus provides three tree diagrams of the largae to visually represent the divisions of the three species of perfect larga. He does not include tree diagrams of the imperfect largae.

Figures 2–4 juxtapose an image of each larga tree from Vat307 with a transcription.

Figure 2: Tree of the greater perfect larga

Figure 3: Tree of the lesser perfect larga

All three of these trees are copied on f. 8r of Vat307. Used by courtesy of the Biblioteca Apostolica Vaticana.
In the roots of the trees are situated the four solmization syllables that Vetulus claims are particular to the *ars nova*—*ut*, *re*, *mi*, and *fa* (aside from the tree of the least perfect larga, which lacks *ut*). In each of its appearances, *ut* is not assigned a specific division. This is presumably because *ut* is figuratively positioned below the other solmization syllables in the tetrachord of the *ars nova*—one sings *ut* before *re* when singing the tetrachord. Its visual placement below the others reflects this ordering.

When reading Vetulus’s tree diagrams it is important to bear in mind that he does not represent notes directly. Instead, each numeral in the trees of the largae indicates how many breve units are contained within the imagined note or notes at that given point. The branches depict the division of the spans of these imagined notes into parts. Because one span may be divided up several different ways—for instance, the span of a larga worth twelve breves may be either divided imperfectly and split into two equal branches, or divided perfectly and split.

---

25 The solmization syllables are placed at the bottom of the tree to symbolize the ascent from plainsong to measured music, reflecting the ascent from the material to the divine in Vetulus’s celestial hierarchy. The four solmization syllables represent the four elements—earth, fire, air, and water. See: Chapter 3.
into three equal or two unequal branches. Some numerals represent more than one note simultaneously (such as the rightmost branch of the tree of the lesser perfect larga shown in Figure 3). As such, it is at times possible to determine which note is being described in the tree only after having decided how the span of time represented by a given numeral is to be divided up.

That Vetulus chose to depict not the notes themselves, but rather to write numerals that represent a given number of breves illustrates that, on one level, he conceived of spans of musical time via the accumulation of a minimally short unit (or units). In the trees of the largae, this unit is the breve. Yet at the same time, a reader proceeds through the diagram by looking upwards through the branches, a process that entails dividing up longer timespans into shorter ones. I would suggest that the conceptual principles undergirding the trees of the largae, as well as the trees of the breves to be discussed below, thus reveal that Vetulus conceived of musical time both in terms of grouping and division.

To illustrate how these diagrams are to be read, consider again the tree of the greater larga, beginning with the re branches shown in Figure 5. Two branches extend upwards from re, at the end of which are the numerals 4 and 8. These represent the division of the span of twelve breves into two unequal parts. The branch to the left represents the span of four breves, i.e. a least imperfect larga or a duplex imperfect longa. Proceeding upwards from this branch, the four splits into two branches, each worth two breve units; they are imperfect longae. These split again into two parts. At the end of each of these branches a numeral 1 leaf represents a single breve unit. Returning to the root ball, the branch to the right proceeds in the same way, except that here Vetulus starts his division with a note worth eight breve

---

26 It is conceivable that a reader would read the trees of the largae from top to bottom, but this is impossible in the trees of the breves because minims vary in length.

27 The longer of these two parts represents an altered note. Alteration occurs when the second of two notes in a perfection is doubled in length to fill out the triple unit.
units—the greater imperfect larga. This branch then splits in half to represent two spans worth four breve units, i.e. two least imperfect largae or duplex imperfect longae. These divide again into spans worth two breve units, i.e. imperfect longae, and finally into breve units. Figure 6 translates these branches into mensural notation.

Figure 5: Re branches of the tree of the greater larga

Figure 6: Translation of re branches into mensural notation

<table>
<thead>
<tr>
<th>Left branch</th>
<th>Right branch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The other branches are read the same way. To illustrate this, Figure 7 shows the \textit{fa} branches of the tree of the greater larga. The \textit{fa} root ball (worth twelve breve units) is divided equally into three parts, each worth four breve units; they are least imperfect largae or duplex imperfect longae. These spans split in half to represent notes worth two breve units—imperfect longae—and finally into breve units. These branches are translated into mensural notation in Figure 8.

Figure 7: \textit{Fa} branches of the tree of the greater larga

![Image of fa branches of the tree of the greater larga]

Figure 8: Translation of \textit{fa} branches into mensural notation

![Table showing mensural notation]

81
Lastly, Figure 9 shows the \textit{mi} branches of the greater perfect larga (worth twelve breves). The branches show that this span is divided duply. This renders the imagined greater perfect larga imperfect, even though it still continues to be called a greater perfect larga. Vetulus does not betray any concerns in his treatise over this contradiction, which also appears in the divisions of the breves. Reading upwards from the bottom, the reader sees two numeral 6s. The leftmost numeral 6 splits into three branches. It therefore represents a perfect note worth six breve units—a least perfect larga or a triplex imperfect longa. The three branches represent notes worth two breve units—imperfect longae. Finally, these branches split into six breve units.

Returning to the root ball, the branch that grows upwards to the right is split up into three branches. Because this timespan is divided up multiple ways, we can only ascertain which notes are represented here by interpreting the numeral 6 after deciding which path we will take up the tree. To the left, this span is divided into two unequal parts (marked by a numeral 2 and a numeral 4). Reading the numeral 6 as a precursor to these branches, it is divided into two unequal parts, and therefore represents a perfect note—a least perfect larga or a triplex imperfect longa. The branch that leads to the left represents a note worth two breve units—an imperfect longa—which is then split into two breve units. The middle branch represents a note worth four breve units—a least imperfect larga or a duplex imperfect longa. This is in turn divided into spans worth two breve units—imperfect longae—and finally breve units.

Returning to the rightmost numeral 6 leading from the root ball of Figure 9, one can see that a branch also grows outwards to the right and is divided into two parts. Reading the diagram from this perspective, the note depicted by the numeral 6 is imperfect. It is a lesser imperfect breve or a duplex perfect longa, and is divided into two spans worth three breve
units—perfect longae—and finally into six breve unit leaves. The \( mi \) branches are translated into mensural notation in Figure 10.

Figure 9: \( Mi \) branches of the tree of the greater larga

![Diagram of Mi branches](image)

Figure 10: Translation of \( mi \) branches into mensural notation

![Translation of Mi branches](image)

As is illustrated in Figures 9 and 10, the rightmost numeral 6 of the tree of the greater larga can be imagined as two different notes simultaneously. When it is divided into three
parts it represents a least perfect larga (or a triplex imperfect longa). When it is divided into two parts, it represents a lesser imperfect larga (or a duplex perfect longa). This illustrates that both the numerals at the nodes of the tree branches and the agency of the reader determine which notes are represented on the diagram at any given moment.

*The “Proper” Divisions of Breves and Semibreves*

Like the largae, breves can be perfect or imperfect. Every perfect and imperfect note is organized into divisions—greater, lesser, or least. There are thus six species of division of the breves. Each division is synonymous with a division in the Marchettan sense, and thus bears two names, as is illustrated in Table 2. The table compares the Marchettan breve names with the Vetulan breve names and shows how many parts are contained within each of these notes. It is important to bear in mind that although Vetulus provides an idiosyncratic method of naming notes, he uses the Marchettan names interchangeably with his own system. It is often difficult to ascertain exactly which note Vetulus is describing because he also uses several other kinds of names (to be discussed below). For the sake of simplicity, I use the Vetulan naming system set out in Table 2 throughout this dissertation.

Table 2: Marchettan names compared to Vetulan names

<table>
<thead>
<tr>
<th>Perfect</th>
<th>Imperfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marchettan name</td>
<td>Vetulan name</td>
</tr>
<tr>
<td>Duodenaria</td>
<td>Greater perfect breve</td>
</tr>
<tr>
<td>Novenaria</td>
<td>Lesser perfect breve</td>
</tr>
<tr>
<td>Senaria perfecta</td>
<td>Least perfect breve</td>
</tr>
</tbody>
</table>
Although Vetulus builds on Marchetto’s system, there are nevertheless a number of differences between their divisions of the breves. The first of these is that—as I noted above—Vetulus distinguishes between semibreves and minims by adding an ascending stem to his minims. Second, while Marchetto divides his breves only into semibreves, some of Vetulus’s breves are divided into shorter breves. This occurs wherever a breve is divided into three levels of shorter parts, i.e., the greater perfect breve (duodenaria breve), which in Vetulus’s system may be divided into two least perfect breves (senaria breves), or three least imperfect breves (quaternaria breves) before it can be divided into semibreves and minims; and the greater imperfect breve (octonaria breve), which is divided into two least imperfect breves (quaternaria breves). This practice was condemned by Prosdocimus in his Tractatus pratis cantus mensurabilis ad modum Italicorum. Like the breves, there are also greater, lesser, and least semibreves in Vetulus’s system. Greater semibreves contain three parts and are perfect. Lesser semibreves contain two parts and are imperfect. Least semibreves are synonymous with minims.

Each breve and semibreve in Vetulus’s system is further systematized into what he terms prolationes or subdivisiones. It is worth pausing to consider what exactly Vetulus means by prolatio, since this word is used to describe several different processes in Liber de musica.

28 Confusingly, Vetulus’s greater perfect breve can be divided into two or three parts.

29 Prosdocimus de Beldemandis, Tractatus pratis cantus mensurabilis ad modum Italicorum. A Treatise on the Practice of Mensural Music in the Italian Manner, ed. and trans., Jay A. Huff, Musicological Studies and Documents, vol. 29 (American Institute of Musicology, 1972), 28. Musicologists at times refer to this practice using the German term Longanotation. The term Longanotation was coined by Kurt von Fischer in 1956 to reflect the idea that the foundation of the French system was the longa, and that minims remain constant across proportions, enabling musicians to calculate mensural equivalence. Longanotation is at times compared with Brevisnotation. Associated with the theory set out in the Pomerium, the breve of Brevisnotation is believed to remain constant in this system, and modus (the division of longae into breves) is absent. Kurt von Fischer, Studien zur italienischen Musik des Trecento und frühen Quattrocento. Das Repertoire. II. Repertoire-Untersuchungen, (Bern: P. Haupt, 1956), 112. Marco Gozzi uses the presence of modus in Johannes Vetulus’s Liber de musica to argue that the treatise exhibits French influence. Gozzi, “New Light,” 19. However, Long has suggested that the diversity of notational examples does not support the claim that modus was absent from Italian notation. Long, “Musical Tastes in Fourteenth-Century Italy,” 32–3.
Customarily, the term *prolatio*, translatable into English as “prolation” is used by musicologists to describe the division of semibreves into minims. Where prolation is major, semibreves contain three minims. Where it is minor, semibreves contain two minims. It may also be used to describe the “four prolations,” i.e. the various combinations of perfect and imperfect *tempus* (the triple or duple division of breves into semibreves) and major and minor prolation (see: Chapter 4, Figures 2–3). Vetulus’s use of the term *prolatio* corresponds loosely to the ideas embedded within these terms, since his *semibrevis maior* [greater semibreve] is worth three minims, and his *semibrevis minor* [lesser semibreve] is worth two minims. He also at times employs the term *prolatio* in a general sense to describe the division of any temporal span into parts.

As Zayaruznaya has observed, the term *prolatio* as it was used in medieval theory is more nuanced than the modern conceptions of prolation described above, and can project in a general sense the idea of an “utterance,” or a “way of singing.” As a “performative act,” the term *prolatio* was at times employed in reference to the tempo of a song.\(^{30}\) The author of the mid-century Barcelona anonymous treatise describes *prolatio* in this way, stating that there are “duo […] modi cantandi, sive prolationis” [two ways of singing or uttering].\(^{31}\) The “modus prolixior” [the more expansive manner] is of the perfect *tempus*, and the “modus brevior” [the more succinct manner] is of the imperfect *tempus*.\(^{32}\) Vetulus’s notion of *prolatio*, which I translate as “extension,” is related to tempo because it determines the duration of a note in atoms. This means that each kind of breve, semibreve, and minim comes in three lengths. For instance, a greater semibreve can be of the greater, lesser, or least *prolatio* or extension. All

\(^{30}\) Anna Zayaruznaya, “A Minor History of *tempus and prolatio*,” Frankfurt, 2018.


\(^{32}\) Trans. Zayaruznaya, “A Minor History of *tempus and prolatio.*”
three of these greater semibreves are worth three minims, but nevertheless vary in duration because they contain a different number of atoms.

That Vetulus elected to use the term *prolatio* to convey in a general sense the notion of a “way of dividing” musical time, as he does the term *modus* (see: Commentary), but also to determine the durations of notes in atoms, arguably illustrates the continuity inherent within Vetulus’s project between speculation and practice. As I will discuss further in Chapter 3, the concept of “prolation” or “extension” for Vetulus is imbued with mystical significance because his extensions are organized into triadic structures, reflecting the angelic hierarchies of Pseudo-Dionysius the Areopagite. At the same time, the extension to which a note belongs determines its duration, and with this tempo—an attribute of music performance that Vetulus attempted to systematize in his treatise and one to which I will return later in this chapter. Further, as I contend in Chapter 5, the notion of mensuration—itself a “way of dividing”—was a performative act, and one that arose through the organization of notes into patterns by a singer. Vetulus’s *prolatio* thus reinforces connections between speculation and practice on multiple levels.

Table 3 below sets out the values of each of Vetulus’s “proper” perfect divisions—*duodenaria*, *novenaria*, and *senaria perfecta*—and the imperfect divisions—the *octonaria*, *senaria imperfecta*, and *quaternaria* from the greater perfect breve of the greater extension (or *duodenaria* division), worth seventy-two atoms, down to the minim of the least extension worth three atoms. As can be seen in the table, the notes in Vetulus’s system are proportional to one another on a number of levels. First, all perfect breves are in 3:2 proportion with imperfect breves.33 Second, greater semibreves are in 3:2 proportion with lesser semibreves. Last, the greater, lesser, and least extensions of each species of semibreve are proportional to one another.

----

33 Vetulus would have adopted this from Marchetto, whose perfect and imperfect breves are also in 3:2 proportion.
another. Because notes of the least extension group together to form longer notes that are also of the least extension, all longer notes that are of the least extension will be built up from minims that are also of the least extension. Their durations will therefore be multiples of three atoms. The same is true of the notes of the greater and lesser extensions. For instance, two minims of the least extension (3 atoms) group together to form a lesser semibreve of the least extension (6 atoms). Similarly three minims of the greater extension (6 atoms) group together to form a greater semibreve of the greater extension (18 atoms). Minims are also proportional to each of the breves. Four minims of the least extension (3 atoms) together form a least imperfect breve of the least extension (12 atoms). Similarly, twelve minims of the greater extension (6 atoms) form a greater perfect breve of the greater extension (72 atoms). As Hammond has observed, the foundational organizational principle of Vetulus’s system is thus that all notes are “based upon a constant number of atoms factorable by 2 and 3 and their multiples.”

Table 3 corresponds to Hammond’s table of the breves and semibreves in a number of respects. For instance, Hammond includes the greater, lesser, and least perfect breves (worth 72, 54, and 36 atoms); and the greater, lesser, and least imperfect breves (worth 48, 36, and 24 atoms). He also includes the following semibreves in his table: the greater semibreves of the greater (18 atoms), lesser (12 atoms), and least (9 atoms) extensions; the lesser semibreves of the greater (12 atoms), lesser (8 atoms), and least (6 atoms) extensions; and the least semibreves (minims) of the greater (6 atoms), lesser (4 atoms), and least (3 atoms) extensions.

---

34 Hammond, “Introduction,” 20. More precisely, one may say that the notes of Vetulus’s system contain within them a number of atoms equal to the powers of two and three and their products up to a limit.

Table 3 also deviates from Hammond’s table of the breves and semibreves in a number of respects. In addition to the perfect and imperfect breves described above, he includes the greater, lesser, and least semi-perfect breves (worth 36, 24, and 18 atoms); and the greater, lesser, and least semi-imperfect breves (worth 24 or 36, 18, and 12 atoms). His classifications of the semi-perfect and semi-imperfect notes are presumably derived from a passage near the opening of *Liber de musica* in which Vetulus lays out the structure of his mensural system.

Brevis seu tempus perfectum maius, minus et minimum. Tempus imperfectum maius, minus et minimum. Brevis seu tempus semiperfectum maius, minus et minimum. Brevis seu tempus semiimperfectum maius, minus et minimum. Et dicitur semiperfectum aut semiimperfectum eo quod partitur tempus perfectum aut imperfectum per medium et non secundum vocem. Notandum est quod unaquaeque istarum divisionum sunt maioris, minoris et minimae prolationis.37

A breve or perfect tempus [can be] greater, lesser, and least. An imperfect tempus [can be] greater, lesser, and least. A breve or semi-perfect tempus [can be] greater, lesser, and least. A breve or semi-imperfect tempus [can be] greater, lesser, and least. And they are called semi-perfect or semi-imperfect because the perfect or the imperfect tempus is divided in half, and not according to their sound. Note that each of these divisions are of the greater, lesser, and the least extensions.

Here, Vetulus states that perfect and imperfect tempora are greater, lesser, and least and that the semi-perfect and semi-imperfect tempora are also greater, lesser, and least. A semi-perfect or semi-imperfect tempus is divided exactly the same way as its perfect or imperfect equivalent, but is half its duration in atoms. Vetulus appears to use these generic terms merely to describe

---

36 He therefore tabulates in total twelve divisions of the tempus, and excludes the greater, lesser, and least extensions from his tables. However, he nevertheless acknowledges the existence of the concept of prolatio in the introduction to his edition. See: Hammond, “Introduction,” 20–1. By my calculation, the lesser semi-perfect breve is worth twenty-seven atoms, since it is worth half of the lesser perfect novenaria breve, which is worth fifty-four atoms.

the duration of notes in atoms, without necessarily stating in precise terms the division of notes into parts.38

By categorizing the semi-perfect and semi-imperfect notes, Hammond follows this passage of Liber de musica. However, his table is still incomplete because Vetulus also states that each of the perfect and imperfect, greater, lesser, and least divisions are distributed further into greater, lesser, and least extensions. This means that there are in total eighteen proper divisions of the tempus.39 The terms semi-perfect and semi-imperfect are simply used to name divisions that are worth half of the perfect and imperfect divisions, and are equal in length to the least extensions in my tables.40 However, they may be divided up any number of ways.

---

38 Notandum est quod quando tempus imperfectum aut semiimperfectum dividitur per medium, aliquando per duo binariae, aliquando per duo ternariae et aliquando per duo quaternariae. Et omnes istas divisiones possumus miscere simul, tamen imperfectum tempus cum imperfecto et semiimperfectum cum semiimperfecto tempore. de Anagnia, Liber de musica, ed. Hammond, 48–9. [Note that when the imperfect or semi-imperfect tempus is divided in half, there is sometimes divided into two binariae, sometimes into two ternariae and sometimes into two quaternariae. And we can mix all of these divisions simultaneously, imperfect tempus with imperfect and semi-imperfect with semi-imperfect tempus.]

39 This might be what Vetulus is referring to when he states that there are eighteen rhythmic modes, as follows: “Sed quaod considerationem divisionum mensurarum, mihi videtur quod, sumendo modum a largis, principales universalium tam perfectorum quam imperfectorum sunt 18. Videlicet perfectorum sunt 11, imperfectorum 7.” de Anagnia, Liber de musica, ed. Hammond, 35. [But with respect to the divisions of the measures it seems to me that, having taken the mode from the largae, there are in total eighteen principal perfect and imperfect [modes]. There are eleven perfect and seven imperfect.] Vetulus also states that there are eleven perfect modes and seven imperfect modes. The significance of this designation remains unclear, since extrapolating from Table 3, there are nine perfect and imperfect divisions. This is similar in concept to Petrus dictus Palma Ociosa’s twelve “modes” or ways of discanting, as set out in his Compendium de discantu mensurabili of 1336. Johannes Wolf, “Ein Beitrag zur Diskantlehre des 14. Jahrhunderts,” Sammelbände der Internationalen Musikgesellschaft 15 (1913-14), 517–34.

40 He also at times describes a “diminished perfect” division, which appears to be synonymous with what would be the semi-perfect division. Vetulus explicitly condones the use of more than one name for the same duration: “Etiam praedictum tempus improprium perfectum diminutum, aut semiimperfectum maius quia in mensura sunt idem, potest in tres aequales partes dividi. Et quaelibet pars semibrevis minor appellatur, et duarum minimarum maioris prolationis et atomorum 12 est valoris.” de Anagnia, Liber de musica, ed. Hammond, 50. [Also, the aforesaid improper diminished perfect or the greater semi-imperfect tempus, since they are the same in measure, can be divided into three equal parts. And each part is called a lesser semibreve, and is worth two of the minim of the greater extension and twelve atoms.]
Table 3: “Proper” divisions and extensions of breves and semibreves

<table>
<thead>
<tr>
<th>Duration in Atoms</th>
<th>Greater perfect breve duodenary</th>
<th>Lesser perfect breve novenario</th>
<th>Least perfect breve senaria perfecta</th>
<th>Greater imperfect breve octonaria</th>
<th>Lesser imperfect breve senaria imperfecta</th>
<th>Least imperfect breve quaternaria</th>
<th>Greater semibreve</th>
<th>Lesser semibreve</th>
<th>Minim (least semibreve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Lesser</td>
<td>Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Least</td>
<td>Lesser</td>
<td>Greater</td>
<td>Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>Lesser</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Least</td>
</tr>
<tr>
<td>24</td>
<td>Lesser</td>
<td>Least</td>
<td>Lesser</td>
<td>Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Least</td>
<td>Least</td>
<td>Greater</td>
<td>Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lesser</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Greater</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Least</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lesser</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Greater</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lesser</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Least</td>
</tr>
</tbody>
</table>

The “Improper” Divisions of Breves and Semibreves

Thus far, I have introduced what I term the “proper” divisions. As can be seen in Table 3, this set of divisions is built up from three minims—a minim of the greater extension worth six atoms, a minim of the lesser extension worth four atoms, and a minim of the least extension

---

worth three atoms. The second set of divisions (shown below in Table 4) is also built up from three minims—a minim of the greater extension worth four atoms, a minim of the lesser extension worth three atoms, and a minim of the least extension worth two atoms. I term this the “improper” set of divisions.\(^{42}\) I discovered this set of divisions because at times Vetulus uses the same name to describe notes that differ in duration in atoms. Hammond also observed this, writing in his edition:

In \((42, 17)\)\(^{43}\) there is an apparent inconsistency, since Vetulus gives the major *semibrevis* of minimum prolation and the minor *semibrevis* of minor prolation both the value of 6 atoms, where previously the major *semibrevis* had 9 atoms and the minor *semibrevis* 8.\(^{44}\)

In Table 3, the greater semibreve of the least extension (Hammond’s major *semibrevis* of minimum prolation) is worth nine atoms, and the lesser semibreve of the lesser extension (Hammond’s minor *semibrevis* of minor prolation) is worth eight atoms. This table thus cannot account for a greater semibreve of the least extension and a lesser semibreve of the lesser extension worth six atoms. Hammond also observes in his table of divisions that there are two values for the minim of the least extension—this note can be worth two or three atoms.\(^{45}\) This led Hammond to suggest that there was an inconsistency in Vetulus’s work. However, as I will now show, Vetulus theorized two sets of divisions in *Liber de musica*. There was thus no inconsistency in his use of the same duration in atoms for two notes with the same name.

---

\(^{42}\) I consider the proper divisions the default, and unless otherwise specified, a reader can assume that I am referring to a proper note.

\(^{43}\) That is, the section in which Vetulus describes how a *senaria* breve can “ascend to,” i.e., be divided into nine parts and become a *novenaria* breve. This is possible because, as can be seen in Table 3, several notes share the same duration in atoms in Vetulus’s system. This means that a given duration can take on the form of several different notes, depending on the context.

\(^{44}\) Hammond, “Introduction, 20–1.

The terms “proper” and “improper” that I apply here to describe these two sets of divisions are derived from Vetulus’s occasional use of the adjectival forms *proprius* -a -um [proper] and *improprius* -a -um [improper] to refer to the quality of his divisions. His references to the “proper” and “improper” divisions are at times contradictory. He introduces the concept of the improper division near the opening of the treatise, as follows:

Etiam divisionem perfectam diminutam habemus principaliter duobus modis quae est etiam senariae divisionis, scilicet propriam et impropriam. Propria est illa quae nascitur in se ipsa. Impropria est illa quae habet mediam partem temporis divisionis duodenariae maioris prolationis.⁴⁶

There are also two principal kinds of perfect, diminished division, which is also of the *senaria* division, namely the proper and improper. The proper is born in itself. The improper is made of half of the *tempus* of the greater extension of the *duodenaria* division.

According to this description, the proper division is that which is “born in itself”; the improper is equal to the “mediam partem,” or “half” of the greater perfect breve. This oblique description appears to imply that the proper notes are not derived from other notes, whereas the improper notes are derived from the proper notes. Because Vetulus is inconsistent with his use of the term improper throughout *Liber de musica*, this passage arguably could be interpreted two different ways. First, assuming that by “mediam partem,” Vetulus means “half”—as I have translated the term here—he is stating that an improper note is one that is derived from the division of a greater perfect breve in half. For instance, an “improper” least perfect breve of the greater extension (36 atoms) can be derived through the division of the greater perfect breve of the greater extension (72 atoms) in half. At times, he also describes greater perfect breves that are divided in half as improper, presumably because these are derived from greater perfect breves that are divided into three equal parts.

Vetulus uses the term improper to describe notes that are derived from the division of longer notes in half in other parts of his treatise. For example, he outlines the division of the greater perfect tempus (the seventy-two atom duodenaria breve) into two equal parts as follows:

Adhuc supradictum tempus divisionis duodenariae maioris prolationis, quod est compositum ex 3 temporibus divisionis quaternariae maioris etiam prolationis, et quodlibet tempus ex duabus minoribus semibrevisibus, potest dividi per medium. Nunc dicendum quare. Quia praefatum tempus componitur per tria tempora quaternariae, ut dictum est supra, et quodlibet tempus divisione quaternariae potest dividi in duas minores semibreves, ita quod summarie omnia ista tria tempora faciunt sexies minores semibreves quae possunt dividi per medium, videlicet per bis tres. Et tempus semiperfectum47 maius, aut perfectum improprium diminutum, quod reducitur ad modum imperfectum et dividitur secundum modum perfectum, vocatur et 36 atomorum est valoris.48

Still, the aforesaid tempus of the duodenaria division of the greater extension, which is also composed of three tempora of the quaternaria division, also of the greater extension (and any [other] tempus [that is composed] of two lesser semibreves) can be divided in half. Let us now say why. Because the aforementioned tempus is composed of three quaternaria tempora, as is stated above, and any tempus in the quaternaria division can be divided into two lesser semibreves, because in sum these three tempora contain six lesser semibreves, which can be divided in half, namely into three twice. And this is called the greater semi-perfect, or the improper diminished perfect tempus, which is grouped imperfectly and is divided perfectly, and is worth thirty-six atoms.

As Vetulus states, the greater perfect breve of the greater extension (72 atoms) can be divided into three least imperfect breves of the greater extension (24 atoms). These breves are each composed of two lesser semibreves of the greater extension (12 atoms). When grouped into threes, these lesser semibreves form a new note. Vetulus calls this note a “greater semi-perfect,” or “improper diminished perfect tempus,” worth thirty-six atoms. Vetulus states that this note is perfect, and that it is grouped imperfectly, reflecting its derivation from the greater perfect breve of the greater extension (72 atoms). He later goes on to describe the division of this note into six minims, suggesting that it is a least perfect tempus of the greater extension (36

47 I changed this from “semiimperfectum” to “semiperfectum” to reflect Vat307.

48 de Anagnia, Liber de musica, ed. Hammond, 49–50.
atoms). Vetulus’s use of the term improper here appears to refer to this note’s derivation from the division of the duodenaria breve in half, and not the set of divisions to be described below.

Second, returning to the passage quoted above—“the improper is made of half of the tempus of the greater extension of the duodenaria division”—it is also possible that by the “median partem” [half] Vetulus is implying that all the proper notes of the lesser extension are equal to the improper notes of the greater extension. That is, the proper greater perfect breve of the lesser extension (i.e., the note that sits conceptually between the greater perfect breve of the greater and least extensions) is equal in duration to the improper greater perfect breve of the greater extension. Both notes are worth forty-eight atoms (compare Tables 3 and 4). To this extent, the improper division may also be seen as a derivative of the proper division. That Vetulus should have used the term improper to describe two different concepts is in keeping with the tone of his writing in general: Liber de musica is at times difficult to comprehend because Vetulus employs the same terms to describe multiple different concepts (such as the terms greater, lesser, and least themselves). However, unless otherwise specified I use the term improper to describe only the second set of divisions built up from three minims worth two, three, and four atoms, and not the notes that are derivatives of the division of longer notes, such as the greater perfect duodenaria breve, in half.

In an extended passage near the beginning of Liber de musica, Vetulus attempts to clarify the difference between the proper and improper notes by describing four types of quaternaria breve:49

Quaterniam habemus quattuor modis, videlicet illud quod derivatur a divisione perfecta diminuta propria quae non dat respectum ad modum in reductione. Aliud quod derivatur etiam a divisione perfecta diminuta tamen impropria, et reducitur ad modum imperfectum et dividitur secundum perfectum. Aliud quod reducitur

49 Vetulus’s description of the four kinds of quaternaria breve may provide a further explanation for why Hammond included only four kinds of breve in his table.
There are four kinds of *quaternaria*; one is derived from the proper perfect diminished division, which does not give respect to the *modus* in its grouping. Another is also derived from the diminished perfect division, but the improper; and it is grouped imperfectly and divided perfectly. Another that is grouped perfectly descends from the *duodenaria* division of the greater extension. And another that descends from the *octonaria* division is grouped and divided imperfectly.

In this passage the first *quaternaria* breve is derived from the “proper perfect diminished division,” presumably the least perfect breve of the greater extension (i.e., the *senaria perfecta* breve, worth 36 atoms). It is diminished, since it is a perfect breve that is worth only half of the greater perfect breve of the greater extension (i.e., the *duodenaria* breve, worth 72 atoms).

Vetulus does not specify why this note is proper, but we can surmise that he may mean that it is not derived from the *duodenaria* breve but is “born in itself.” He envisages the division of this breve into a smaller part—a lesser semibreve of the greater extension (12 atoms)—and a larger part—a least imperfect breve of the greater extension (i.e., a *quaternaria* breve worth 24 atoms). I visualize this process in Figure 11.

**Figure 11: Division of the least perfect breve of the greater extension into two unequal parts**

---

As is shown in Figure 11, Vetulus outlines a process whereby the least perfect breve of the greater extension (36 atoms) is divided into two unequal parts, the second of which is twice as long as the first. This bears similarity to the process of alteration, whereby the second of two like notes that occurs between two longer ones is lengthened to fill out a triple grouping. In this case, the triple grouping is the timespan of the least perfect breve of the greater extension (36 atoms). The first, shorter part is the lesser semibreve of the greater extension (12 atoms). The second part is an “altered” lesser semibreve of the greater extension. When doubled in length, this note equals 24 atoms, and is therefore reimagined as a least imperfect breve of the greater extension. This can explain why Vetulus states that the least imperfect breve of the greater extension does not “fill out the modus.” Because it is an altered note, it cannot be grouped into the modus formed by the least perfect breve of the greater extension (36 atoms) even though it is a breve.

The second quaternaria breve to which Vetulus refers in the extract above is more difficult to identify precisely. He states that it is derived from a diminished perfect note, this time improper. Following the idea that by improper he is referring to the “middle part,” i.e., a note of the lesser extension, one might surmise that he means that this quaternaria division is equal in length to the “diminished” improper greater perfect breve of the greater extension. Following my description of the improper divisions below, this quaternaria tempus would be worth twenty-four atoms, since the improper greater perfect breve of the greater extension is worth forty-eight atoms, and the term “diminished” for Vetulus typically indicates that a note is half of its normal value. This would also explain why Vetulus states that this note is “divided” perfectly, since this would mean that he is reimagining a perfect duodenaria tempus that is worth twenty-four atoms as a quaternaria breve.

---

51 *Modus* refers to the relationship between breves and longae. Where modus is perfect, longae contain three breves. Where modus is imperfect, longae contain two breves.
The derivation of the third *quaternaria* is more easily graspable: it arises from the division of the greater perfect breve into three least imperfect breves, and is therefore grouped into the perfect *modus*. Similarly, the fourth type of *quaternaria* is derived from the simple division of the greater imperfect breve into two parts, and is therefore both grouped and divided imperfectly.

At times, Vetulus refers to notes that are absent from Table 3 using the term improper. The passage below illustrates this use of the term, and contains an explicit reference to what I suggest is Vetulus’s second set of divisions.

Et sicut per duo tempora quaternaria componitur tempus divisionis octonariae, ita per duo tempora senaria componi potest tempus divisionis duodenariae. Quod tempus dicitur duodenariae impropriae divisionis et potest dividi per ternarium numerum, et quilibet numerus tempus impropriae imperfectionis quaternariae divisionis appellatur quod dividitur per modum imperfectum et reductur secundum modum perfectum, et 16 atomorum est valoris. Etiam duo istorum temporum quaternariae possunt facere unum tempus divisionis octonariae; minoris impropriae imperfectionis notatur, et est valoris 32 atomorum. Potest etiam quodlibet istorum temporum praedictorum divisione quaternariae ascendere ad impropriam octonariam divisionem minimae prolationis, quae reductur et dividitur per modum imperfectum.52

And just as the *tempus* of the *octonaria* division is composed of two *quaternaria tempora*, so too can the *tempus* of the *duodenaria* division be composed of two *senaria tempora*. This is said to be the *tempus* of the improper *duodenaria* division, and it can be divided into a ternary rhythmic unit, and each unit is called the *tempus* of the improper imperfection of the *quaternaria* division, which is divided imperfectly and grouped perfectly and is worth sixteen atoms. Also, two of these *tempora* of the *quaternaria* [division] can make one *tempus* of the *octonaria* division; note of the lesser improper imperfection, and it is worth thirty-two atoms. Any of these aforesaid *tempora* in the *quaternaria* division can also ascend to the improper *octonaria* division of the least extension, which is grouped and divided imperfectly.

In the above passage, Vetulus states that a greater imperfect breve can be divided in half to create two least imperfect breves. Similarly, a greater perfect breve can be divided in half to create two least perfect breves. Assigning a duration in atoms to these notes, he states that a

greater perfect breve (48 atoms) will contain three least imperfect breves (worth 16 atoms each). He continues to explain that two of the least imperfect breves (16 atoms) can be grouped together to form a greater imperfect breve (32 atoms). The least imperfect breve (16 atoms) may be reimagined as a greater imperfect breve of the least extension, also worth sixteen atoms.

The opening phrases of this description do not provide sufficient information to determine whether the proper and improper divisions are distinct from one another in duration. Arguably, the least imperfect breve (16 atoms) to which he refers could be the proper least imperfect breve of the lesser extension; the greater perfect breve (48 atoms) could be the proper greater perfect breve of the lesser extension; and the greater imperfect breve (32 atoms) could be the proper greater imperfect breve of the lesser extension, all shown in Table 3. However, at the end of the passage, Vetulus informs the reader that there is also a greater imperfect breve worth sixteen atoms. Here, Vetulus departs from the mensural hierarchy outlined in Table 3, describing a greater imperfect breve that is shorter than the proper greater imperfect breve of the least extension (24 atoms). I suggest that this note can be explained because Vetulus theorizes two sets of divisions. This note is therefore the improper greater imperfect breve of the least extension (see Table 4 below). All of the other notes in this passage may be reinterpreted as improper notes as well. The least imperfect breve (16 atoms) is the improper least imperfect breve of the greater extension; the greater perfect breve (48 atoms) is the improper greater perfect breve of the greater extension; and the greater imperfect breve (32 atoms) is the improper greater imperfect breve of the greater extension.

---

53 Hammond does not include this note in his tables. Hammond, “Introduction,” 20–1.
What is confusing here—and throughout Liber de musica—is that Vetulus rarely distinguishes between the improper and proper divisions, or indeed mentions the extension to which a note belongs. Most of the time, the reader (both of his prose and the tree diagrams) must infer this information. Nevertheless, through close examination of every branch of the tree diagrams and the prose of his treatise in its entirety, it becomes indisputably apparent that Vetulus theorizes more notes than are contained within Table 3, or that can be accounted for systematically in Hammond’s tables. This can be explained by the existence of a second set of divisions.

Vetulus describes the improper divisions outlined in Table 4 implicitly throughout Liber de musica, but rarely distinguishes them explicitly from what I term the proper divisions. Nor does he name every note within his improper set of divisions. Nevertheless, the difference between the two sets of divisions becomes readily apparent when, as Hammond noted, Vetulus uses the same name to refer to two notes with differing values in atoms. Consider the following passage:

Quaelibet minor quae est valoris duarum minimarum minoris prolationis potest facere unam maiorem semibreven minimae prolationis, quia tam minor minoris prolationis quam maior minimae sex atomorum est valoris qui possunt dividii per binarium, sicut minor semibrevis praedicta in duas partes dividitur, videlicet per bis 3, aut per ternarium sicut maior praefata in tres etiam partes dividit potest, videlicet per ter 2. Et ut dicitur supra, sic divisio 6 potest componi per tres minores semibreves, ita divisio novenaria componitur ex tribus maioribus, ut patet. Et tunc tempus divisionis novenariae minima prolationis vocatur.55

---

54 Vetulus states that this note is of “the lesser improper imperfection.” This note could be either the improper greater imperfect breve of the greater extension or the proper greater imperfect breve of the lesser extension in my tables. Ultimately, this illustrates that my own use of the term improper is more consistent than Vetulus’s. By attempting to make sense of his work, my own in certain respects obscures the confusion inherent within his. This problem is also encountered by editors of music notated in mensural notation—at times, the ambiguity of the notation prevents one from translating the rhythms tidily into modern staff notation (a textbook example of this is Lorenzo da Firenze’s Ita se n’era star nel, copied in F87, ff. 45v–46r). These challenges draw attention to the contrasting systems of value within which medieval people operated. I will discuss this problem further in Chapters 4–5.

55 de Anagnia, Liber de musica, ed. Hammond, 52.
Any lesser [semibreve] that is worth two minims of the lesser extension can make one greater semibreve of the least extension, because both a lesser [semibreve] of the lesser extension and a greater [semibreve] of the least [extension] are worth six atoms, which can be divided into a binary [rhythmic unit], just as the aforesaid lesser semibreve can be divided into two parts, namely into three twice, or into a ternary rhythmic unit, just as the aforementioned greater [semibreve] can also be divided into three parts, namely into two three times. And, as is stated above, the senaria division can be composed of three lesser semibreves, so the novenaria division is composed of three greater [semibreves], as is shown. And this is called the tempus of the novenaria division of the least extension.

Vetulus states that a lesser semibreve of the lesser extension (6 atoms) worth two minims of the lesser extension (3 atoms) can be divided into three parts that group together to make a greater semibreve of the least extension (also 6 atoms). This note contains three minims of the least extension (2 atoms). Three lesser semibreves of the least extension (6 atoms) group to form a least perfect breve (18 atoms). Similarly, three greater semibreves of the least extension (6 atoms) group to form a lesser perfect breve of the least extension (18 atoms). As can be observed through a comparison of Tables 3 and 4, both the improper greater semibreve of the least extension (6 atoms) and the improper lesser perfect breve of the least extension (18 atoms) are shorter than their proper equivalents.

Vetulus does not identify all of the improper divisions by name. As such, to arrive at the two tables, some inference was necessary. In Tables 3 and 4, each note that is mentioned by name either as a note of a specific division and extension that is extraneous to the proper divisions, or that appears on a tree diagram, is highlighted in bold. I was at times able to ascertain whether notes were improper or proper because each set of notes within a given mensural division shares the same extension. That is, a greater perfect breve of the greater extension, whether improper or proper, will contain smaller notes that are also of the greater extension. Although some of the notes shown in Table 4 are missing from his prose, Vetulus provided a value for each of the extensions—greater, lesser, and least—of at least one of each

56 Hammond noted the existence of this minim in his table. Hammond, “Introduction,” 21.
type of note, enabling me to calculate the remaining values within the table using simple arithmetic. I might add that my table’s single assumption is that Vetulus intended his improper division to follow the same rules as the table of proper divisions, i.e., that notes are proportional to one another.

Table 4: “Improper” divisions and extensions of breves and semibreves

<table>
<thead>
<tr>
<th>Duration in Atoms</th>
<th>Greater perfect breve duodecimaria</th>
<th>Lesser perfect breve novemaria</th>
<th>Least perfect breve senaria perfecta</th>
<th>Greater imperfect breve octonaria</th>
<th>Lesser imperfect breve senaria imperfecta</th>
<th>Least imperfect breve quaternaria</th>
<th>Greater semi-breve</th>
<th>Lesser semi-breve</th>
<th>Minim (least semi-breve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>♦</td>
<td>♦</td>
<td>♦</td>
<td>♦</td>
</tr>
<tr>
<td>36</td>
<td>Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Lesser Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Lesser</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Least Greater Lesser Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Least Lesser Lesser Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Least Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Least Least Lesser Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Lesser</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Least Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Least Less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Least Greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Least</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

57 A similar table is published in: Ovenden, “Atoms and Music,” 244.
**Trees of the tempora**

Vetulus depicts the greater (*duodenaria*), lesser (*novenaria*), and least (*senaria*) perfect tempora using tree diagrams. In certain respects these trees function in a similar way to the trees of the largae. For instance, notes are not represented directly, but rather must be inferred from the numerals placed in the branch nodes. The trees also ascend from longer timespans to shorter ones most of the time, although occasionally branches merge and split again, compelling a reader to both divide and group temporal spans as they look upwards through the diagrams. There are also some significant differences between these tree diagrams. First, while the numerals of the trees of the largae represent the spans of accumulated breve units, the numerals in the trees of the breves depict the spans of accumulated minim units. Because there are six different kinds of minim (worth 2, 3, 4, or 6 atoms), the durations of the minims represented by the numerals change depending on where one looks in the tree and how one looks at the tree. As such, it is essential that a reader of these trees bears in mind the duration of the notes that they imagine in atoms.

A second conceptual difference is that a reader of the trees of the breves is required to hold in their mind much more information than a reader of the trees of the largae. Unlike in the trees of the largae, where the breve units of each division are represented from the longest larga up to the breve itself, Vetulus does not portray the division of each note in his trees of the breves. Instead, a reader must at times infer the remaining notes in a division from a longer span worth several minims. One can appreciate this by looking at the leaves of the trees of the breves, which bear the numerals 2 or 3, but never 1. The reader must thus infer groups of the shortest minims from these leaves.

A further distinction is that the numerals in the trees of the breves can portray spans of minims that are interpreted as different sets of notes depending on the orientation that the
reader takes. While this was also true to a minimal extent in the trees of the largae (think back to the rightmost branch of Figure 9), the spans represented by the nodes of the trees of the breves can at times stand in for many notes, and with them several different divisions. This is because multiple different breves, semibreves, or minims can share the same duration in atoms, while only a handful of largae and longae share the same duration in breves. This necessitates that a reader must constantly reinterpret the notes that they extrapolate from the grouped minim spans represented by the numerals. It also means that the numerals correspond to the number of minims within only some of the notes that are inferred from a given node. Figures 12–14 juxtapose images of each breve tree with a transcription.

Figure 12: Tree of the greater perfect breve

---

58 The trees in Figures 12–13 are copied on f. 8v of Vat307. The tree in Figure 14 is copied on f. 9r. Used by courtesy of the Biblioteca Apostolica Vaticana.
Figure 13: Tree of the lesser perfect breve

Figure 14: Tree of the least perfect breve
To comprehend how Vetulus’s trees are read, consider the lower mi branches of the tree of the greater perfect breve, shown in Figure 15. Annotations are provided that illustrate which notes can be inferred from the minim spans represented by the numerals. The numeral twelve that accompanies the mi root ball indicates that there are twelve minim units within this note. Because this is the tree of the greater perfect breve of the greater extension (72 atoms), we know that this note can be divided into twelve minims of the greater extension (6 atoms). Two branches lead from this node. To the left, a numeral four indicates that the span represented here can be divided into four minims of the greater extension (6 atoms). Worth one-third the length of the greater perfect breve of the greater extension (72 atoms), it is a least imperfect breve of the greater extension (24 atoms). Because the diagram does not show it explicitly, the reader is expected to infer that this note stands in for a complete quaternaria division. The reader must therefore imagine the two lesser semibreves of the greater extension (12 atoms) and the four minims of the greater extension (6 atoms) that are contained within this division. To the right, the greater perfect breve of the greater extension (72 atoms) is divided into a span worth eight minims of the greater extension (6 atoms). This is a greater imperfect breve of the greater extension (48 atoms). Continuing up the branch, this is divided in half into two spans worth four minim units—least imperfect breves of the greater extension (24 atoms). It is left up to the reader to fill out the remainder of the quaternaria division of the left branch, who imagines the two lesser semibreves of the greater extension (12 atoms) and four minims of the greater extension (6 atoms) contained within it. The rightmost node splits again into two parts. The numeral twos here show that these spans can be divided into two
minims of the greater extension (6 atoms). They are therefore lesser semibreves of the greater extension (12 atoms). Figure 16 transcribes these branches into mensural notation.\textsuperscript{59}

Figure 15: Tree of the greater perfect breve, lower $mi$ branch

\begin{figure}
\centering
\includegraphics[width=\textwidth]{tree.png}
\end{figure}

\textsuperscript{59} Vetulus describes this process himself as follows: “Et tempus perfectae maioris divisionis 12 maioris prolationis appellatur quod principaliter in duas partes inaequales dividitur, et tunc prima pars erit minor, secunda vero maior vel e converso. […] Tunc quando ipsa alteratio requaeritur, est valoris et maior praedictarum partium tempus imperfectum maius octonariae divisionis maioris prolationis nominatur et 48 atomorum continet in se valorem. Et hoc tempus non restringitur ad modum.” de Anagnia, \textit{Liber de musica}, ed. Hammond, 43. [And the \textit{tempus} of the greater perfect division is called the \textit{duodenaria} of the greater extension, which is divided principally into two unequal parts, and then the first part will be smaller, but the second larger, or the opposite, […] Then, when thinking again about alteration, it is worth and is the larger of the aforesaid parts, [and it is] named the greater imperfect \textit{tempus} of the \textit{octonaria} division of the greater extension, and it is worth forty-eight atoms.]
One of the defining characteristics of the tree diagrams, and Vetulus’s system as a whole is the potential for divisions to be “mixed” with one another. As Vetulus states, mixing occurs when a given note is reinterpreted as another one, resulting in the creation of a new division that spans the same duration in atoms as the old division. This is possible because multiple notes share the same durations:

Potest enim tempus praefatum octonariae maioris prolotionis praedictae dividi per binarium numerum. Et quilibet numerus tempus breve semiimperfectum maius quaternariae maioris prolotionis vocatur, quod dividitur et reductur per modum imperfectum.

Etiam potest quodlibet istorum temporum semiimperfectorum maiorum quaternariae prolotionis ascendere ad divisionem senariam. Et tempus semiimperfectum maius senariae minoris prolotionis, quod reductur ad modum imperfectum, nominatur.

The aforementioned tempus of the octonaria of the greater extension can be divided into a binary rhythmic unit. And each part is called a greater semi-imperfect breve tempus of the quaternaria of the greater extension, which is divided and grouped imperfectly.

---

60 Prosdocimus also states that a song that is “composite” [compositus] or “mixed” [mixtus] contains more than one mensuration. de Beldemandis, Tractatus pratice, ed. and trans. Huff, 24–5.

61 de Anagnia, Libcr de musica, ed. Hammond, 45.
Any of these greater semi-imperfect tempora of the quaternaria extension can also ascend to the senaria division. And it is called the greater semi-imperfect tempus of the senaria of the lesser extension, which is grouped imperfectly.

In this passage, Vetulus describes first a greater imperfect breve of the greater extension (48 atoms). This note is divided into two least imperfect breves of the greater extension (24 atoms), which contain within them implicitly two lesser semibreves of the greater extension (12 atoms) and four minims of the greater extension (6 atoms). In the second part of the passage, Vetulus explains that the least imperfect breve of the greater extension (24 atoms) may be reinterpreted as a lesser imperfect breve of the lesser extension (24 atoms), which contains two greater semibreves of the lesser extension (12 atoms) and six minims of the lesser extension (4 atoms). Reaching back further, the greater imperfect breve of the greater extension (48 atoms) mentioned at the opening of the passage can be reinterpreted as well. It is now a greater perfect breve of the lesser extension (48 atoms).

This process is illustrated in Vetulus’s tree diagrams, in which the durations depicted by the numerals can take on a variety of forms depending on how one looks at the tree. To understand how this works, consider the part of the rightmost mi branch shown in Figure 17. This branch extends above the portion analyzed above in Figures 15 and 16, and provides annotations demonstrating how these branches may be interpreted when one pays attention only to the three circled notes. The numeral twos indicate that these two spans can be divided into two minims of the greater extension (6 atoms); they are therefore lesser semibreves of the greater extension (12 atoms). The branches merge above them to form a span worth four minims of the greater extension (6 atoms); this note is a least imperfect breve of the greater extension (24 atoms). Figure 18 transcribes this reading into mensural notation.

62 That is, the value in atoms of the breve remains the same, but will now be divided into six rather than four.

63 Vetulus also calls this note the “greater semi-imperfect tempus,” which refers to the fact that this note is half of the duration of the greater imperfect breve of the greater extension (48 atoms).
Figure 17: Continuation of *mi* branch, *quaternaria* perspective

![Diagram showing the continuation of the *mi* branch with annotations for *two*](image)

Figure 18: Figure 17 transcribed into mensural notation

<table>
<thead>
<tr>
<th>Mensural Notation</th>
<th>Atoms</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Mensural Notation" /></td>
<td>6</td>
</tr>
<tr>
<td><img src="image" alt="Mensural Notation" /></td>
<td>12</td>
</tr>
<tr>
<td><img src="image" alt="Mensural Notation" /></td>
<td>24</td>
</tr>
</tbody>
</table>

Figure 19 provides an annotation from the perspective of a reader who continues to look upwards through the branches of the tree, and who pays attention only to the three notes circled in this diagram. The numeral 4 that was previously interpreted as a least imperfect...
breve of the greater extension (24 atoms) is divided in half. The two numeral threes indicate that the notes to be inferred here can each be divided into three minims of the lesser extension (4 atoms); they are therefore greater semibreves of the lesser extension (12 atoms). This means that the note represented by the numeral 4 is now reinterpreted as a lesser imperfect breve of the lesser extension (still 24 atoms). While the numeral threes describe how many minims are contained within the notes inferred in this reading, the numeral four describes only the perspective of a reader who is interpreting the node as a *quaternaria* breve, but not the imperfect breve of the lesser extension (24 atoms) that is inferred in the reading illustrated in Figure 19. Figure 20 transcribes this reading into mensural notation.

Figure 19: Continuation of *mi* branch, *senaria imperfecta* perspective
Figure 20: Figure 19 transcribed into mensural notation

<table>
<thead>
<tr>
<th>Mensural Notation</th>
<th>Atoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦</td>
<td>4</td>
</tr>
<tr>
<td>♦ ♦</td>
<td>12</td>
</tr>
<tr>
<td>♦</td>
<td>24</td>
</tr>
</tbody>
</table>

Figure 21 shows the third orientation that a reader may take when looking at this group of branches. Here, the crossed branches leading up from the numeral threes indicate that the mixing of divisions is taking place—what was before a senaria or a quaternaria breve has been reinterpreted again. The crossed lines lead to two spans marked by numeral fours, which each can be divided into four minims of the least extension (3 atoms); these nodes represent timespans equivalent to least imperfect breves of the least extension (12 atoms). The leftmost of these spans splits again into two parts, each marked by a numeral two; these numerals can be interpreted as lesser semibreves of the least extension (6 atoms). The reader must imagine the two minims of the least extension (3 atoms) that they contain. Because the numeral four at the bottom of the diagram has now been divided into two imperfect breves of the least extension (12 atoms), we can ascertain that the note imagined in this reading contains eight minims of the least extension (3 atoms); it is a greater imperfect breve of the least extension (still 24 atoms). Again, the numeral four here corresponds only to the quaternaria perspective illustrated in Figure 17. Figure 22 transcribes this reading into mensural notation.
Figure 21: Continuation of *mi* branch, *octonaria* perspective

Figure 22: Figure 21 transcribed into mensural notation

<table>
<thead>
<tr>
<th>Mensural Notation</th>
<th>Atoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓</td>
<td>3</td>
</tr>
<tr>
<td>↓ ↓ ↓ ↓</td>
<td>6</td>
</tr>
<tr>
<td>■  ■  ■  ■</td>
<td>12</td>
</tr>
<tr>
<td>■ ■</td>
<td>24</td>
</tr>
</tbody>
</table>

Figure 23 shows the fourth orientation that a reader may take when looking at these branches. The two numeral fours above the crossed lines that before represented spans worth four minims are divided in half. The numeral threes indicate that they are divided into spans worth three improper minims of the least extension (2 atoms); they are
improper greater semibreves of the least extension (6 atoms). This means that the notes represented by the spans of the two numeral fours now each contain six improper minims of the least extension (2 atoms); they are improper lesser imperfect breves of the least extension (12 atoms). If the reader chooses to look back to the lower circled numeral four, they will perceive that it now represents a span worth twelve improper minims of the least extension (2 atoms); it is an improper greater perfect breve of the least extension (24 atoms). This perspective is translated into mensural notation in Figure 24.

Figure 23: Continuation of mi branch, duodenaria perspective

64 The reader must switch to the improper division here because the minims contained within these spans are shorter than the proper minims of the least extension (3 atoms). While I only read the last of these four interpretations using the improper division, it would also be possible to read the second and third using the improper division, since there is overlap between these divisions. Because Vetulus rarely specifies whether a note is proper or improper, the two are at times interchangeable.
Although the examples discussed above can be read unproblematically, some of the branches of Vetulus’s trees appear to be misdrawn, and show divisions that are impossible according to the system set out above. This occurs primarily when Vetulus asks the reader to divide a note containing an odd number of atoms into two parts. Theoretically, this should never take place since, according to Vetulus, a note can never contain fewer than two atoms, nor can the atom be split. This exemplifies the haphazard way by which Vetulus describes his own system.

Figure 25 shows again the tree of the lesser perfect breve. The roots of the tree each represent the spans of lesser perfect breves of the greater extension (54 atoms). To the left, the re root ball is divided into three branches marked by numeral threes, indicating that these spans contain within them three minims of the greater extension (6 atoms); they are therefore greater semibreves of the greater extension (18 atoms). To the right, the mi root ball is divided into two unequal parts. The left branch is marked by a numeral three, indicating that this span contains three minims of the greater extension (6 atoms); it is a greater semibreve of the greater extension (18 atoms). To the right, a numeral six marks a
span that contains six minims of the greater extension (6 atoms). Because this span is divided in half, it represents an imperfect note—a lesser imperfect breve of the greater extension (36 atoms). It is subsequently divided into two parts—spans that contain three minims of the greater extension (6 atoms); they are greater semibreves of the greater extension (18 atoms).

Marked in Figure 25 with three red boxes are the nodes that split off from the durations marked by the numeral threes (recall that these represent greater semibreves of the greater extension, worth 18 atoms). The branches that lead to the numeral twos show that these durations are divided in half, suggesting that they contain nine atoms. However, here a problem arises. Vetulus expects the reader to divide these nine atoms in half into notes worth two minims (shown by the numeral twos contained within the red boxes). This is impossible, since nine atoms cannot be divided in half without splitting the atom. For this reason, there are no lesser semibreves that contain nine atoms. These branches therefore depict divisions that are impossible according to Vetulus’s theoretical system.
While this is the most extensive error in Vetuslus’s tree diagrams, there are a number of others—a handful of the branches do not divide up correctly, while some of the numerals are drawn incorrectly. As I will discuss further below, Vetuslus misuses his own system in other ways over the course of the treatise; this is one of the reasons why Liber de musica is so inscrutable. While this may point towards incompetence on Vetuslus’s part, the following explanation is perhaps more appropriate: Vetuslus did not correct these errors because there was no need for him to correct them. Because his treatise was written primarily to further speculative, rather than practical ends, it was important that Vetuslus crafted a system that explored all of the possibilities of the notational systems available to him, without necessarily providing a system that could be put in practice. I now further this

---

65 These infelicities are noted in the footnotes to the translation.
argument by comparing Vetulus’s work to that of some of his more practically-minded contemporaries.

**Vetulus Compared with his Contemporaries**

As Lefferts has observed, Vetulus’s exploration of all of the various ways of arranging duple and triple temporal spans bears similarity to the systems of the fourteenth-century English theorist Johannes Torkesey and his follower Willelmus. As I outlined in the previous chapter, these theorists followed Boethius (and therefore Nicomachus) in mapping the hierarchical organization of the various powers of two and three and their products onto triangular diagrams. Building a mensural hierarchy from minimally short notes worth two and three atoms each, Vetulus’s system fits neatly onto the triangle. Figure 26 represents the duration in atoms of Vetulus’s divisions of the breves, semibreves, and minims using the triangle, and compares these to the numerals of Willelmus’s version of the triangle, which represent the number of *simpiae* units (his shortest note) within each note. Figure 26 counts up only the longest of Vetulus’s breves (72 atoms), and not up to the hypothetically longest possible note within his system as a whole (a larga worth 864 atoms, to be discussed below). The triangle of Vetulus’s atoms stops before Willelmus’s does. Nevertheless, the patterns of the two diagrams are remarkably similar, indicating a conceptual similarity between the two projects, i.e., the exploration of all of the powers of two and three and their products.

---

Because multiple notes contain the same number of atoms in Vetulus’s system, some of the numerals on the triangle shown in Figure 26 represent temporal spans that could take on the form of several different notes. Figure 27 provides a realization of the triangle in Figure 26 that includes Vetulus’s note names. The numerals continue to indicate

---

68 Laurie Koehler has observed that where minim equivalence (equal minims) is maintained and perfection and imperfection are permissible on all levels, the mensural notes fit perfectly onto the triangle. She associates this practice with Philippe de Vitry, and suggests that his mathematical proofs originated in the work of the French Jewish philosopher and mathematician Levi ben Gershon. See: Koehler, *Pythagoreisch-platonische Proportionen*, 47–8. For a recent discussion of ben Gershon’s work as it relates to de Vitry’s, see: William C. Watson, “Philippe de Vitry, Levi ben Gershon, and the Consonant Whole Tone,” *Music Theory and Analysis* 5, no. 1 (2018), 28–57.
how many atoms are contained within each temporal span. Each triangle within the
diagram contains a note name (or names)—it tells the reader the division to which a note
belongs. The numerals at the corners of the triangles indicate how many atoms the greater,
lesser, and least extensions of each note contains. One may ascertain whether the extension
is greater, lesser, or least by comparing the corners of each triangle with one another. The
triangles containing the improper notes (written in green) point upwards, while triangles
containing the proper notes (written in red) point downwards.

Figure 27: Figure 26 translated to include note names

Figure 27 shows that Vetulus’s system may be mapped neatly onto the triangle, and
highlights the highly contextual nature of his hierarchy of notes: a proliferation of notes

69 Cohn’s ski-hill graph (to be discussed further in Chapter 5) works under similar principles to
Torkesey’s triangle. See: Richard Cohn, “Complex Hemiolas, Ski-Hill Graphs and Metric Spaces,”
Music Analysis 20, no. iii (2001), 295–326. For a discussion of the relationship between the two
diagrams, see: Cohn, “Graph-Theoretic and Geometric Models,” 237–55.
share the same duration. Consider, for example, the numeral 12—representing twelve
atoms—which is joined to seven notes, or the numeral 24, which is joined to eight. As I will
discuss further in Chapters 4 and 5, the idea that several notes could share the same
duration was also a characteristic of the complex notational systems utilized in practice. I
will return to this idea in the conclusion to this chapter.

*Expanded gradus systems*

Vetus’s decision to assign multiple notes the same duration, as well as his use of the
comparatives greater, lesser, and least to describe the quality of notes, is illustrative of his
adaptation and expansion of the *gradus* system associated with Jean des Murs.70 As I
discussed in Chapter 1, des Murs organizes notes into different groups or *gradus* in his
*Notitia artis musice*.71 Notes in different *gradus* share durations, but are different in form.72
Table 5 provides again Table 1 from Chapter 1 to remind the reader of the various notes
within des Murs’s *gradus* system.

---


71 The *Notitia artis musice* has traditionally been dated to 1319 or 1321. Ulrich Michels, “Foreword,” in
*Notitia artis musicae*, by des Murs, ed. Michels, 9. Karen Desmond has recently argued that the year
1321 has been afforded undue emphasis, and that des Murs’s work was probably compiled over a
longer period, with the *Conclusiones* of Book 2 written separately. See: Desmond, *Music and the moderni*,
70–114.

72 That is, they would be the same length, but be drawn differently in notation.
A number of early fourteenth-century authors expanded the *gradus* system to incorporate longer notes, leading to the inclusion of five *gradus*, rather than the four of des Murs. Petrus de Sancto Dionysio, an early fourteenth-century Augustinian monk, expanded the system by adding a fifth *gradus* containing notes longer than des Murs’s first *gradus*. Willelmus and Torkesev also increased the system by adding both longer and shorter notes. Vetulus’s work is unique in using an atom as a counting unit for his system as a whole, rather than a minimally short note. Vetulus’s hierarchies may thus be seen as a more substantial intervention than the systems set out by these theorists because he not only incorporates longer notes, i.e., the largae, but also because he incorporates *gradus* of

---

Table 5: Des Murs’s *gradus* system in tabular form

<table>
<thead>
<tr>
<th>Duration in minims</th>
<th>First gradus</th>
<th>Second gradus</th>
<th>Third gradus</th>
<th>Fourth gradus</th>
</tr>
</thead>
<tbody>
<tr>
<td>81</td>
<td>Longissima †</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Longior †</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Longa †</td>
<td>Perfecta †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Imperfecta †</td>
<td>Brevis †</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Brevis †</td>
<td>Brevis †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brevior †</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Brevissima †</td>
<td>Parva †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Minor †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Minima †</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---


75 The atom is not the only counting unit used in Vetulus’s system. Vetulus also argues that perfections or breves can be counting units. This further illustrates that temporal spans are formed through both division and grouping in his system.
the extensions or subdivisions. This results in a system that is considerably more expansive than any other fourteenth-century *gradus* system, and constitutes, I would suggest, an attempt to apply the *gradus* system exhaustively to mensural theory.\textsuperscript{76}

Another theorist who incorporated the Marchettan divisions into an expanded *gradus* system is the anonymous author of the *Rubrice breves*.\textsuperscript{77} This treatise was written by a fourteenth-century follower of Marchetto of Padua, who Vecchi suggests was influenced by contemporaneous French *ars nova* theory.\textsuperscript{78} The author describes several different ways of dividing up the breve into between three and twelve (or more) minims. Like Vetulus he uses comparatives to describe the various ways of dividing the breve, associating each of these with either the French or Italian styles. Both Vetulus’s and the anonymous author’s hierarchies are based on the principle that there can be “greater,” “lesser,” or “least” divisions of breves, as well as “greater” (or lesser) extensions. Semibreves can also be greater, lesser, or least. As is shown in Table 6, a number of the author’s divisions are left incomplete, or are absent in their entirety. For instance, the least imperfect *tempus* is absent; the *tempus* itself, which contains nine minims, is not assigned a division. He also uses the term “natural greater semibreve” to refer to two different notes, one of which contains four minims, and another which contains three.

\textsuperscript{76} The *gradus* system is also substantially expanded in the *Ars cantus mensurabilis mensurata per modos iuris*. As I discussed in Chapter 1, the author develops des Murs’s system primarily by considering all of the various ways by which a note may be imperfected by remote parts. It is worth noting that the author also discusses special noteshapes of the kind that are found in the repertory discussed in Chapters 4 and 5. Both in this author’s treatise and in Vetulus’s, we thus find that des Murs’s *gradus* system is expanded to facilitate the writing of complex rhythms.


\textsuperscript{78} Vecchi, “Anonimi *Rubrice brevis*,” 126. Three copies of this treatise have survived, including SDVm42, ff. 65v–66v; Pu606, f. 110r; Vat5322, ff. 115v–116v.
Table 6: Mensural system of the *Rubrice brevis* compared with Vetulus’s\(^{79}\)

<table>
<thead>
<tr>
<th>Note name</th>
<th>Anonymous <em>Rubrice brevis</em></th>
<th>Minims</th>
<th>Vetulus <em>Liber de musica</em></th>
<th>Note name</th>
<th>Minims</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perfect breves</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than perfect tempus</td>
<td></td>
<td>&gt;12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right <em>(recte)</em> perfect tempus</td>
<td></td>
<td>12</td>
<td>Greater perfect tempus</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Tempus</td>
<td></td>
<td>9</td>
<td>Lesser perfect tempus</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Greater than lesser perfect tempus</td>
<td></td>
<td>7–8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesser perfect tempus</td>
<td></td>
<td>6</td>
<td>Least perfect tempus</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Greater than least perfect tempus</td>
<td></td>
<td>3 (sung slower)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Least perfect tempus</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Imperfect breves</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right <em>(recte)</em> imperfect tempus of the Italian way</td>
<td></td>
<td>8</td>
<td>Greater imperfect tempus</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Greater than right imperfect tempus</td>
<td></td>
<td>6 (sung slower)</td>
<td>Lesser imperfect tempus</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Right imperfect tempus of the French way/ French <em>senaria</em></td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesser imperfect tempus</td>
<td></td>
<td>4/ 6 (sung faster)</td>
<td>Least imperfect tempus/ lesser imperfect tempus</td>
<td></td>
<td>4/ 6</td>
</tr>
<tr>
<td><strong>Altered semibreves</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greater artificial semibreve</td>
<td></td>
<td>8</td>
<td>Greater imperfect tempus</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td><strong>Semibreves</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural greater semibreve</td>
<td></td>
<td>4</td>
<td>Least imperfect tempus</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Greater semibreve/ natural greater semibreve</td>
<td></td>
<td>3</td>
<td>Greater semibreve</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Lesser semibreve</td>
<td></td>
<td>2</td>
<td>Lesser semibreve</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Least semibreve/ minim</td>
<td></td>
<td>1</td>
<td>Least semibreve/ minim</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

A comparison between Tables 3–4 and 6 reveals that Vetulus’s system of divisions has a wider scope than that of the author of the *Rubrice brevis*, reflecting, perhaps the differing purposes for which these two treatises were compiled. The *Rubrice brevis* is a practical text, and therefore appears to reflect the lack of standardization that characterizes performance. Vetulus’s treatise, on the other hand, is deeply rooted within the tradition of *musica speculativa*. As such, his divisions are more wide-ranging and in certain respects systematic because they appear to have been devised theoretically.  

*Tempo*

Developing the conceptual principle set out in Marchetto’s *Pomerium* that the breve may contain more than twelve parts—resulting in a note that is “more than perfect”—the anonymous author of the *Rubrice brevis* describes notes that are “greater than” some of the divisions. Notes that are “greater than” at times contain more minims—such as the “greater than lesser perfect *tempus*,” which contains seven or eight minims, versus the lesser perfect *tempus*, which contains six minims. The breve can also be made longer by a slower tempo (or shorter by a faster one). For instance, the “greater than right imperfect *tempus*” contains six minims, but is sung slower than the French “right imperfect *tempus*,” which also contains six minims. Similarly the “greater than least perfect *tempus*,” contains three minims, but is sung slower than the least perfect *tempus*, which also contains three minims.

---

80 This pattern, whereby practice is less regular, versus theory, which is more complete and systematic, but that cannot always do justice to the variety of music performance, is also inherent in the complex notational systems discussed in Chapters 4 and 5. For example, as I will explain in further detail in Chapter 4, the author of the *Tractatus figurarum* described a complex notational system that appears never to have been used in practice. Conceived in theory *a priori*, this notational system is logical and systematic. This may be compared with the complex notational system described by the author of the *Ars cantus mensurabilis mensurata per modos iuris*, which appears to have been synthesized from performance, and as such is less internally consistent.
The lesser imperfect *tempus* can contain four minims at a normal tempo, or six minims at a faster tempo.

As we also saw in the Barcelona anonymous treatise mentioned briefly above, the author of the *Rubrice brevis* describes how his *modus cantandi* [ways of singing] relate to the various tempi used by a musician. His theorization of the *modus dividendi* [ways of dividing] represents an attempt to codify the performative process of singing. With the exception of the more than perfect *tempus*, breves towards the top of the table are longer in duration than those at the bottom (but do not necessarily contain more minims). A note is thus “greater than” by virtue either of a slower tempo of minims, or of the breve, which may then contain more minims to account for its slower tempo. He states that the division containing the least number of minims—the least perfect *tempus*—is sung so quickly that it cannot contain more than three minims.\(^ {81} \) An exception to this appears to be the more than perfect *tempus* itself, which the author states is sung faster to accommodate more minims.\(^ {82} \) This illustrates that the author of the *Rubrice brevis* considered the absolute duration of the breve to be the deciding factor in a note’s place within the hierarchy of divisions, not only the number of notes it contains.

Arguably, the systems set out in *Liber de musica* and the *Rubrice brevis* are underscored by a similar principle, i.e., that both the duration of a note and its division into parts determines its position in the mensural hierarchy. Because Vetulus assigns a specific value to his atoms he provides a means of measuring tempo precisely. However, his tempi are extremely slow. For example, his lesser perfect breve of the greater extension (54 atoms) or “medium tempus,” which is said to be “received” by the musician, lasts for 7.5 seconds, an

---

\(^ {81} \) Vecchi, “Anonimi *Rubrice brevis*,” 131.

\(^ {82} \) Vecchi, “Anonimi *Rubrice brevis*,” 128.
extraordinarily long stretch of time for the duration of a note.\(^{83}\) The longest breve in his system, a greater perfect breve of the greater extension (72 atoms), is yet longer, worth 10 seconds. The longest note—the greater larga of the greater extension—worth twelve breves of 72 atoms each—measures 864 atoms, i.e., two full minutes.

Given the extremely long duration of Vetulus’s notes, Marco Gozzi has dismissed Vetulus’s system as a whole as a practical method for the calculation of musical tempo.\(^{84}\) Salvatore Gullo attempted to resolve this issue by assuming that the breve *tempus* in *Liber de musica* represented the duration of a longa rather than a breve. This is not supported by Vetulus’s assertion multiple times that the *tempus* is the breve. However, Gullo himself acknowledged that, even assuming the tempus is a longa, Vetulus’s tempi are twice as slow as would be expected.\(^{85}\) An alternative perspective was offered by Ephraim Segerman, who argued that Vetulus’s tempi are representative of fourteenth-century practice, and that tempo became progressively faster as time went by (and particularly in recent years thanks to advances in recording technology and curtailed audience attention spans).\(^{86}\) In such debates it is important to acknowledge that although Vetulus rationalized musical tempo, he presumably had no method for measuring the breves he described precisely. Although the fourteenth century was known for its proliferation of mechanical clocks, these devices were notoriously inaccurate, and provided a means of measuring only equal hours, not the seconds and minutes as well.\(^{87}\)

\(^{83}\) By Marco Gozzi’s estimate, this is around three times the expected length of a breve. Gozzi, “New Light,” 19.

\(^{84}\) Gozzi, “New Light,” 19.


Even though Vetulus’s system may not be seen as a practical means of determining musical tempo, his work nevertheless arguably points towards the idea expressed by the anonymous author of the *Rubrice brevis* that the Italian divisions were associated to a certain degree with tempo—the breves of both Vetulus’s and the anonymous author’s least divisions are sung faster than those of the lesser or greater divisions. That specific divisions or mensurations were associated with tempo is also supported by the testimony of Jacobus, who observes in Book 7 of the *Speculum musice* (c. 1330s–1350s) that a contemporary theorist described “greater,” “medium,” and “least” perfect *tempora* and that these were associated with different tempi. That Vetulus chose to incorporate this idea into his treatise serves to illustrate again, I would suggest, that Vetulus wished to emphasize the interconnectedness of performance and speculation. Just as we saw in his adaptation and expansion of the *gradus* system, we can see that an underlying concept or principle that is practically applicable is systematized and exhausted to justify a comprehensive speculative music-theoretical system. His speculative project thus arguably responds to practice, even though it is itself impractical.

Liber de musica and a Vitriacan Ars nova Witness

A final comparison may be made between the concepts discussed in *Liber de musica* and those of the Vitriacan *Ars nova* witnesses. As I noted in the introduction, Vetulus’s treatise was copied beside one of the major witnesses to the *Ars nova*, indicating that the compilers

---

of Vat307 associated the two texts with one another.\textsuperscript{89} Desmond has observed that Vetulus’s inclusion of a triplex larga in his treatise is reminiscent of the Doctor modernus that Jacobus criticizes in his Speculum musice. She suggests that this indicates Vetulus was aware of the theory set out by the Vitriacan Ars nova witnesses.\textsuperscript{90} Similarities can also be found between the music examples used in this Ars nova witness and those in Liber de musica. Vetulus’s examples are more expansive and comprehensive than those of the Vitriacan Ars nova witness. However, as I will show, they are also riddled with errors. This further reinforces the idea that Vetulus prioritizes comprehensiveness over precision, again pointing towards the primarily speculative purpose of Liber de musica.

In the final part of his treatise, Vetulus provides a substantial list of music examples to illustrate how the divisions set out in the first part of the treatise may be employed in practice. His music examples provide a simplified application of his system because they do not incorporate the extensions. Further, he excludes the greater perfect and imperfect tempora from his examples because, as he notes himself, these breves are composed of three and two least imperfect tempora, respectively.\textsuperscript{91} Using his examples, Vetulus discusses concepts such as imperfection,\textsuperscript{92} alteration, the use of dots, the drawing of rests and ligatures, syncopation, and the rule similis ante similem, whereby if the tempus or prolation of a given kind of note is perfect, like notes before like must be perfect. Vetulus’s description of the rule similis ante similem is particularly problematic because he contradicts himself, stating that like notes before like notes should be perfect, whilst providing examples in

\textsuperscript{89} This treatise is edited in: John Douglas Gray, “Ars Nova Treatises Attributed to Philippe de Vitry” (PhD diss., Colorado University, 1996), 26–50.

\textsuperscript{90} Desmond, “Did Vitry Write an Ars vetus et nova?” 448.

\textsuperscript{91} de Anagnia, Liber de musica, ed. Hammond, 75.

\textsuperscript{92} Imperfection occurs when a part of a ternary note is removed by a shorter note or notes. Together, these notes fill out the ternary unit. Marchetto of Padua does not theorize imperfection, but the author of the anonymous Rubrice brevis—a treatise that expands on Marchetto’s system—does. I will discuss further similarities between these authors’ treatises below.
which imperfection is applied to like notes before like. Consider, for instance, the following description of the rule *similis ante similem*:

*V el ut patet hic:* \(\frac{4}{4}\) quod est tunc prima minima, secunda vero maior, tertia minor, et quarta maior erit. *Quaerendum* est qualiter imperfici potest ista tertia semibrevis, cum ipsam sequatur semibrevis et non minima nec valor minimae, et etiam dictum est quia de longis, brevibus et semibrevibus sit idem iudicium. *Ergo sicut* longa ante longam valet tria tempora, et brevis ante brevem valet tres semibreves, *ita semibrevis ante semibrevem debet valere tres minimas.*

Or as is shown here: \(\frac{4}{4}\). Then the first is a minim, the second a greater [semibreve], the third a lesser [semibreve], and the fourth will be a greater [semibreve]. It is necessary to ask how the third semibreve can be imperfected when a semibreve follows it and neither a minim nor the value of a minim, and this is also stated because the judgement is the same regarding longae, breves, and semibreves. Therefore, just as a longa before a longa is worth three *tempora*, and a breve before a breve is worth three semibreves, so must a semibreve before a semibreve be worth three minims.

In this passage, Vetulus describes how notes are organized where the prevailing division is *novenaria*, i.e., the division of the lesser perfect breve. In this division, *tempus* is perfect and prolation is major. Breves thus contain three greater (perfect) semibreves, which are worth three minims each. Imperfection and alteration are possible. In his example, Vetulus draws a minim followed by three semibreves. The first of these semibreves is dotted, and therefore perfect. He states that the second semibreve is imperfected by the minim, and that the third is a perfect semibreve. He asks how it is that the “third” semibreve—i.e., the second from our perspective, because the minim is itself a least semibreve to Vetulus in this context—can be imperfect. He states that this note is imperfect because “a semibreve before a semibreve [must] be worth three minims.” However, this is inconsistent, since according to *similis ante similem* the minim should imperfect the last semibreve before the breve. This is not an isolated incident; Vetulus misuses *similis ante similem* multiple times throughout the second half of *Liber de musica*, indicating that this was not a fleeting error. It
appears either that Vetulus did not understand this rule well, or that he did not take the
trouble to apply it correctly. The extract above is representative of all of the music
examples in Vetulus’s *Liber de musica*: Vetulus introduces a division and describes
exhaustively the different ways of arranging semibreves and minims within it, outlining the
rules (correctly or incorrectly) of mensural notation in the process.

Vetulus’s use of examples may be compared with that of the Vitriacan *Ars nova*
witness copied in *Vat307*. In this treatise, a number of different kinds of music examples
are used. Some of the examples take the form of brief passages that illustrate a specific
theoretical concept that is explicated in the text, in a manner similar to the example shown
above. Others take the form of motets. As Anna Zayaruznaya has argued, the motet
examples cannot be fully understood without detailed knowledge of the motets themselves.
This indicates that the *ars nova* repertory may be seen as one of the locations of Vitriacan
theory. Unlike the motet citations found in the Vitriacan *Ars nova* witnesses, Vetulus’s
examples do not presuppose prior knowledge of the reader. Further, their comprehensive
scope, which may be contrasted with the more limited scope of the Vitriacan examples,
indicates that Vetulus’s motivation was one of cataloguing all the possible note
combinations, not describing practice as the Vitriacan *Ars nova* witnesses seem to do.

Table 7 compares extracts of Vetulus’s examples with those of the Vitriacan *Ars nova*
witness copied in *Vat307*. As the texts in this table illustrate, there are remarkable
similarities between some of Vetulus’s examples and those of the *Ars nova* witness. This
extends to content and wording—highlighted in bold are passages where exactly the same
wording is used in both texts. However, there are also some notable differences. For

93 Anna Zayaruznaya, “Vitriacan Practice as Theory,” *American Musicological Society Annual Conference,
Minneapolis/ Virtual Conference*, 2020. Emma Dillon has described the notational innovations
present in *ars nova* motets such as *Garrit gallus/In nova fert* as a “practicum of theory.” Emma Dillon “Seen
and Not Heard: Symbolic Uses of Notation in the Early *Ars nova*,” *Il Saggiatore musicale* 23, no. 1 (2016),
26.
instance, the Vitriacan *Ars nova* witness provides one way of ordering notes, whereas Vetulus explores all the possible options for each division. Vetulus’s monotonous and repetitive descriptions are reminiscent, perhaps, of the “tedious” descriptions of the intervals available in counterpoint writing, examples that Anna Maria Busse Berger has argued may have aided memorization. Further, the default ordering of notes in the Vitriacan *Ars nova* witness is typically introduced last among all of the options examined in *Liber de musica*, indicating that Vetulus did not privilege the trochaic semibreve-minim groupings favored by the author of the treatise copied in *Vat307* over other arrangements of notes. Nevertheless, the style of the examples is very similar, indicating a shared idea of how note orderings should be presented. Again, we can see in these examples Vetulus adapting a theoretical concept that was practically applicable, and exhausting it for the purposes of comprehensive documentation, rather than to describe practice.

---

94 “When consonant and dissonant intervals are explained, they often list every single consonant interval separately as encountered within each hexachord. As a result, these treatises make very tedious reading indeed for us today.” Anna Maria Busse Berger, *Medieval Music and the Art of Memory* (Berkeley: University of California Press, 2005), 132.
Table 7: Vetulus’s music examples compared with those of *Vat307* copy of a Vitriacan *Ars nova* witness.\(^{95}\)

<table>
<thead>
<tr>
<th>Vetulus <em>Liber de musica</em> Latin</th>
<th>Vetulus <em>Liber de musica</em> English</th>
<th>Vitriacan <em>Ars nova</em> witness Latin</th>
<th>Vitriacan <em>Ars nova</em> witness English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praeditum tempus dividitur in duas aequales partes principaliter ut hic: vel aut ut hic: vel ut patet hic: seu ut hic: Tunc unaquaque dictarum partium semibrevis maior appellatur.</td>
<td>The aforesaid <em>tempus</em> is divided principally into two equal parts, like this: or like this: or as is shown here: or like this: Then each of the said parts is called a greater semibreve.</td>
<td>Sex minime possunt poni pro tempore imperfecto. Unde notandum est quod quando pro tempore imperfecto due ponuntur semibreues non signate ambe sunt equales quia quilibet tres valet minimas ut hic:</td>
<td>Six minims can be placed for an imperfect <em>tempus</em>. Therefore note that when two semibreves without tails are put in place of an imperfect tempus, they are equal because they are each worth three minims, like this:</td>
</tr>
<tr>
<td>Dividitur etiam praefatum tempus in tres inaequales partes […] Vel e contrario ut hic: et tunc prima erit maior, secunda vero minor et ultima minima.</td>
<td>The aforementioned <em>tempus</em> is also divided into three unequal parts […] Or the opposite like this: and then the first will be a greater [semibreve], the second a lesser [semibreve], and the last a minim.</td>
<td>Quando tres ponuntur prima valet tres minimas secunda duas tertia solam ut hic:</td>
<td>When three [notes] are placed, the first is worth three minims, the second two, and the third one, like this:</td>
</tr>
<tr>
<td>Potest etiam praefatum tempus dividiri in quattuor partes […] Vel e contrario sic: et <em>prima</em> pars erit minor, <em>secunda</em> minima, <em>tertia</em> minor, et <em>ultima</em> minima.</td>
<td>The aforementioned <em>tempus</em> can also be divided into four parts […] Or the opposite thus: and the first part will be a lesser [semibreve], the second a minim, the third a lesser [semibreve], and the last a minim.</td>
<td>Quando quatuor <em>prima minor secunda minima tertia minor quarta minima</em> ut hic:</td>
<td>When there are four, the first will be a lesser [semibreve], the second a minim, the third a lesser [semibreve], the fourth a minim, like this:</td>
</tr>
</tbody>
</table>

As I have shown, the essence of Vetulus’s music-theoretical project constitutes a system for the hierarchical classification of notes into duple and triple groupings built up from two minimally short notes—proper and improper minims of the least extension. The system of divisions set out in *Liber de musica* is highly complex. It contains sixty-six notes in total and explores all of the different ways of organizing duple and triple groupings. In presenting such a system, Vetulus incorporates a number of ideas that are central to the theory of the early–mid fourteenth centuries. These include the notion that notes can be divided into up to twelve parts, borrowed from the divisions of Marchetto of Padua, the *gradus* system associated with Jean des Murs, the tempo relations of Italian theory, and the music

| Potest etiam praefatum tempus in quinque partes dividit [...] Adhuc figurari possunt sic: \[↓↓↓\] Tunc *tres primaeae* erunt *minimaeae* et simul pro uno tempore semibreve reducuntur. *Quarta erit minor*, cum qua ultima minima facit perfectionem. | The aforementioned tempus can also be divided into five parts [...] They can still be formed thus: \[↓↓↓\] Then the first three will be minims and are grouped together into the time of one semibreve. The fourth will be a lesser [semibreve] with which the last minim makes a perfection. | Quando quinque ponuntur *tres prime minime quarta minor* quinta minima ut hic: \[↓↓↓\] | Quando quinque ponuntur *tres prime minime quarta minor* quinta minima ut hic: \[↓↓↓\] | When four [notes] are placed the first three will be minims, the fourth a lesser [semibreve], the fifth a minim, like this: \[↓↓↓\] | When six [notes] are placed they will all be equal minims, like this: \[↓↓↓\] |
| Quando praefatum tempus praedictae 6 in sex partes dividitur ut patet sic: \[↓↓↓↓\] tunc *omnes erunt aequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequales* et per ternarium numerum reducuntur ad perfectionem. | When the aforementioned tempus of the aforesaid senaria [division] is divided into six parts as is shown here: \[↓↓↓↓\] then all will be equal and they are grouped into ternary rhythmic units into a perfection. | Quando sex ponuntur *omnes erunt equalaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequales* minime ut hic: \[↓↓↓↓\] | Quando sex ponuntur *omnes erunt equalaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequalesaequales* minime ut hic: \[↓↓↓↓\] | When four [notes] are placed the first three will be minims, the fourth a lesser [semibreve], the fifth a minim, like this: \[↓↓↓\] | When six [notes] are placed they will all be equal minims, like this: \[↓↓↓\] |

Quando quinque ponuntur *tres prime minime quarta minor* quinta minima ut hic: \[↓↓↓\] | Quando quinque ponuntur *tres prime minime quarta minor* quinta minima ut hic: \[↓↓↓\] | Quando quinque ponuntur *tres prime minime quarta minor* quinta minima ut hic: \[↓↓↓\] | Quando quinque ponuntur *tres prime minime quarta minor* quinta minima ut hic: \[↓↓↓\] | When four [notes] are placed the first three will be minims, the fourth a lesser [semibreve], the fifth a minim, like this: \[↓↓↓\] | When six [notes] are placed they will all be equal minims, like this: \[↓↓↓\] |
examples of the Vitriacan *Ars nova* witnesses. Taking all of these elements to extremes, Vetulus’s work becomes unwieldy and impractical and, at times, error-laden.

Despite the complexity of his system, Vetulus is in certain respects suspicious of innovation: he makes use only of the standard notes—the larga, longa, breve, semibreve, and minim. Towards the end of his treatise, he mentions other more complex noteshapes, stating:

> Et imperfectis divisionibus, videlicet in duodenarium et octonarium, requiruntur multae figiae variae et diversae et specialiter semibreves caudatae variis et diversis modis.\(^{96}\)

And in the imperfect divisions, namely in the *duodenaria* and *octonaria* many different and varied noteshapes and semibreves in particular are found, caudated by various and diverse means.

Here, Vetulus observes that where the *duodenaria* and *octonaria* divisions occur, special semibreves caudated in various ways are at times used. This corresponds to the practice found frequently in later-medieval examples whereby special noteshapes are used to distinguish between the fourfold division of the semibreve that occurs in the *duodenaria* and *octonaria* divisions and the threefold division of the semibreve that occurs in the *novenaria* and *senaria imperfecta* divisions. Vetulus expresses trepidation about these notes, and singles out the semiminim † as a note that should be used only sparingly.\(^{97}\) Vetulus justifies this choice by appealing to the principle of parsimony, referred to as Ockham’s razor: “It is pointless to do with more what can be done with less.”\(^{98}\) This results in a system in which a

---

\(^{96}\) De Anagnia, *Liber de musica*, ed. Hammond, 75.

\(^{97}\) He states that semiminims may only be used when notes of the greater or least extensions are mixed with the lesser. De Anagnia, *Liber de musica*, ed. Hammond, 96.

\(^{98}\) “Frustra fit per plura quod fieri potest per pauciora sive per unum.” de Anagnia, *Liber de musica*, ed. Hammond, 75. Although Ockham’s razor is associated with William of Ockham, the idea had already been articulated by earlier authors, and was common in scholastic writings. That Vetulus cited this phrase thus does not indicate that he was aware of Ockham’s theory.
variety of different durations of musical time are assigned the same noteshape. The content of his system is extraordinarily intricate, but the form that it takes is very simple.

Later in this dissertation (Chapters 4 and 5), I will turn to some notations that serve to codify the kinds of rhythmic complexities that are present in Vetulus’s system, but that, unlike in Liber de musica, are distinguished using the so-called “special” noteshapes that he condemns. Invented to distinguish between different ways of counting musical time, these result in markedly different visual results. Yet, Vetulus’s project arguably attempts to attain similar goals—the writing of intricate mensural proportions, and the assigning of the same duration to several notes simultaneously. On the one hand, this emphasizes that two theoretical projects may be conceptually similar even when the form in which they appear is very different. The opposite is also possible: as I will discuss in the following chapter, this becomes particularly evident through a closer comparison between the theoretical projects of Marchetto and Vetulus, whose systems of notation bore similarity, but who thought about the relationship between musical and general time in contrasting ways. On the other, it illustrates the differing purposes of Vetulus’s project versus those of the later writers who would theorize complex notations. Some of these notations were devised (as I will argue) to visually clarify the differences between kinds of notes for performers. Vetulus’s project, on the other hand, is speculative. As I will examine in further detail in the following chapter, its aim is to reflect the mathematical proportions of the Trinitarian Neoplatonic cosmos.

That Vetulus should have incorporated ideas that are associated with both the *ars nova* and the *ars subtilior* problematizes the idea that these late-medieval musical styles can necessarily be cordoned off from one another and relegated to opposite ends of the fourteenth century. It encourages us to question whether the conceptual principles of the notationally complex music of the later fourteenth century might have been established much earlier than the boundaries of the *ars subtilior* as they are drawn in modern
scholarship. Vetulus’s description of the novel notations that were used in the octonaria and duodenaria divisions further supports this claim, and indicates that such notations may have been currency already in the middle decades of the fourteenth century. However, the solution to this chronological problem, I suggest, is not to simply extend the boundaries of the ars subtilior style further back into the fourteenth century. Instead, Vetulus’s testimony arguably invites us to rethink how we compartmentalize the stylistic boundaries of the ars subtilior altogether, and to consider in place of the ars subtilior style the constituent ideas that are present in practical and theoretical notational systems.
Chapter 3: A Celestial Hierarchy of Music

At the opening of his *Liber de musica*, the fourteenth-century Italian music theorist Johannes Vetulus de Anagnia gives an account of the relationship between hexachords.¹ According to Vetulus, there are three hexachords because there are three things in human nature. The first of these three things is the flesh or the matter of the human body, which is represented by the hard hexachord. The flesh is made of the four elements—earth, fire, air and water. The second is the soul or the “substantial form” of the human body and is represented by the natural hexachord. The last is good will; an intermediary force that binds together the soul and the flesh. The good will is represented by the soft hexachord. According to Vetulus the will, which is located within the intellect and therefore the soul, enables a person to “turn […] back to bodily pleasure, which is of the four elements.” At times it “exalts itself and rejoices in the praise of God through the softness and smoothness of the spirit.” This is why the natural hexachord represents the soul, even though it is the good will that mediates between the soul and the flesh—the soul enables a person to turn back to God through contemplation. The intermediary force of the soul as it sits between a person and God is analogous to the way

¹ For further details about Vetulus’s life, biography, and copies of his treatise, see: Chapter 2.
that the natural hexachord overlaps with both the hard and the soft hexachords. This relationship is depicted in Figure 1.

Figure 1: Vetulus’s tripartite model of hexachords and natural substances

---

2 “Et ad istas notas ingredimur per tres claves, scilicet (sqb) quadratum, naturalem et b rotundum. Et hoc quare, quia in natura humana tria sunt, scilicet caro quae ex quattuor elementis constat, et hoc repraesentat prima clavis quadrangularis quae nascitur in G quod g dicitur a gravando. Est enim in humana natura forma substantialis, scilicet anima in qua est voluntas et habet potestatem contemplandi, et hoc repraesentat secunda clavis naturae quae est in C. Tertia clavis est in b rotundo, quae repraesentat bonam voluntatem quae est inter animam et corpus, et nascitur in F. Et sic naturalis substantia per suam voluntatem reflectit se ad dilectionem corporis quod est de quattuor elementis, et aliquando se exaltat et hilarat ad dei laudem per mollitiem et lenitatem spiritus. Sic secunda clavis, scilicet naturae, potestatem habet ingrediendi ad primam et tertiam.” de Anagnia, Liber de musica, ed. Hammond, 26. [We engage with these notes through the three species of hexachord, namely the hard (quadrum), the natural, and the soft (b rotundum). And this is why: because there are three things in human nature, namely the flesh, which is made of the four elements, and the first species of hexachord of the quadrangular (solmization syllable), which begins with G represents this, which is called g from “gravando” (weighing down). There is substantial form in human nature, namely the soul, in which there is will, and it has the power of contemplation, and the second natural species of hexachord represents this, which is in C. The third species of hexachord is in round b, which represents the good will between the soul and the body, and begins with F. And through its own will a natural substance turns itself back to bodily pleasure, which is of the four elements, and it sometimes exalts itself and rejoices in the praise of God through the softness and smoothness of the spirit. Thus the second species of hexachord, namely the natural, has the power to enter the first and the third (hexachords).] As can be observed in this passage, Vetulus uses the term “body” to refer both to the body as flesh and the body as a substance, i.e., as a composite of matter and flesh. Klima addresses this problem in relation to the work of Thomas Aquinas in the following: Gyula Klima, “Man=Body+Soul: Aquinas’s Arithmetic of Human Nature,” in Thomas Aquinas: Contemporary Philosophical Perspectives, ed. Brian Davies (Oxford: Oxford University Press, 2002), 257–74.
In Figure 1, the lower semicircle shows the connections between each of the three hexachords, and that the natural hexachord sits between the hard and the soft as an intermediary. The thick lines join each hexachord to its respective allegory. The higher closed circle shows the three parts of a person—the flesh, the soul and good will. Here, the good will is an intermediary that sits between the flesh matter and the soul form. The closed circle depicts the good will’s role in connecting the flesh and the soul, and the way that a person’s own will turns them back towards bodily pleasure. The arrow pointing upwards represents the ascent of the soul as it rises in contemplation of the divine.

The idea that the body was a composite of flesh (matter) and soul (form) is the most famous example of the doctrine of hylomorphism, and was theorized by Aristotle in works including *On the Soul*, *Metaphysics*, *Physics*, and *Politics*. Unlike Vetulus’s system, Aristotle’s hylomorphism did not incorporate the concept of a mediating force between matter and form. However, a number of medieval authors argued for the existence of such a force, similar to Vetulus’s good will. Among these, the English theologian John Wyclif (c. 1330–84) described a tripartite model of the relationship between the flesh, the soul and God. In his system, the mind (or intellective soul) is a “created spirit” that can exist independently of the body and travel upwards to God like the angels. At the same time, this spirit is part of the human body, and is linked to the flesh by an intermediary force—the *connexio* [a binding

---

3 Interpretations of Aristotle’s hylomorphism vary. For example, David Charles has proposed a reading of Aristotle’s hylomorphism in which its physical and psychological components are inseparable. This opposes both “spiritualist” and “physicalist” interpretations that argue for the possibility that one or other of these components may act independently of the other. David Charles, “Aristotle’s Psychological Theory,” *Proceedings of the Boston Area Colloquium in Ancient Philosophy* 24, no. 1 (2009), 1–29. Victor Caston has argued that Charles’s “strong” reading of hylomorphism should be tempered to acknowledge that although psychological states as a whole are inseparable from their physical counterparts, the parts of these psychological states may act independently. See: Victor Caston, “Commentary on Charles,” *Proceedings of the Boston Area Colloquium in Ancient Philosophy* 24, no. 1 (2001), 30–47.

together], originating in God’s will. Vetulus’s rationalization of the soul is not an exact equivalent of Wyclif’s. For example, Vetulus does not discuss the role of memory in his model. Nevertheless, both systems are similar in theorizing an intermediary force between the body and soul in the form of will. For Vetulus this is the “good will.” Vetulus’s intellective soul then connects humans to God via contemplation and will. This is reflected by the ability of the natural hexachord to “enter” or overlap with the hard and the soft hexachords.

The extract described above is one representative example of a location in which Vetulus’s philosophical leanings lead him to use music to represent the relationship between physical reality and the divine. In this chapter, I develop the work of Chapter 2 to argue that Vetulus devised a system for the hierarchical organization of musical time that not only described, but also determined how he envisaged the physical and metaphysical structures of reality. In order to tailor his music-theoretical system to his image of the world, Vetulus’s observations are at times unorthodox. For example, he states that there are four notes in the *ars nova*, even though in practice the music of the *ars nova* was composed of hexachords. He does this in order that his system of music theory will correspond to his vision of the numerical proportions of the universe: there are four notes in Vetulus’s *ars nova* because he wants them to correspond to the four elements. However, this adjustment is not one-sided. Just as he tailors his music-theoretical project to his theological views, so does he attune his views about the world to the numerical proportions that are present in his notational theory. This is emblematic, I would suggest, of an attribute of the inseparability of the allegory and the allegorized. As Jon Whitman has discussed, one of the consequences of the interplay of

---

5 This may also originate in Augustine’s description of the good will that leads a person to come to faith by God’s will in his *Confessions*, Book X.

6 Alberto Gallo has also observed that Vetulus used mathematical and astrological proportions in his treatise. Gallo, *La teoria della notazione*, 66. Karen Desmond has noted that Vetulus is the only music theorist of the fourteenth century to link descriptions of the Trinity and mensural notation. Desmond, “Did Vitry Write an *Ars vetus et nova*?” 459.
the allegory and the thing that is allegorized is that over time, the allegory exercises a compositional or constitutive as well as an interpretative role. The allegory itself serves as an interpretation of the object that it personifies. This interpretation is particularly pertinent to Vetulus, for whom all parts of reality were linked in a chain of being. Music reflects the world, but the world also reflects music. It further points towards a phenomenon that Wegman has discussed in relation to fifteenth-century music theory: appeals to authority by late-medieval authors were typically done so to support a prevailing opinion, rather than as a reaction to the historical texts themselves. Vetulus’s work provides a clear example of this, since he frequently misquotes authorities and alters their ideas to fit to his own music-theoretical and theological agendas.

To illustrate how Vetulus portrays the world using mensural notation, I examine his work from a number of different perspectives. First, I will discuss Vetulus’s views on atomism, suggesting that his atom worth $5/36$ of a second was adapted from the most common value for temporal atoms adopted in the later Middle Ages—as catalogued by the English encyclopedist Bartholomaeus Anglicus—and that Vetulus chose this particular value so that he could assign the duration of fifty-four atoms—the “ounce”—to the most important note in his mensural hierarchy. In doing so, Vetulus legitimized an atomistic rationalization of musical time that could lend itself to the exploration of all the possible combinations of duple and triple rhythmic units—an idea that is central to his theorization of the mensural hierarchy, and that characterizes the concerns of contemporaneous theorists.

---


8 Wegman, “Musical Understanding,” 59. Hicks also observes that medieval Neopythagoreans were wont to employ only the parts of Pythagorean teaching with which they were in agreement. Aspects of such theories that were contradictory to their Christian worldviews, such as metempsychosis, were rejected. Hicks, “Pythagoras and Pythagoreanism,” 419.
Second, I will compare Vetus’s views on time with those of Marchetto of Padua, author of the *Pomerium* (c. 1319). As I discussed in Chapter 2, Vetus follows Marchetto in organizing musical time into hierarchical divisions of between two and twelve parts. Despite these similarities, there are also notable differences between Vetus’s and Marchetto’s descriptions of time. Following Aristotle, Marchetto describes time as a “measure of motion,” whereas Vetus favors the Augustinian-influenced description of time as a “span of motion.” Musical time for Marchetto is a “least in the fullness of sound,” while for Vetus it is “that which is moved in time.” I will argue that these definitions reveal the conceptual contrasts between these theorists’ views on the relationship between musical time and general time, even though there are some surface-level similarities between the two.\(^9\) As I will show, theorists such as Vetus who described time as a span did so primarily to emphasize the similarities between musical and general time. This further illustrates Vetus’s belief in the mutually constitutive relationship between the musical and the worldly.

Third, I will provide a brief overview of Vetus’s divisions of musical time. As I showed in Chapter 2, Vetus organizes notes into tripartite structures of “greater,” “lesser,” and “least” notes. I suggest that he does this in imitation of the layered triadic structures of the angelic hierarchies set out in Pseudo-Dionysius’s *De coelesti hierarchia*. That these structures were also present in contemporaneous music theory illustrates Vetus’s desire to combine speculative music theory and a Neoplatonist Trinitarian theology with the latest notational innovations.

Finally, I will discuss Vetus’s visual representation of the hierarchies of notes in the form of trees. I will argue that his theory is influenced by the work of the thirteenth-century Catalan mystic Ramon Llull, who used diagrams to portray the relationships between all parts

---

\(^9\) Frederick Hammond observed similarities between these two authors’ definitions of general time, and suggested that Vetus’s definition of time originated in Marchetto’s *Pomerium*. See: de Anagnia, *Liber de musica*, ed. Hammond, 28.
of reality and the connection between the worldly and the celestial. Drawing together the various elements of the philosophical system set out in *Liber de musica*, I suggest that Vetulus viewed the world as a place in which all parts of creation—material and immaterial—were linked to one another in a chain of being. According to Vetulus’s mystical Neoplatonic image of the universe, all things are similar to one another because they constitute imperfect reflections of God’s divinity as it is manifested in nature. I conclude by observing similarities between Vetulus’s use of ascending tree diagrams and that of some of his contemporaries. I suggest that Vetulus’s beliefs that music reflected the interconnectedness of all of the different parts of reality—as codified in the Llullian tree—provided an appropriate conceptual framework for Vetulus’s theoretical project, in which a number of contemporaneous theories are combined and exhausted (as discussed in Chapter 2). Arguably, this preempts conceptually the exploration of all the proportional possibilities of the mensural notational system that would also define the notationally complex music of the later fourteenth and early fifteenth centuries, to be discussed in Chapters 4 and 5.

**Vetulus’s Atomism**

According to Vetulus, musical time is composed of durational atoms. He describes the calculation of these atoms as follows:

Dividitur tamen tempus per annum, menses, hebdomodas, dies, quadrantes, horas, punctos, momenta, uncias et atomos. Atomus vero indivisibilis est. […]

In quattuor principales quadrantes dividitur <dies>. Quadrans habet horas sex. De hora nascuntur puncta quattuor. Punctus habet momenta decem. Momentum habet uncias duodecim. Uncia habet atomos 54.10

---

Time is divided into the year, months, weeks, days, quadrants, hours, points, impulses, ounces, and atoms. The atom is indivisible. […]

It must be said that the day is divided into four principal quadrants. A quadrant contains six hours. Four points proceed from the hour. A point contains ten impulses. An impulse contains twelve ounces. An ounce contains fifty-four atoms.

Vetulus’s temporal atoms are calculated precisely through the division of the year into months, weeks, and days, up to the atom. Days contain four quadrants, each worth six hours. Hours are divided into four points, which contain ten impulses made up of twelve ounces, each worth fifty-four atoms. Carrying out the calculation described here results in an atom of time worth 5/36 of a second.

The direct source of Vetulus’s division of the year into atoms worth 5/36 of a second remains obscure. In a brief article from 1963, A. MacHabey Sr. identified parallels between the atomistic division of time set out in Liber de musica, and that of Rabanus Maurus, an eighth-century Frankish Benedictine archbishop and astronomer who was an exponent of the idea that celestial motion could be understood in terms of Pythagorean harmonic ratios.

Maurus described his atomistic vision of reality in his famous encyclopaedia, known both as De rerum naturis [On the Natures of Things] and De universo [On the Universe], in general terms. However, in his lesser-known Liber de computo of 820, Maurus outlined a method for the division of time into a variety of different parts up to the atom, as follows:

---

11 I follow Bonnie J. Blackburn’s and Leofranc Holford-Strevens’s translation of this word. Bonnie J. Blackburn and Leofranc Holford-Strevens, The Oxford Companion to the Year (Oxford: Oxford University Press, 1999), 663.

12 Llull also describes in general terms the division of his day into hours and impulses. I will discuss further connections between Llull’s and Vetulus’s theories below. Ramon Llull, “De arbole elementali,” in Opera Latina, vol. 24, ed. Pere Villalba Varneda, Corpus christianorum continuatio mediaevalis, vol. 180A (Turnhout: Brepols, 2000), 52.

13 A. MacHabey Sr., “Notions scientifiques disséminées dans les textes musicologiques du moyen âge,” Musica disciplina 17 (1963), 8, 16.
Discipulus: Ostentum quid est?

Magister: Sexagesima pars unius horae, atomos in se continens CCCLXXVI.

DISC. Quid est momentum?

MAG. Certus lectus solis in coelo. Hoc per quadraginta vices ita emensum horam jam reddit integram.

[...]

DISC. Quid est minutum?

MAG. Decima pars horae. [...] Habet ergo minutum partem unam et dimidiam, momenta quatuor, ostenta sex, atomos (V)CCLVI.

DISC. Punctus quid est?

MAG. Quarta pars unius horae.¹⁴

Student: What is a “showing”?¹⁵

Teacher: One sixtieth of an hour, containing in itself 376 atoms.

Student: What is an “impulse”?

Teacher: A certain observation of the sun in heaven. Through forty turns measured this renders a complete hour.

[...]

Student: What is a “small unit”?

Teacher: A tenth of an hour. [...] Therefore a small unit contains one and a half parts, four impulses, six showings and 156 atoms.

Student: What is a point?

Teacher: A quarter of an hour.

---


¹⁵ Blackburn and Holford-Strevens observe that these may be regarded as “flashes.” Blackburn and Holford-Strevens, The Oxford Companion to the Year, 663. I use their translations for all of the terms in quotation marks in this extract.
There are some similarities between Vetulus’s and Maurus’s divisions of time. An hour for
Maurus is the same for Vetulus (lasting the duration of an hour today) and both authors agree
that points are worth one-quarter of an hour. However, as Machabey Sr. observes, the two
models diverge in several respects arithmetically—each writer describes a number of levels of
division that are absent in the other’s system. Maurus, for example, describes the length of
“parts” of an hour, “small units,” and “showings.” Vetulus includes none of these durations in
his treatise. Maurus’s atom, which is worth 15/94 of a second, is also slightly larger than
Vetulus’s.

Although Maurus and Vetulus would agree with the general idea that temporal atoms
are durational, and that they are calculated through the division of a longer timespan (such as
the day) into parts, their atomistic projects were nevertheless conceptually distinct. Living in
the ninth century, Maurus was writing at a time when philosophers still had access to the
many Ancient texts about atomism that would later be lost, or fall out of fashion. As such,
Maurus’s atomism is closer in kind to the physicalist atomism of the Ancient Greeks that was
transferred to the Latin tradition through Lucretius’s *De rerum natura* [On the Nature of
Things]. This is evinced in his theorization of five species of atoms: atoms of the body, sun,

---

16 For a full table of comparison between Vetulus’s and Maurus’s systems, see: MacHabey Sr.,
“Notions scientifiques,” 16.

17 Christoph Grellard and Aurélian Robert, “Introduction,” in *Atomism in Late Medieval Philosophy and

18 In Ancient Greece atomists such as Democritus and Epicurus were concerned with the nature of
substances (things in the world). Both of these authors agreed that atoms occupied space, and that
between them lay empty space or void. They thought that atoms were formed of only one substance,
and that variations between their shape and size determined the consistency of worldly objects. Pabst,
speech, number, and time. According to Maurus, these atoms fly around and crash into each other, creating the world through their movements. Isidore of Seville had also described atoms of this kind in his seventh-century *Etymologiarum libri XX.*

By the fourteenth century, atomists such as Vetulus had developed perspectives on the nature of the world and the relationship between minimal particles and substances that were distinct from those of the early medieval atomists. In keeping with the practices of other late-medieval atomists, Vetulus’s indivisibilism appears to have arisen in part through the mathematical theorization of multitude as an accumulation of indivisible *unitates* or units; he states that the atom can serve as the unit of number when measuring the temporal durations of music. Hammond has suggested that Vetulus was influenced by Boethius’s definition of multitude in *De arithmetica institutione* in this regard, although it is also possible that Vetulus’s description of the atom as the indivisible unit of multitude originated in Aristotle’s

---

19 “Magister: Atomos philosophi vocant quasdam in mundo minutissimas partes corporum, ita ut nec visui facile pateant, nec sectionem recipiant. Unde et atomi dicti sunt. Nam tomos Graece divisio dicitur, atomus vero indiviso. Denique hoc illucque volitant atque feruntur sicut tenuissimi pulveres qui infusi per fenestras radiis solis fugantur.” Maurus, “Liber de computo,” Col. 0677A–B. [Teacher: Atoms are what philosophers call certain parts of bodies in the world, so tiny that they can be neither seen easily nor divided. And for this reason they are called atoms. For in Greek (the word for) division is “tomus,” or the absence of division “atomus.” Finally, they fly hither and thither and are carried about like the finest powders, which pour through the windows on sunbeams.]

20 “Atomos philosophi vocant quasdam in mundo corporum partes tam minutissimas ut nec visui pateant nec *τομή,* id est sectionem, recipiant; unde et *atomoi* dicti sunt. Hi per inane totius mundi inrequietis motibus volitare et hoc atque illuc ferri dicuntur, sicut tenuissimi pulveres qui infusi per fenestras radiis solis videntur.” Isidore of Seville, *Etymologiarum libri XX,* ed. J.-P. Migne, in *Patrologia Latina,* vol. 83 (Alexandria, VA: Chadwyck-Healey Inc., 1996), Col.0472D–Col.0473A. “Atoms (atomus) are what the philosophers call certain corporeal particles in the world that are so tiny that they are not visible to sight, and do not undergo *τομή* , that is, ‘splitting,’ whence they are called *tomoi.* They are said to fly through the void of the entire world in unceasing motion and to be carried hither and thither like the finest powders that may be seen pouring in through the window on sunbeams.” Isidore of Seville, *The Etymologies of Isidore of Seville,* trans. Stephen A. Barney et al. with the collaboration of Muriel Hall (Cambridge: Cambridge University Press, 2006), 271 (slightly modified).

21 Vetulus’s description of number is as follows: “Numerus est secundum philosophum collectio de unitatibus congregata. Et ita secundum musicum est congregatio notarum vel atomorum in uno corpore.” [According to the Philosopher, a number is an assembled collection of units. And thus according to a musician it is a collection of notes or atoms in one body.] de Anagnia, *Liber de musica,* ed. Hammond, 30. Because Vetulus states that notes or perfections can also take on the role of the unit, we find in Vetulus’s theory that the unit is not a fixed temporal dimension. Instead, a variety of different notes, or the atom itself, can serve as counting units.
The tradition of Boethius typically associated with twelfth-century scholasticism was appropriated by later-medieval theorists who wished to argue that equivalence existed between numbers and geometrical space, and that spatial magnitudes could be viewed as derivatives of accumulated points. In Liber de musica, temporal durations take on the qualities of spatial dimensions by being associated with notes and thereby quantities of time.

Among fourteenth-century music theorists, Vetulus was not alone in conceiving of indivisible atoms of this kind; a similar description of the division of the day into atoms can be found in Jacobus’s Speculum musice (c. 1330s–1350s). However, even though Jacobus theorized atoms that could be used to measure temporal durations, he did not believe that time itself was composed of atoms. In Book I of the Speculum musice, Jacobus paraphrases Aristotle’s Physics to reject the atomistic organization of general time. This is because he distinguished between general time, which for him was an infinitely divisible continuum, and time as it is measured in music. It is only by assigning discrete note values to the infinitely

---

22 Hammond’s assertion is plausible because Boethius’s description of multitude as a collection of units was ubiquitous in the later Middle Ages. However, medieval commentators typically refer to Aristotle by the name “the Philosopher.” It is unclear whether Vetulus is indeed referring to Aristotle here, or whether he was referring to Boethius by the name “the Philosopher” unconventionally. It is also possible that Vetulus means Aristotle, but was nevertheless familiar with the Boethian definition of multitude, since his knowledge of philosophy was haphazard. For Boethius’s theorization of multitude and number, see: Boethius, De institutione arithmetica, ed. Friedlein, 13. I discuss Boethius’s theorization of multitude further in Chapter 1. For Aristotle’s theorization of multitude, see: Aristotle, Metaphysica, ed. Vuillemin-Diem trans. de Moerbeka, 195–206.


24 “Important enim notulae quaelibet determinatas temporis morulas et in hoc inter se distinguuntur, licet in hoc generaliter conveniant quod tempus important ad modum quo annus, mensis, dies, quadrans, hora, momentum, uncia, atomus?” Jacobus, Speculum musiceae, vol. 7, ed. Bragard, 85. “For all notes convey determinate stretches of time, and are distinguished from each other in this respect, yet they generally agree on this point that they convey the tempus in the same way as the year, the month, the day, the quarter, the hour, the moment, the twelfth part (ounce), the atom.” Jacobus, The Mirror of Music Book, trans. Wegman, 78.

divisible continuum of general time through measurement that Jacobus’s musical time becomes discrete and atomistic.  

As I will discuss in further detail below, Vetulus was a more devoted atomist than Jacobus because he also theorized general time as a “span” of motion, rather than the more conventional “measure” of motion. Nevertheless, both these theorists’ atoms are distinct conceptually from those of earlier medieval authors such as Maurus. This is because they are primarily mathematical, and because they were utilized for the purpose of the measurement of musical time. Vetulus does not state whether he thinks physical reality was also composed of atoms. However, there is no reason to suppose that he was influenced by physicalist atomism, even though there are some similarities between the way he and Maurus divide the day into atoms.

The atomist I have identified whose mathematical division of time into atoms is closest to Vetulus’s is the English Franciscan Bartholomaeus Anglicus (d. 1272). In his *De proprietatibus rerum* [On the Properties of the things], Anglicus divided the hour into four points, ten impulses, twelve ounces, and forty-seven atoms. Andrew Pyle has suggested that this way of dividing up the year into atoms might have originated in occult numerology. It is likely that Vetulus was aware of Bartholomaeus’s system of division because it adopted the

---


27 Anglicus’s *De proprietatibus rerum* was the “most widely copied, cited, and translated” encyclopedia of the Middle Ages. Michael Twomey, “Bartholomaeus Anglicus, in *Oxford Bibliographies*, 2017.

28 Recall that this may be compared with Vetulus’s hour, which is divided into four points, ten moments, twelve ounces, and fifty-four atoms.

figure for atoms per hour most commonly accepted in the Middle Ages. The only difference between these two ways of dividing time into atoms is that Bartholomaeus states that the ounce is worth forty-seven atoms, whereas Vetulus claims that it is worth fifty-four.

It is possible that Vetulus altered the number of atoms in the ounce to fit his divisions of musical time. This is because fifty-four is divisible by two, three and nine. This enabled Vetulus to assign the ounce to the most important note in his system—the novenaria or lesser perfect breve of the greater extension, which is composed of nine minims organized into three groups of three. It also allowed Vetulus to divide the ounce into two or three parts. As I discussed in Chapter 2, one of the undergirding principles of Vetulus’s system is the exploration of all of the possible orderings of duple and triple rhythmic groupings. The ounce of fifty-four atoms thus lends itself to the numerical proportions of Vetulus’s hierarchical organization of musical time.

**Time as a Span**

Using his atom of time as a unit of measurement for every musical sound, Vetulus devises a way of organizing musical notes into hierarchical divisions. These divisions were discussed in detail in Chapter 2, but I will revisit them here for clarity. As Frederick Hammond has observed, Vetulus’s mensural hierarchies are influenced by those set out by Marchetto of Padua in his *Pomerium*. Both authors devised a system of the division of the breve into between four and twelve parts, naming these divisions after the number of parts they

---

30 Blackburn and Hollórd-Strevens, *The Oxford Companion to the Year*, 663. For example, such a division of the day into atoms can be found in the computus treatise *De anni ratione* by the astrologer Johannes de Sacrobosco, who lived in Paris in the thirteenth century.


32 I exclude the divisions containing two, three, and more than twelve parts here for simplicity.
contain: quaternaria (four), octonaria (eight), novenaria (nine), and duodenaria (twelve). Since six minims can be divided two ways—into two thrice or three twice—there are two kinds of senaria breve. When the senaria breve is divided into three groups of two semibreves, it is called the senaria perfecta division <3,2>. When it is divided into two groups of three semibreves, it is called the senaria imperfecta division <2,3>. Figure 2 provides a visual representation of Marchetto’s divisions of the breve.

Figure 2: Marchetto’s Divisions of the tempus

Marchetto’s divisions apply only to breves, which are divided into undifferentiated semibreves, i.e., semibreves that differ in duration, but look the same. Marchetto also describes longer notes, but does not distribute them into divisions.

Vetulus expands Marchetto’s system in a number of ways. In addition to minims, semibreves, breves, and longae, he introduces the larga ♩, a kind of note that Marchetto did not describe in the Pomerium. He applies Marchetto’s system of division both to the largae and the breves. Largae are thus divisible into between four and twelve breves. Vetulus uses

---

33 As can be seen in Figure 2, the senaria imperfecta breve is two-thirds as long as the senaria perfecta breve.
stemmed minims in place of Marchetto’s undifferentiated semibreves. His breves are thus divisible into between four and twelve minims.

Vetulus provides a second name for each of his breves. He states that a breve can be perfect and contain three parts, or be imperfect and contain two parts. Like Marchetto’s, Vetulus’s perfect and imperfect breve are in 3:2 proportion. Each perfect and imperfect breve can be greater, lesser or least. The designations greater, lesser and least, along with perfect and imperfect, refer to the division to which a breve belongs. For example, another way of describing the *duodenaria* breve is to say that it is a greater perfect breve. The *novenaria* breve is synonymous with the lesser perfect breve, and the *senaria perfecta* breve is synonymous with the least perfect breve. The *octonaria* breve is also called the greater imperfect breve, the *senaria imperfecta* breve is also called the lesser imperfect breve, and the *quaternaria* breve is also called the least imperfect breve.\(^{34}\) These relationships are illustrated in Figure 3.

Figure 3: Vetulus’s divisions of the breves as triadic hierarchies

![Diagram of Vetulus's breves divisions](diagram)

To this Vetulus adds a further layer of complication. In addition to the divisions, Vetulus assigns each breve what he terms a “prolation” or “extension.”\(^{35}\) Extensions are also

---

\(^{34}\) Unlike Marchetto’s *senaria* breves, Vetulus’s are the same in length.

\(^{35}\) For further discussion of Vetulus’s use of the term *prolatio*, see: Chapter 2.
greater, lesser and least. Unlike the divisions, the extensions do not refer to the number of parts in a note, but rather its duration in atoms. There are two sets of divisions and extensions—“proper” and “improper.” This means that there are six different variants of each kind of breve, semibreve, and minim in Vetulus’s system; each of these notes can be greater, lesser and least in each of the proper and improper sets of divisions. Figures 4 and 5 portray Vetulus’s divisions and extensions of the breves as triadic hierarchies. As is shown in these figures, the underlying principle of Vetulus’s system is the hierarchical layering of the tripartite structures of greater, lesser and least notes. The duration of each note is determined by the number of atoms it contains. A comparison of Figures 2, 4, and 5 further reveals that even though Vetulus follows Marchetto in devising a system that relies on the division of notes into between four and twelve parts, his system is considerably more expansive.

Figure 4: Vetulus’s “proper” divisions and extensions of the breve as triadic hierarchies

---

36 I discuss this designation in further detail in Chapter 2.
Marchetto and Vetulus also define time differently from one another. As I discussed in Chapter 1, most fourteenth-century music theorists deferred to the following ubiquitous definition of time from Aristotle’s *Physics* IV: “hoc enim est tempus: numerus motus secundum prius et posterius”[37] [for this is what time is: a number of motion with respect to the before and after]. Marchetto uses one of the most common variants of this definition in his *Pomerium*: “tempus est mensura motus (per Philosophum, quarto Physicorum)”[38] [time is the measure of motion (according to the Philosopher in *Physics* IV)]. According to this definition, time is a

---


continual flow between the nonexistent past and future. The present is a durationless boundary between the past and the future, and time is numbered, or measured, by human perception of its motion.\textsuperscript{39}

Marchetto cites Aristotle in his description of general time, but not musical time. This is because Marchetto, like many of his contemporaries, distinguished musical time, or the \textit{tempus} from general time.\textsuperscript{40} For fourteenth-century theorists (including Marchetto), the musical \textit{tempus} referred to the span of a breve, or its division into semibreves. More specifically, Marchetto states that musical time is the “prima ratio mensurandi notas” [first way of measuring notes], or a “minimum in plenitudine vocis” [least in the fullness of sound].\textsuperscript{41} Borrowed from the thirteenth-century music theorist Franco of Cologne,\textsuperscript{42} Marchetto takes this definition literally and equates the musical \textit{tempus} with the shortest full note that can be produced by a singer who has inhaled and exhaled completely.\textsuperscript{43} This is emblematic of his practice-oriented approach to the study of music.

In \textit{Liber de musica}, Vetulus provides a definition of general time that differs subtly from Marchetto’s:

\begin{quote}
Unde tempus secundum philosophum sic diffinitur: Tempus est mora motus mutabilium rerum, sed tempus prout spectat ad musicum non est tempus sed id quod agitur in tempore, videlicet harmonia cantus et vocum melodia quae per tempus mensuratur.\textsuperscript{44}
\end{quote}

According to the Philosopher, time is defined as follows: “time is a span of motion of changeable things.” But the \textit{tempus} for the musician is not time, but that which is put

\textsuperscript{39} See Chapter 1 for further discussion of the medieval music-theoretical reception of this definition of time.

\textsuperscript{40} Tanay, \textit{Noting Music}, 32–3.


\textsuperscript{42} of Cologne, \textit{Ars cantus mensurabilis}, ed. Reaney and Gilles, 34.


\textsuperscript{44} de Anagnia, \textit{Liber de Musica}, ed. Hammond, 28.
into motion in time, namely the harmony of song and the melody of sounds, which are measured by the tempus.

For Vetulus, musical time is inseparable from sound, which is moved in time and measured by the tempus. He draws an analogue between the system of measurement of the duration of the “natural day” and musical time. While the musical tempus is distinct from general time, its situation within time allows the musician to utilize methods for the measurement of general time to quantify the durational values present in music.

Vetulus’s definition of general time differs from Marchetto’s by describing time not as a “measure” or “number” of motion, but rather as a mora, that is a “delay” or “span” of motion. This variant of the Aristotelian definition of time appears less commonly in fourteenth-century music theory treatises. Yet a number of other theorists also described time as a span of motion. These include the later fourteenth-century Italian theorist Petrus de Amalfia, author of the Compendium artis motectorum Marchecti, the anonymous author of the Omnis ars sive doctrina, and Jacobus, author of the Speculum musice.

Presumed to have been written in the later fourteenth century, Petrus’s Compendium includes a definition of general time as a span of motion. It states that this span is equivalent to the duration of a note. Petrus blurs the boundaries between general time and the musical tempus, suggesting that the “spans” of motion that compose general time include notes such as the longa and breve. This is because these notes can be systematized into divisions. The perfect longa is divided into the duodenaria division, the imperfect longa into the octonaria

---

division, and the breve into the *quaternaria* division.\(^{46}\) The anonymous author of the *Omnis ars sive doctrina* provides an elaborate definition of general musical time (rather than specifically the musical *tempus*), describing it as a span that arises from the pulsation of air. It is associated with the duration of specific notes. The longer the note, the slower the motion that produces the span of musical time.\(^{47}\)

Jacobus’s definition of time is considerably more detailed than those of any of these authors. In his *Speculum musice*, Book IV, he cites the variant definition of time that was also used by Vetulus, “est enim tempus, ut libro primo tactum est, mora motus secundum prius et posterius” [time is, as has already been stated in Book I, a span of motion according to the before and after].\(^{48}\) However, the definition of time Jacobus provides in Book I differs from

\[^{46}\]“Unde sciendum est, quod tempus secundum generalem sui accepcionem est mora motus mutabilium rerum. Que quidem mora aut est longa aut est brevis, si longa aut perfecta aut imperfecta. Si perfecta et sic habemus tempus perfectum, quod constat ex duodecim minimis semibrevisibus, quod alio nomine nuncupatur duodenarium. Si vero fuerit mora imperfecta habemus tempus imperfectum, quod ex octo semibrevisibus minimis construitur et alio nomine nuncupatur octonarium. Si vero mora fuerit brevis et sic habemus tempus breve, quod ex quatuor minimis perfectur et aliter nuncupatur quaternarium nec non imperfectissimum.” Petrus de Amalfia, “Compendium aris motectorum Marchecti,” in Anonymous, *Mensurabilis musicae tractatuli*, ed. F. Alberto Gallo, Antiquae musicae italicae scriptores, vol. 1 (Bologna: Antiquae musicae italicae studiosi (Università degli studi di Bologna, 1966), 43–47. [It should be known that time according to its general acceptance is a span of motion of changeable things. This same span is either a longa or a breve; if it is a longa it is either perfect or imperfect. If it is perfect then we have perfect *tempus*, which consists of twelve least semibreves (minims), which by another name is called the *duodenaria*. If there should be an imperfect span we have imperfect *tempus*, which is composed of eight least semibreves (minims), and by another name it is called the *octonaria*. If the span should be a breve then we have the breve *tempus*, which is perfected from four minims and is otherwise called the *quaternaria*, likewise the most imperfect.] Petrus’s naming of the division in which the longa contains twelve parts the “perfect *tempus*” or *duodenaria*, and the division in which the longa contains eight parts the “imperfect *tempus*” or “octonaria” does not correspond to Marchetto’s theory, according to which the breve is divided into the *duodenaria* and *octonaria* divisions. His description of the *quaternaria* division as the *tempus imperfectissimum*, or “most imperfect” *tempus*, is also in deviation from Marchetto’s theory. Gallo suggests that this points towards French influence in his treatise. Gallo, revised by Bücker, “Petrus de Amalfia.”

\[^{47}\]“Tempus in musica mensurabili est motus mora valorum alterum alteri concurrentium, pulsu atque percussione cantantium secundum medium maius et minus, prius ac posterius sonum in tempore relatum, et in sui esse quanto commensurato et limitatur in modulis.” Anonymous, *De musica mensurabili*, ed. Sweeney, 31. [The *tempus* in mensurable music is the span of motion of continuous (*alterum alteri concurrentium*) values, by means of the beating and striking of singers according to a greater and lesser, prior and posterior sound carried in time, and how commensurate it is in its being is limited in rhythmical measures.]

\[^{48}\]Jacobus, *Speculum musice*, vol. 4, ed. Bragard, 44.
this. Following Aristotle, he there describes general time as a “numerus motus secundum prius et posterius” [number of motion according to the before and after]. Jacobus provides further details about his definition of time, observing that time is not motion “absolutely.” Instead, while it is motion “materially,” “formally” it is the numbering of motion. Musical time is thus composed of material and formal parts. Since the numbering of motion takes place in the soul, time cannot exist unless it is counted by the soul. In music, a quantifiable utterance or “span” is associated with time. This necessitates not only the mental counting of time, but also the formation of the spatial temporal durations of abstracted musical notes in the soul.

The origins of these authors’ definitions of time as a span remain obscure, although a number of medieval authors associated it with Augustine. Augustine does not appear to have written this phrase in the form found in Vetulus’s treatise, but he nevertheless refers repeatedly to time as a span in his quadrivial treatise De musica [On Music]. He also considers the durational nature of the present in his famous discussion of time in the Confessions, Book XI. Here Augustine discusses in detail the paradoxical nature of time as a continual flow between the nonexistent past and future, and asks whether time exists independently of the mind. Augustine suggests that time exists independently of motion, and problematizes the idea that time can be measured on account of the non-existence of the future and past. To

---


50 Jacobus, Speculum musicæ, vol. 1, ed. Bragard, 76–7. For further discussion of this, see Chapter 1.

51 In a recent study, Martin Pickavé and Antoine Côté suggest that Albert the Great attributed it incorrectly to the Latin grammarian Priscian (fl. c500). It is found, for example, in James of Viterbo’s discussion of the distinction between Aristotle’s and Augustine’s rationalization of time. Antoine Côté and Martin Pickavé, “James of Viterbo’s Philosophy of Nature,” in A Companion to James of Viterbo, ed. Antoine Côté and Martin Pickavé (Leiden and Boston: Brill, 2018), 147.

52 Augustine’s De Genesi ad litteram, II, 14 has been cited as a source of this phrase. However, I have found no evidence that the phrase is used in Augustine in this treatise or elsewhere. See: Zdzisław Józef Kijas OFM Conv., “Prophecy and Christology in Olivi’s Commentary on Isaiah 7:14,” Franciscan Studies 57 (1999), 152; Nancy van Deusen, Theology and Music at the Early University: The Case of Robert Grosseteste and Anonymous IV (Leiden and New York: Brill, 1995), 62.
resolve this, he states that time is measured by virtue of a distentio animi [distention of the soul].

Time can thus be known by means of memory of the past, consciousness of the present, and anticipation of the future. Augustine elaborates upon this theory at length in De musica, where he describes the way in which the recurring rhythms of poetic meter pass away into the memory, are experienced by the senses, and expected in the future. For Augustine, musical time is composed of minimal temporal units because of its association with the metrical rhythms of Latin poetry.

Vetulus references Augustine’s work on a number of occasions in Liber de musica. As I noted above, his description of the good will that mediates between the body and soul described above is similar to Augustine’s assertion in his Confessions that that a person who has been called to faith by God’s grace will come to it by means of good will. Vetulus’s statement that contemplation and will are powers of the soul also bears similarity to Augustine’s assertion in his De Trinitate [On the Trinity] that memory, understanding, and will are the three essences of the soul. More specifically, Vetulus makes a direct reference to Augustine’s De catechizandis rudibus [On the Catechizing of the Uninstructed] when he equates the appearance of the Trinity in the four parts of the world in the Sixth Age of the World to the squareness of the breve. This is one of a number of curious number allegories that Vetulus includes in his treatise. While I will discuss Vetulus’s use of such allegories in further detail below, his seemingly ad hoc inclusion of references to Augustine and other writers appears to

---


be undergirded by his determination to relate different parts of reality to one another. It also establishes Vetulus’s theological credentials by showing that he is a follower of Augustine.

Whether Vetulus’s and his contemporaries’ definitions of general time as a span originated in Augustine remains unclear. Nevertheless, Vetulus’s use of this variant of Aristotle’s ubiquitous definition of time, which is similar to Augustine’s use of the term *mora* to describe spans of time in his *De musica*, may be seen as a legitimization of Vetulus’s belief that the temporal continuum is formed from the accumulation of small corpuscles—atoms of time. However, unlike Augustine (or Boethius, and most other fourteenth-century atomists), Vetulus thought that temporal atoms could be quantified, leading him to describe time atoms that were very large, and durational. Using such a definition of general time deepens the association between musical time and general time because the unit of measurement of musical and general time are the same. As I have suggested throughout these two chapters, Vetulus’s motivations appear to originate in his speculative approach and, as I will explain in further detail below, a belief that the parts of music can stand in for the parts of the world. Using a durational temporal atom to measure both general time and musical time helps to further reinforce this idea, since it forges closer conceptual ties between these two worlds. This may be compared to Marchetto’s more conventional definition of general time, which is divorced from the musical time of performance, and illustrates that even though Vetulus modelled his divisions on Marchetto’s, his ideas about time were rooted in a very different conceptual framework.

---

57 Gallo, *La teoria della notazione*, 68.
According to Vetulus, the triadic hierarchies of his largae, breves and semibreves have metaphysical significance. The tripartite greater, lesser and least parts of musical time reflect the triadic structure of the Trinity of God, who is greater, the angels, who are lesser, and Christ, who is least (because of his mortality). Vetulus’s theory is full of such symbolism. Many of his extra-musical ideas are drawn from scripture; others, as I have already noted, allude to the writings of Augustine.\(^58\) While such allegories were evidently of central importance to Vetulus, it is worth noting that not all of the readers of Liber de musica appear to have approved of his choices—in the Vat307 copy of the treatise, two sections have been crossed out by a later hand. The first of these concerns the relationship between the greater, lesser, and least largae, which Vetulus associates with the Father, Son, and Holy Spirit.\(^59\) According to Vetulus, the Father is greater, the Son is lesser, and the Holy Spirit sits between the two (implying that the Son is in fact least and that the Holy Spirit is lesser in this orientation). He explains this by appealing tangentially to Aristotle, stating “id quod tenet medium sapit naturam maioris et minoris extremitatis,” [that which is in the middle savors


\(^59\) Vat307, f. 1v.
the nature of the greater and lesser extremity]. The second section that is crossed out, titled “What is the Holy Spirit in relation to the novenaria?” also associates the numbers of music with a triad, this time the threefold hierarchy inherent within a man, who Vetulus states is fashioned in imitation of the Holy Trinity. The three parts include the praise of God (the number one); the body and soul (the number two); and the body, the soul, and good will (the number three). A point of similarity between this extract and the earlier passage that was removed is the positioning of one of the parts of the Trinity—in this case God—in the “middle.” A controversial choice, perhaps, and one that appears to contradict the implication that the number one is associated with God (via praise) and the number three (via the good will).

One of the most important allegories in Liber de musica takes the form of Vetulus’s description of the novenaria breve, or the greater perfect breve of the lesser extension worth fifty-four atoms. As Vetulus states himself, the novenaria breve or lesser perfect tempus of the greater extension associated with the ounce of fifty-four atoms is the most important note within his system. It is the note that is “perceived, divided, and grouped by the musician from the natural to the arithmetic day,” and the note where “the measure of the tempus was first begun by a musician.” According to Vetulus, this note represents the “nine choirs of angels.” As is well known, the nine choirs of angels were described by Pseudo-Dionysius in his

---

60 This is presumably a reference to Aristotle’s Politics, IV, VII, 41, “in eo […] [medio] utrumque extremorum apparat,” [each of the two extremities can be seen in (the middle)]. Aristotle, Aristotelis Politicorum Libri octo cum vetusta translatione Guillelmi de Moerbeke, ed. F. Susemihl, trans. William of Moerbeke (Leipzig: B. G. Teubner, 1872), 412.


62 “Acceptum, divisum et reductum a musico a die naturali usque ad arithmetican.” de Anagnia, Liber de musica, ed. Hammond, 44.

63 “Primo per musicum incepta fuit mensura temporis.” de Anagnia, Liber de musica, ed. Hammond, 53.
De coelesti hierarchia.\textsuperscript{64} By associating this note with nine choirs of angels, Vetulus places at the center of his music-theoretical project the hierarchy of the nine choirs of angels of Pseudo-Dionysius. Further, at this important juncture, Vetulus associates the ounce with the note that is important to a practicing musician, thereby establishing a further point of contact conceptually between his idealized image of music—both practical and speculative—and his image of reality.

Like the components of Vetulus’s mensural hierarchy, Pseudo-Dionysius’s nine choirs of angels are organized into three strata—primary, middle and lower. As Pseudo-Dionysius explains, each stratum itself contains a primary, middle and lower part, since this constitutes the prior form of all hierarchies.\textsuperscript{65} In the primary stratum are positioned the seraphim, whose name means “fire-makers” or “carriers of warmth.” These angels are positioned closest to God. They are accompanied by the cherubim, which means the “fullness of knowledge” or “outpouring of wisdom,” and finally the thrones, which signify transcendence over the earthly.\textsuperscript{66} In the middle hierarchy are placed the dominions, signifying a “lifting up which is free, unfettered by earthly tendencies.” With them are placed the “powers,” representing “courage,” and finally the authorities, who are “so placed that they can receive God in a

\textsuperscript{64} A Christian Neoplatonist of possible Syrian origins, Pseudo-Dionysius wrote a number of influential treatises in the fifth or early sixth century CE. Written originally in Greek, Pseudo-Dionysius’s works were transmitted to the Latin West via the translations of the Irish philosopher John Scottus Eriugena c. 800–c. 877. The authorship of these works is unknown, but in the Middle Ages it was widely believed that the first-century Christian convert Dionysius the Areopagite himself had authored them. The authenticity of these works had been questioned by a handful of thinkers as early as the sixth century. However, it was not until the middle of the fifteenth century that their authorship came under close scrutiny. As a result, Pseudo-Dionysius’s works were highly influential in the Middle Ages thanks to Dionysius’s association with Paul the Apostle. They were regarded as second in authority only to Augustine. A number of eminent scholastics wrote commentaries on his works, including Eriugena, Hugh of St. Victor, Robert Grosseteste, Albertus Magnus, and Thomas Aquinas. E. R. Dodds, “Introduction,” in Proclus, The Elements of Theology, ed. and trans. E. R. Dodds (Oxford: Clarendon Press, 1992), xxvii.


harmonious and unconfused way.” Lastly, the lower hierarchy contains the principalities, who have the ability to be “returned completely toward that principle which is above all principles.” The archangels serve to link the principalities with the lowest rank of angels: the angels.

As is well known, the idea that threefold hierarchies permeate nature was passed down to Pseudo-Dionysius by Proclus of Athens (412–485 C.E.) and his Elements of Theology. The work is commonly split into two parts. The first of these concerns a set of oppositions that make up his system of metaphysics. Proclus describes the concept of the One or unity. All parts of nature proceed back towards the unity as the ultimate Good and first cause of all things. While unity incorporates both the concepts of the unity as a pure one, and the unity as a whole that combines many other parts, the One itself is a unity without parts. In this way it can be the first cause of all other things. Theorizing a chain of causes that proceeds from the One, Proclus argues that all good that exists in the world is related to the One because of its being as the unified principle of the Good. Everything that is lower is an image of that

69 It is believed that Pseudo-Dionysius may have been a student of Proclus. Proclus’s work made its way into the Middle Ages via the Latin translations of his Liber de causis, which were attributed to a number of different authors, such as Aristotle and Ibn Daoud. Dennis J. Brand, “Introduction,” in Anonymous, Liber de causis, Translated from the Latin with an Introduction, trans. Dennis J. Brand (Milwaukee, WI: Marquette University Press, 1984), 5.
70 As E. R. Dodds has shown, these include “unity and plurality, cause and consequent, the unmoved, the self-moving and the passively mobile, transcendence and immanence, declension and continuity, procession and reversion, causa sui and causatum, (the imparticipable, the participated, and the participating), eternity and time, substance and reflection, whole and part, active and passive potency, limit and infinitude, being, life, and cognition.” Dodds, “Introduction,” x. Pieter d’Hoine and Marije Martjin, All from One: A Guide to Proclus (Oxford: Oxford University Press, 2017), 50.
71 Proclus theorizes a chain of causes. Each aspect of reality proceeds backwards towards its own localized cause, in a chain of connection. Everything emanates ultimately from the One because it is the first cause of all things. Proclus, The Elements of Theology, ed. and trans. Dodds, 13 (prop. 11).
72 d’Hoine and Martjin, All from One, 51–2.
73 Proclus, The Elements of Theology, ed. and trans. Dodds, prop. 15, 18–19.
which came before, and is therefore in some way an image of the One. In the second part, Proclus describes the structure of reality, demonstrating that the hierarchies of all parts of reality are subordinate to the One. He describes a triadic hierarchy composed of Being, Life and Intellect. The triadic hierarchy of being sits between the One and the Soul, and is the principle of all other triadic structures that exist in reality.

Following Proclus and the tradition of Neoplatonism, Pseudo-Dionysius writes in his *De coelesti hierarchia* that the forms and figures of the material realm reflect the sacred hierarchy of the heavens. Tailoring this to a Christian context, he states that God uses these structures to allow humans to know him by adapting to human capacity to know. Through observation of the material “order and rank” of nature, people can come to know the “harmonious ordering toward the divine realm.” However, Pseudo-Dionysius also believed that one could not know God directly because of the limitations of human capacity to know. Thus, by witnessing beauty in nature, one approaches closer to God because everything that exists is a symbol of God and is thus similar to him. However, God also transcends all that is in nature, and is therefore dissimilar to it. Thus, Pseudo-Dionysius argues, one comes closer to God by appreciating that he is greater than everything that is sensible, and therefore unknowable.

In his *Liber de musica*, Vetulus inserts his work into the tradition of Neoplatonist writings that theorize a world that is composed of triadic structures within triadic structures.

---

74 d’Hoine and Martjin, *All from One*, 54.

75 d’Hoine and Martjin, *All from One*, 55–59. As Andrew Hicks has discussed, Proclus’s lower reality facilitates the understanding of higher beings. The higher beings themselves are not composed of the ratios and numbers of the lower beings. Instead, the lower beings represent the essence of the soul. Hicks, *Composing the World*, 197.


by arguing that his triadic hierarchy of notes reflects the Trinity. Vetulus literally writes the form of Pseudo-Dionysius’s celestial hierarchies into his mensural hierarchies. His divisions may be seen to be analogous to the primary, middle, and lower strata of angels, while his extensions may be seen to allegorize the primary, middle, and lower kinds of angels that exist within each of Pseudo-Dionysius’s strata. As I noted in the previous chapter, these greater, lesser, and least levels also correspond to the upper, middle, and lower levels of notes as theorized in the expanded gradus systems of the followers of Jean des Murs. By integrating his interpretation of the gradus system into an image of a universe formed of triadic structures, Vetulus thus merges his Trinitarian theology with one of the most influential fourteenth-century systems of notation.

Llullian Trees

Vetulus represents his divisions using six tree diagrams. Three of these trees represent the greater, lesser and least divisions of the largae. The other three represent the greater (duodenaria), lesser (novenaria), and least (senaria) perfect breves. I discuss how these trees may be read in detail in Chapter 2. However, I provide a brief explanation here to refresh the reader’s memory.

Figure 6 shows the tree of the least perfect breve. Vetulus’s trees proceed upwards from the root, where solmization syllables are situated to represent the ascent from plainsong to mensural music. Accompanying each syllable in the root balls, Vetulus places a numeral. As

As Hicks has shown, triadic structures are found in other Neoplatonic works that address the organization of music, such as Hugh of St. Victor’s twelfth-century Didascalicon. Hicks, Composing the World, 91. This may be traced back to the idea expressed by Plato in his Republic that the transcendent One can be reached through mediators, and that the contemplation of the clarity and stability of numerical proportions of the world can help a person to better understand the eternal Good itself. David Albertson, Mathematical Theologies: Nicholas of Cusa and the Legacy of Thierry of Chartres (Oxford and New York: Oxford University Press, 2014), 26, 31.
I noted in the previous chapter, the numerals of the trees of the breves describe a span of time in minims, which then may be interpreted as a note or notes. In Figure 6, each root ball contains a numeral 6, indicating that the breves contain six minims of the greater extension (6 atoms). Proceeding upwards, the branches depict the division of each span into parts. For example, the rightmost root ball (still 36 atoms) is split into two parts by the branches that grow from it. Numeral 3s are positioned at the nodes of these branches, indicating that this span is divided into two spans worth three minims of the greater extension (6 atoms); they are greater semibreves of the greater extension (18 atoms). These branches merge together again into a node bearing a numeral 6. This represents again a span worth six minims of the greater extension (6 atoms). The branches split again, this time into two unequal parts. The numeral 2 represents a span worth two minims of the greater extension (12 atoms); it may be interpreted as a lesser semibreve of the greater extension. The numeral 4 represents a span worth four atoms of the greater extension (6 atoms); it may be interpreted as a quaternaria breve or least imperfect breve of the greater extension (24 atoms). The branches that follow depict this span's division into various shorter parts. By the end of the branches, the numerals portray a given number of minims of the least extension. Vetulus's atoms are thus present implicitly beyond the upper reaches of the branches of his trees, but are not represented visually in the diagrams.
Vetulus refers to the process of travelling up the tree using the term *ascendo-ere* (to ascend), and the process of travelling down the tree using the term *descendo-ere* (to descend). Vetulus’s use of the term “ascending” refers to several different processes. First, the eye ascends if it reads the tree from bottom to top. Second, it describes the division of longer spans into shorter ones. As the reader’s eyes ascend Vetulus’s trees, spans typically (but not always) become progressively shorter. He uses the verb “to descend” in a similar way. To these Vetulus adds a third explanation: the term “to ascend” represents the ascent of the soul as it praises God. He explains this process as follows:

Et per arbores praedictas fit ascensus per totam musicam tam planam quam mensuratam usque ad atomum, similiter et reductio. Sed quaeritur quare per has arbores prius ascenditur quam descendatur, quod totum contrarium facit philosophus quando ostendit dialectico ordinationem et constitutionem naturae. Respondetur:

---

Quia natura multum distat ab hac scientia. Nam in natura omne superius constituit suum inferius et maius est eo. Sed in hac scientia quae ad dei laudem inventa est, ut plurics dictum, nullus laudans est maior deo immo minor, et non constituit deum immo ascendit ad dei laudem ut constituatur ab eo. Sic omnes laudantes deum laudant eum ascendendo de virtute ad virtutem. 

And by means of the aforesaid trees the ascent through all music, both plain and measured, is made, all the way to the atom, like reduction. But why do they first ascend before descending through these trees, since the complete opposite is done by the Philosopher when he shows the division and construction of nature by means of logical [reasoning]? This is why: Because nature is far distant from this knowledge. For in all nature everything superior makes its inferior and is greater than it. But in this knowledge, which was invented for the praise of God, as has been said many times, nothing that praises is greater than God; on the contrary it is lesser, and it does not make God; on the contrary it ascends in praise of God and is made by Him. Thus, all things that praise God praise him by ascending from virtue to virtue.

According to Vetulus, the visual orientation of the trees reflects the ascent from plainsong to mensural music, all the way up to the atom. This is analogous to a process of “reduction” (reductio). Equating this to the logical system of Aristotle, Vetulus here appears to be using the term “reduction” to refer to the process of travelling down the Porphyrian tree of categories from the many to the one as outlined by Porphyry in his *Isagoge* (late third century). 

The *Isagoge*, or introduction to Aristotle’s *Categories*, was introduced to the medieval Latin world through Boethius’s translations, and was popularized in the form of the many medieval Porphyrian tree diagrams. Porphyry never included a tree diagram in his work, but an abundance of medieval authors used the tree to depict the process of moving down

---


81 “Sed in familiis quidem plerumque reducuntur ad unum principium, verbi gratia ad Iovem.” Porphyry, *Isagoge translatio Boethii et anonymi fragmentum vulgo vocatum “Liber sex principiorum” accedunt Isagoge fragmenta M. Victorino interprete et specimen translationum recentiorum categoriarum*, ed. Laurentius Minio-Paluello (Bruges: Desclée, de Brouwer, 1966), 11–12. [But in genealogies the many are reduced to one beginning, such as to Jove.] As I mentioned in Chapter 1, Karen Desmond has already suggested that tree diagrams were used by thirteenth- and fourteenth-century music theorists to depict distinct species of notes, after Porphyry. Desmond, *Music and the moderni*, 184–97. As I will here show, Vetulus alludes to elements of the Porphyrian tree, but as a whole his system incorporates a variety of different voices to create a method of tree-like categorization of mensural music that strays away from the strict top-down Porphyrian categorization of substances.

82 See Chapter 1 for further discussion of the origins of Porphyrian trees.
through Aristotle’s various categories from the most general categories that are predicated of many (genus, species, difference, and so on) to that which is predicated of one (the individual).83

That Vetulus is alluding to the Porphyrian tree is supported by his observation earlier in *Liber de musica* that each type of note (larga, longa, breve or semibreve) constitutes a genus, and that such notes are divided into species (perfect or imperfect) by *differentiae* (differences). Vetulus also states that the perfect and imperfect largae are genera that are divided into species (greater, lesser or least).84 This accords with the categorization of genera into species as described by Aristotle in his *Categories* and parsed by Porphyry. It also upholds the principle by which a given category can be a genus or a species, depending on its context. Where perfect and imperfect largae are species, the genus is larga. However, where greater, lesser and least largae are species, the imperfect and perfect largae are genera.85

Despite these similarities, Vetulus states himself that his tree diagrams are distinct from typical Porphyrian trees in a number of respects. One visually apparent difference is that Vetulus’s trees grow upwards in the same way as natural trees, whereas Porphyrian trees grow downwards, with substance at the top.86 This means that, contrary to the standard pattern of Porphyrian trees, Vetulus’s “general principles”—the solmization syllables of plainsong and

---

83 For a discussion of the variety of different purposes to which tree diagrams were put in the Middle Ages, see: Hacking, “Trees of Logic,” 221–63.


85 As I discussed in Chapter 1, Marchetto of Padua also represented his divisions of musical notes in the form of a tree diagram in his *Pomerium*. Although it is possible that Vetulus was influenced by Marchetto in his inclusion of such images, Vetulus’s and Marchetto’s trees differ conceptually from one another. One of the principal differences is that Marchetto draws trees that descend from longer to shorter notes, following the style of the canonical Porphyrian tree of Peter of Spain. This further illustrates that although there are some formal similarities between these two theorists’ projects, the underlying concepts considered within their works are at times distinct.

86 As I noted in Chapter 1, Hacking has argued that this is because the Porphyrian tree is supposed to represent the human body, with the roots standing in for the head. Hacking, “Trees of Logic,” 227.
mensural music, and longer notes—are placed below individual atoms, which are placed at
the top of his diagrams.

A second, and crucial, difference between Vetulus’s trees and the Porphyrian tree is
that the trees in Liber de musica do not actually represent distinct species of dialectic, even
though they depict the transition from that which is predicated of many (longer notes) to that
which is predicated of one (the atom). Vetulus explains why this is: the Porphyrian tree
represents nature. Vetulus’s trees, on the other hand, use the hierarchical relationship
between different notes to describe the physical and metaphysical worlds. In doing so, they
use the physicality of music to portray the process of ascending to the divine in praise,
thereby transcending nature and the physical. Thus, although some elements of Vetulus’s
theory engage with the idea of the Porphyrian tree as a logical structure of classification, the
primary purpose of his trees is not to represent the descent through the Aristotelian
categories.

That Vetulus elected to use the terms “ascending” and “descending” to describe the
process of reading his tree diagrams, I suggest, is emblematic of his engagement with the

---

87 Verboon has argued that the Porphyrian tree represents neither the physical nor the metaphysical, but rather the “logical structure of a pure theory of classification.” This would contrast with Vetulus’s usage of the tree to represent both the physical process of dividing musical time, and the metaphysics of the cosmos. “Der Porphyrianische Baum ist also kein Muster für die Beurteilung der physischen Wirklichkeit. Er beschäftigt sich nicht mit dem ontologischen Status von Konzepten. Der Porphyrianische Baum gehört zur Logik und betont die logische Struktur einer reinen Klassifikationstheorie. Der Porphyrianische Baum ist das Muster einer Definitionsart. Es handelt sich hierbei weder um Physik noch um Metaphysik,” Annemieke R. Verboon, “Einen alten Baum verpflanzt man nicht: Die Metapher des Porphyrianischen Baums im Mittelalter,” in Visuelle Modelle, ed. Ingeborg Reichle, Steffen Siegel and Achim Spelten (Munich: Fink, 2008), 255. [The Porphyrian tree is thus no model for the judgement of physical reality. It does not concern the ontological status of concepts. The Porphyrian tree belongs to logic and emphasizes the logical structure of a pure theory of classification. The Porphyrian tree is the model for a method of definition. Thus, it concerns neither physics nor metaphysics.]
theory of the Catalan mystic Ramon Llull (1232/3–1316). Llull’s substantial output includes works such as the *Ars magna* [Great Art] and *Ars brevis* [Short Art], an abridged version of the *Ars magna*, where he sets out his *Ars*, typically named in English simply the “Art,” a system that encompasses logic, metaphysics and theology. Llull made extensive use of diagrams to describe and classify the relationships between all aspects of reality as he saw them, and to unify the natural realm. His work contains numerous tree diagrams, many of which appear in his *Arbor scientiae*, written in Rome in 1295. Both Llull and Vetusus drew trees that grow upwards like natural trees.

Vetusus’s prioritizing of ascending up the tree for the purpose of praising God over descending is similar to Llull’s description of the ascent of the mind towards contemplation as set out in his *Liber de ascensu et descensu intellectus* [Book of the ascent and descent of the intellect]. Developed from his *Llbre de contemplació* [The Book of Contemplation], this work discusses methods of classification of things in the world. Following the medieval tradition of Neoplatonism, as well as the medieval Christian, Arab, and Jewish traditions, Llull theorized the relationship between parts of the world in a chain of being, depicted in the form of ladders. In *Liber de ascensu et descensu intellectus*, Llull describes a “ladder of ascent and descent”

---

88 Born in Majorca to Ramon Amat Llull and Isabel d’Erill, merchants who had supported King James I of Aragon in the invasion and subsequent defeat of the Moorish rulers of the island, Llull travelled widely in Europe and Africa to preach his Catholic mysticism and convert Muslims and Jews with varied success. Heavily influenced by Pseudo-Dionysius, his metaphysical work advocates a “negative theology,” in which God is believed to be unknowable due to the limits of human capacity to understand him. Since Llull believed that God cannot be known directly, Annemarie C. Mayer has argued that he viewed nature as a “mirror” to or “trace” of God’s divinity. According to Llull, God can thus come to be known by observing the qualities of nature. Llull’s life is documented in the biographical *De vita coaetanea* [A Contemporary Life], written c. 1311 by an anonymous friend of Llull’s in Paris. The text is based on Llull’s memories. Annemarie C. Mayer, “Llull and the Divine Attributes in 13th Century Context,” *Anuario filosófico* 49, no. 1 (2016), 142.


that represents created reality and the process of ascending from sensed reality to intellectual reality.\footnote{For Ramon Llull the intellectual path leading to the contemplation of God is an ascent whose first stage is the visible reality of Creation. The starting point is the world of sensory experience, that is to say, the world as inhabited by creatures, this being the first step that enables one to gain access to the (intellectual) perception of intelligible reality. Each of the faculties which make up the complex, psychological mechanism to be found behind the processes of perception or intellection, plays a particular role in the ascent from the sensible to the intelligible world.” Rubio, “A Natural Realm,” 323–4. See also pp. 327–8, 330–31.} Figure 7 presents a simplified version of the ladder. To its right, Llull is accompanied by ladders in a fourteenth-century miniature copied in Karlsruhe.

Figure 7: Llull’s Ladder of Ascent and Descent\footnote{K72, 5r. Llull describes the ordering of the world from stone–God in the following: Ramon Llull, \textit{Opera Latina}, vol. 9, ed. Aloisius Madre, Corpus christianorum continuatio mediaevalis, vol. 35 (Turnhout: Brepols, 1981), 20–199.}

As one proceeds up Llull’s ladder, one passes through various objects that demand different modes of sensory interaction. Just as Vetusius does in his discussion of his tree diagrams, Llull maintains that one may proceed up or down the ladder of being because all
the steps are connected. However, ascending is prior because one proceeds from the inferior to the superior.93

The concept of ascent from the inferior to the superior is also encountered in Llull’s theorization of the ladder of created being. This ladder is described in a number of works including his Llibre de meravelles [The Book of Contemplation], Arbor scientiae, and Liber de ascensu et descensu intellectus.94 The ladder of created being proceeds upwards from the elementative (the four elements), to the vegetative (beings that can absorb nutrients, grow, and reproduce), the sensitive (beings that have a capacity for sensory perception), the imaginative (beings that have an imagination, i.e., a part of the intellect that reproduces an image of sensed forms and that transfers this into an intelligible species that can be comprehended by the passive intellect), humans (rational animals), heaven (the celestial spheres), the angels (form without matter, that is pure soul without flesh), and finally to God (the highest being).95

Vetulus’s positioning of the four supposed solmization syllables of the *ars nova*—*ut*, *re*, *mi*, and *fa*—as root balls (see Figure 6 above), I would suggest, provides further evidence of the presence of Llullian influence in *Liber de musica*. This is because Vetulus explains early in his treatise that the solmization syllables at the base of his trees represent the four elements, as follows:

Sed istae sex notae possunt reduci ad quattuor notas secundum reductionem artis novae, quae sunt *ut*, *re*, *mi*, *fa*. Et hoc quare: Quia sicut quattuor sunt elementa de quibus totus mundus et ea quae sunt in mundo composita sunt, sic totus cantus per praedictas quattuor notas componitur et versatur.96

95 According to Yates, Llull’s Art could “range throughout the universe as conceived in the thirteenth century.” This means that the Art could be applied to any of the parts of Llull’s ladder. Yates, “The Art of Ramon Llull,” 118.
But these six notes can be reduced to four notes according to the reduction of the *ars nova*, which are *ut*, *re*, *mi*, and *fa*. And this is why: since there are four elements out of which the whole world and things that are in the world are made, all song is composed and meditated upon by means of the four aforesaid notes.

According to Vetulus, the four notes of the *ars nova* represent one of each of the four elements, while plainsong is composed of the six solmization syllables of the hexachord. This unusual statement appears to be music-theoretically inconsistent, since the repertoire of the *ars nova* is hexachordal.

That Vetulus’s solmization syllables are elemental is further confirmed by his inclusion of a Llullian “elemental figure” in his diagram (see Figure 9). Vetulus adapts the elemental figure to depict the stepwise motion between each of the solmization syllables, in accordance with Llull’s representation of the four elements in his elemental figures. These diagrams place the four elements in a grid format, alternating the position of each element in order to portray the interconnectedness of all of the four elements. Curiously, Vetulus’s association between the four syllables of the *ars nova* and the elements does not correspond to his hexachordal grid, which includes all six solmization syllables of the hexachord of plainsong.

97 The author of the fourth Berkeley treatise also associated tetrachords with the four elements. He states that the four elements correspond to “worldly harmony.” Worldly harmony is composed of the notes d-e-f-g, i.e., the finals of the church modes. If Vetulus here intended to refer to the finals of the church modes using the solmization syllables of the tetrachord, we again encounter an inconsistency in his music-theoretical knowledge, since *ut*, *re*, *mi*, and *fa* do not correspond to these notes. Further, this would not explain why Vetulus associates the tetrachord only with the *ars nova*, and not with plainsong. Nevertheless, if we compare Vetulus’s proper and improper notes, the ratios that they form (3:4:6 and 2:3:4, respectively) correspond to the ratios inherent within the authentic and plagal modes. The frame 3:4:6 corresponds to the ratios of the plagal modes, wherein the lower thresholds of the ambitus of these modes extend the interval of a fourth (3:4) below their finals, and the upper thresholds extend the interval of a fifth above (2:3, i.e., 4:6). The frame 2:3:4 corresponds to the ratios of the authentic modes, wherein their finals are the interval of a fifth (2:3) below their reciting tones, and the upper thresholds of their ambitus are the interval of a fourth above the reciting tones (3:4), with the exception of mode III. This frame is also inherent within Marchetto’s divisions, since his semibreves can be in 3:2 or 4:3 proportion with one another (see: Chapter 2, p. 75, fn 20). However, Vetulus expands this idea by applying these proportions to his minims, thereby nullifying the equivalence between the *novenaria* and *duodenaria* divisions that is inherent in Marchetto’s system.
To accommodate the difference between the four elements and the six solmization syllables, Vetulus replaces the four-by-four grid with a three-by-four grid, as depicted in Figure 9.

**Figure 8: Llull’s elemental figures**

<table>
<thead>
<tr>
<th>Figure of Fire</th>
<th>Figure of Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire</td>
<td>Air</td>
</tr>
<tr>
<td>Fire</td>
<td>Air</td>
</tr>
<tr>
<td>Water</td>
<td>Earth</td>
</tr>
<tr>
<td>Earth</td>
<td>Water</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Figure of Water</th>
<th>Figure of Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Earth</td>
</tr>
<tr>
<td>Earth</td>
<td>Water</td>
</tr>
<tr>
<td>Air</td>
<td>Fire</td>
</tr>
<tr>
<td>Fire</td>
<td>Air</td>
</tr>
</tbody>
</table>

**Figure 9: Vetulus’s hexachordal figure**

<table>
<thead>
<tr>
<th>ut</th>
<th>re</th>
<th>mi</th>
<th>fa</th>
</tr>
</thead>
<tbody>
<tr>
<td>re</td>
<td>mi</td>
<td>fa</td>
<td>sol</td>
</tr>
<tr>
<td>mi</td>
<td>fa</td>
<td>sol</td>
<td>la</td>
</tr>
</tbody>
</table>

---

98 Adapted from *Vum200*, f. 4r. Llull discusses this figure in his *Ars demonstrativa*. The extract is edited in the following: Ramon Llull, *Opera Latina*, vol. 27: *Ars demonstrativa*, ed. Josep Enric Rubio Albarracín, Corpus christianorum continuatio mediaevalis, vol. 213 (Turnhout: Brepols, 2007), 31–2.

99 *Vat307*, f. 8r. Used by courtesy of the Biblioteca Apostolica Vaticana.
Since Vetulus states that his solmization syllables represent the elements, and includes a Llullian elemental figure in his treatise to represent these, I suggest that his trees serve a similar purpose as Llull’s ladders—to represent the ascent from the allegorically elemental hexachords to the higher, angelic hierarchies of mensural music. That Vetulus’s hexachordal figure is similar, but not the same as Llull’s elemental figure is emblematic of the haphazard style of his treatise as a whole.\(^{100}\) *Liber de musica* draws on numerous traditions in an attempt to provide a coherent picture of the hierarchies of musical time. This dense music-theoretical project also serves to reflect the organization of reality. Vetulus tailors his theoretical and philosophical projects to each other constantly, resulting in an image that is at the level of details inconsistent and contradictory, but that nevertheless succeeds in making connections between disparate parts of the cosmos.

How Vetulus came to study the diagrams of Ramon Llull remains unknown. However, a handful of other theorists also made use of ascending tree diagrams, pointing towards the possibility of the wider application of Llullian tree diagrams to late-medieval music theory, and offering an avenue of future research. One of these diagrams is copied in the English theorist Roger Caperon’s *Comentum super cantum.*\(^{101}\) Caperon’s work has survived in a single copy in *CrD39*, ff. 126r–155r, a later fifteenth-century miscellany that also contains a short

---

\(^{100}\) Llull also theorizes a tree of the elements in his *Arbor scientiae*. However, yet again, Vetulus’s theory does not correspond exactly to that of Llull. Unlike Vetulus, who places his elemental solmization syllables at the roots of his tree, Llull situates his elements within the branches of the elemental tree. Llull, “De arbore elementali,” 11–12, 34–8.

\(^{101}\) I thank Susan Weiss for drawing my attention to this tree diagram and Caperon’s links to Llull, as well as the tree diagram copied in the Provençal Hebrew treatise discussed below. Caperon’s treatise is edited in: Gregorio Bevilacqua, “Il *Comentum super cantum* di Roger Caperon. Introduzione ed edizione critica” (PhD diss., Università di Bologna, 2008).
extract of Vetulus’s *Liber de musica*. Caperon himself is believed to have lived in the later thirteenth and early fourteenth centuries. The tree diagram appears in a Guidonian hand, and is accompanied by circular figures that describe the simple figures, rests, ligatures, and the modes. This bears some conceptual similarity to Vetulus’s trees, which seek to combine the worlds of plainsong and thus the solmization syllables of the Guidonian hand with mensural music using the ascending tree diagram.

Another point of comparison may also be made between Vetulus’s trees and the trees copied within a late fourteenth-century Florentine manuscript written in Hebrew. These trees are particularly interesting because of their remarkable similarity to Vetulus’s trees of the largae. Figure 10 compares Vetulus’s tree of the lesser perfect larga (9 breves) with the anonymous author’s tree, i.e., the tree of perfect tempus with major prolation $<3,3>$, in which a perfect maxima is divided up to the level of the minim. Notes are perfect in each level of the tree; maxima, longae, breves, and semibreves are thus all divided into three parts.

As can be seen in Figure 10, the trees are different in design to some extent: Vetulus uses numerals to describe spans of time, which then must be imagined as notes, while the anonymous author uses noteshapes directly; Vetulus divides his largae up only to the level of the breve, whereas the anonymous author divides his maxima up to the minim. However, both authors draw ascending trees that grow from longer to shorter note-spans, with the branches depicting the division of a longer span into a number of shorter ones. The

---

102 The extract is “Quid sit prolatio,” [What is an utterance?], and is copied on f. 122r. CrD39 is believed to have been written in the fifteenth century on the basis of dates that are written in the manuscript itself, including 1453 and 1473. See: James Haar, “Roger Caperon and Ramos de Pareia,” *Acta musicologica* 41, no. 1 (1969), 29.

103 *Fu70*, ff. 1r–4v. The treatise consists of notes that are believed to have been adapted from lectures that were delivered in Avignon in Provençal. The author of the treatise is named as Daniele Hazan in a much later flyleaf. However, as Adler notes, this identification has not been confirmed. Israel Adler, *Hebrew Writings Concerning Music, in Manuscripts and Printed Books from Geonic Times up to 1800* (Munich: G. Henle Verlag, 1975), 55–6. Stone discusses this treatise in the following: Stone, “The Ars Subtilior in Paris,” 385–8, 392–3.
incompleteness of the Hebrew anonymous diagram also asks the reader to imagine the
division of some of the breves represented into semibreves and minims. This is similar
conceptually to the way in which the reader is asked to imagine notes in Vetulus’s breve
diagrams.¹⁰⁴

Figure 10: Hebrew anonymous ♣ tree compared to Vetulus’s tree of the lesser perfect larga¹⁰⁵

Vetulus’s and the anonymous author’s decision to draw ascending tree diagrams is
relatively unusual, and therefore worthy of note: other examples of mensural diagrams that
ascend from longer to shorter notes include the tree diagrams of John of Tewkesbury, as well
as the triangles of Willelmus and Torkesey (see Chapters 1 and 2). As I suggested in Chapter
1, ascending diagrams were typically used by authors who condoned the forming of longer
musical timespans through the grouping of minimally short mathematical units; for most

¹⁰⁴ I discuss the means by which a reader must imagine notes in Vetulus’s trees in detail in Chapter 2.
¹⁰⁵ Adler, Hebrew Writings Concerning Music, 74, © Henle Verlag, 1975. Vat307, f. 8r. Used with permission.
theorists, these units took the form of minimally short notes.\textsuperscript{106} Such authors also described longer timespans that are divided into shorter ones, indicating that their intervention was not to exclude division, but rather to acknowledge the possibility for both division and grouping when constructing mensural hierarchies. These two possibilities would become particularly important for the theorists and composers of the rhythmically complex music of the later fourteenth and earlier fifteenth centuries. As Jason Stoessel has observed, the special noteshapes utilized in such repertory combine the idea of proportionality and additivity.\textsuperscript{107}

That ascending tree diagrams were used by authors such as Vetulus and the Hebrew anonymous further supports the supposition that such diagrams were used by theorists who wished to theorize a wider range of possible rhythmic groupings. The visual similarities between the trees of the Hebrew author and Vetulus are particularly tantalizing in this regard because the anonymous author was a student of Johannes Vaillant—a composer whose works were copied in \textit{Ch564}, one of the major late-medieval sources of rhythmically complex music. He also discusses in his treatise the complex proportions of Galiot's \textit{Le sault perilleux}, another composer whose music was copied in \textit{Ch564}.\textsuperscript{108}

\textsuperscript{106} As I discussed in Chapter 1, these diagrams appear to have been influenced by the Boethian table of the powers of two and three and their products (following Nicomachus), and ultimately the Platonic tetrahytos. As Michel Huglo has observed, a number of copies of Isidore's \textit{Etymologiae} contain interpolated lambda diagrams, also known as the Platonic "Soul of the World." They occur exclusively in the eleven Iberian copies of Isidore's \textit{Etymologiae}. These diagrams share the same orientation as Toresey's and Willelmus's triangles, and with them Tewkesbury's and Vetulus's trees. However, the numeral 1 in these diagrams represents a divisible whole. Conceptually, they are thus arguably closer in kind to Porphyrian tree diagrams. See: Huglo, "The \textit{Musica Isidori} Tradition," 63–7, 81–3; Huglo †, ed. and trans. Haggh-Huglo, "\textit{Musica ex numeris}," 23–31. It is perhaps worth noting that Vetulus's "unity" or atom, which serves as a mathematical counting unit for the duration of all notes, is situated in the abstract above the level of the highest leaves in the trees of the breves. Positioned in the same location as the One in the Platonic Soul of the World diagram, Vetulus's atoms are nevertheless invisible, reflecting, perhaps, the unknowability of God that was a central component of Pseudo-Dionysius's and Lull's mystical theologies.

\textsuperscript{107} Stoessel, "The Captive Scribe," 207.

\textsuperscript{108} Adler, \textit{Hebrew Writings Concerning Music}, 57.
While the differing conceptual paradigm provided by the form of the ascending trees may have arisen out of music-theoretical conventions, I suggest that their use also appears to have been influenced by the speculative tradition alluded to by Vetulus. Unlike the fixed form of the canonical Porphyrian tree, which may be associated in general terms with conceptual limitedness, the ascending trees of Llull portray the interconnectedness of all reality, and thus offer the possibility of conceptual limitlessness. From the perspective of music theory, such diagrams facilitate the representation of many levels of note groupings, and with them complex proportions. In Vetulus’s work, this manifests in the exhaustive exploration of all the various combinations of duple and triple triadic hierarchies. Although I would not go so far as to suggest that a causal link exists between the two, traces of a similarly adventurous and exploratory attitude towards rhythmic proportion are also arguably present in the late-medieval notationally complex music to be discussed in Chapters 4 and 5.

109 As Anthony Bonner has observed, this was an important component of Llull’s Art. Although Llull applied his Art only to the concepts examined in his treatises, the system offers the potential for limitless expansion. It thus invites the reader to develop it in their own way, just as Vetulus appears to have done. Anthony Bonner, *The Art and Logic of Ramon Llull: A User’s Guide* (Leiden and Boston: Brill, 2007), 171, 296.
Chapter 4: Reading Seemingly Complex Notations

Figure 1 shows an extract of Philippus de Caserta’s ballade *De ma dolour*. To its right is a transcription by Willi Apel.

![Figure 1: Extract of Philippus de Caserta’s *De ma dolour* with transcription by Apel](image)

In Figure 1, black breves are imperfect and can be divided into two semibreves. Semibreves can be perfect or imperfect, depending on the context. Where they precede other semibreves, they are perfect and can be divided into three minims. Where they sit beside a minim they may be shortened by one-third by imperfection. Through this they may become imperfect, worth two minims. As can be seen from Apel’s transcription, the first semibreve of this extract is perfect, and causes a long chain of displacement or syncopation of the perfect semibreve and imperfect breve units, and culminates in the breve unit in what is m. 6 of Apel’s transcription.

In certain respects, Apel’s transcription of this passage may appear to be easier to follow than the original: the three voices are represented simultaneously, which means that the

---

1 Willi Apel, ed. *French Secular Music of the Late Fourteenth Century* (Cambridge, MA: Medieval Academy of America, 1950), 100; *MOe5.24*, f. 26v; cantus. Used by permission of the Ministry for Cultural Heritage and Activities and for Tourism. Estense Galleries, Estense University Library.

2 Apel describes medieval syncopations in terms of “displacement,” and compares these to the syncopations of composers such as Hindemith and Stravinsky. As I will discuss in further detail below, syncopations may more productively be described as “divisions” of a perfection, reflecting medieval usage of the term. Apel, *The Notation of Polyphonic Music*, 414.
relationships between the cantus, contratenor, and tenor are visible. The intricate
syncopations of the upper voice can be compared visually with the other parts, enabling the
singers of the three parts to follow along with each other, facilitating precise alignment of
each note during this intricate passage. However, from another perspective the transcription
arguably results in sensory overload. While attempting to navigate the complex syncopation at
the opening of the song, the singer of the cantus must visually take notice of the activity of
the lower voices. The beaming and barlines, while grouping notes and imperfect breve units,
place further demands on the reader’s attention and emphasize conflict between the voices.³

The original, on the other hand, is efficient: the reader is provided with just enough
information to realize their own part, but no more. Representation in parts also helps a reader
to look further ahead than is possible in a score, where notes are spaced further apart to
accommodate motion in more than one voice. Part-reading thus arguably enables a reader to
perceive in a single glance longer notated phrases than is possible in score reading.⁴

The figure above reveals another piece of information about a potential medieval
reader, one that may seem self-evident, but that is of crucial importance that may distinguish
a medieval reader’s mentality from that of a musicologist today: a prospective reader must

³ Donald Greig has suggested that performing from editions can result in performances that sound too
deliberate, and that do not project the “intended ‘feel’” of a composition. Greig, “Ars Subtilior
Repertory,” 198. Ruth Deford has made a similar observation, stating: “The intention to sing
complicated rhythms often has the effect of sounding too deliberate, too much like dictated freedom.
The effort to re-create exactly what is on the page in modern notation often sounds exactly like that—an effort.” Ruth Deford, Tactus, Mensuration, and Rhythm in Renaissance Music, (Cambridge: Cambridge
University Press, 2015), 198.

⁴ Haar has also suggested that modern transcriptions are at times more complex than the original
manuscript, and has drawn attention to the capacity for mensural notation to be used to represent
complexity in a simple way. James Haar, “Music as Visual Object: The Importance of Notational
Even though modern ensemble performers at times read music from parts, medieval repertory is
almost always edited in score. This reflects a tacit assumption that such material is made easier to read
when it is translated into score format.
have been an expert reader of mensural notation. Because a hypothetical reader of this song—and indeed all of the examples discussed in this chapter—would have been familiar with the late-medieval mensural notational styles of Northern Italy, they would have been sensitive to their basic conceptual principles. These include the idea that rhythms appear in perfections (groups of three) or imperfections (groups of two), and that notes can be either duple (imperfect) or triple (perfect), depending upon their context. Because the mensural system is contextual, a reader must also undergo a continual process of recognition of familiar patterns, or “intrinsic” notational signs to determine their durations. Late-medieval musicians, as “native” readers of mensural notation, would have sought to make sense of noteshapes or coloration practices that were perhaps unfamiliar—or rhythmic and proportional gestures that were complex and challenging—in light of their prior knowledge of the undergirding principles of mensural notation.

Throughout this chapter, I take as a given that all the examples I discuss would have been written with the intention of being used for performance in some way, even if the circumstances of their use in reality varied. This is not a view shared by all scholars of late-medieval repertory. For instance, Uri Smilansky has disputed whether all songs included within the “ars subtilior” label, and Rodericus’s Angelorum psalat in particular, were notated for the purpose of performance: “Angelorum Psalat […] incorporates so many different, non-standard or unique note-shapes that we have not yet been able to come up with a convincing transcription of it. All versions agree that some rhythmic values are signified by more than one shape. It cannot therefore be seen as a purely practical usage.” Uri Smilansky, “A Labyrinth of Spaces: Page, Performance and Music in Late Medieval French Culture,” in Ritual and Space in the Middle Ages: Proceedings of the 2009 Harlaxton Symposium, ed. Frances Andrews (Donington: Shaun Tyas, 2011), 137. Crawford Young has created the most successful transcription of this song to date. See: Crawford Young, “Antiphon of the Angels: Angelorum psalat tripudium,” Recercare 20, no. 1 (2008), 19–22. Lucia Marchi has recently argued that some of the attributions in Ch564 may have been made to performers, strengthening the hypothesis that this codex was compiled for performance. Lucia Marchi, “Traces of Performance in Early Fifteenth-Century Musical Attributions,” Philomusica 18 (2019), 1–18.

“Extrinsic” signs are typically mensuration signs, which can help a reader to confirm the proportional relationships among notes, but are not essential or necessary for the purpose of reading. Jason Stoessel, “The Interpretation of Unusual Mensuration Signs in the Notation of the Ars Subtilior,” in A Late Medieval Songbook, ed. Plumley and Stone, 190; Prosdocimus de Beldemandis, Expositiones tractatus Practice cantus mensurabilis Magistri Johannis de Muris, ed. F. Alberto Gallo (Bologna: A.M.I.S, 1966), 126–32.

Singing from mensural notation demands not only that a reader knows the rules of mensural notation, but also that they look at the folio in a manner that is informed by their knowledge of the mensural system. Notators would have written their notations in light of the expectations of musicians. One of these expectations, I suggest, is that a medieval reader would probably have read from their manuscripts for practice and memorization, not for sight-reading. That medieval readers would not necessarily have placed importance on fluent sight-reading (as we do today) is supported by the testimony of the Italian theorist Prosdocimus de Beldemandis, who observed in his *Expositiones tractatus Practice cantus mensurabilis Magistri Johannis de Muris* (Padua or Bologna, 1404) that a reader who was unsure of the mensuration could simply have determined how the voices fit together by singing, or by observing the counterpoint. Moreover, as Margaret Bent has argued, musical performance may be viewed as a parallel to rhetorical speech. Medieval rhetoricians were expected not to read their written texts aloud by sight, but instead only after meticulous preparation so that they could be correctly declaimed. Bent compares the process of decoding the various parts

---

8 Anna Maria Busse Berger has already argued that medieval musicians would have performed motets by memory. Busse Berger, *Medieval Music and the Art of Memory*, 198–251. Uri Smilansky has suggested that some *ars subtilior* notations would have facilitated ease of memorization. Smilansky, “A Labyrinth of Spaces,” 133. Greig has argued that the challenge of performing from late-medieval notations is significantly mitigated through repeated performances and hearings, and that such notations would not have been used primarily for performance, but rather for memorization. Greig, “Ars Subtilior Repertory,” 198. While I suggest that these notations were not conceived with sight-reading in mind, I do not imply that it is impossible to sight-read from all of the notations discussed in this dissertation. The extent to which a song can be interpreted by sight depends on the skill of the reader and the difficulty of the song in question, which vary. Instead, I hope that my analyses will draw attention to the contrasting practices of reading and looking that late-medieval complex notations demand in comparison with modern staff notation. That a reader today should prioritize sight-reading is, arguably, a product of the modern music profession, in which rehearsal time is at a premium. One may surmise that this mentality would have been alien in a late-medieval court context.


of written speech with the preparation that a musician undergoes when making sense of musical grammar, i.e., counterpoint. Perhaps to this one might add the notation itself.

Further information about how medieval musicians read music, I suggest, can be identified in theoretical descriptions of the late-medieval practices of traynour and syncopation. Traynour is said to occur when special noteshapes or coloration are used to sign the concurrent use of different mensurations while retaining a stable breve. At times, traynour is conflated with the medieval practice of syncopation. Termed sincopa, syncoha, or syncopatio in theoretical texts, syncopation was widely discussed in treatises throughout the fourteenth century, and is described as a process of dividing perfections and imperfections into parts by the interposition of notes that cut across the perfection. The different parts of the divided perfection are then “reducitur” [grouped together] to complete the perfection. As I will discuss, theoretical descriptions of traynour and syncopation demonstrate that medieval readers viewed seemingly complex notations in terms of divided and regrouped


12 In arguing that theoretical descriptions of traynour and syncopation, specifically as they are outlined in the Tractatus figurarum, can be of use when attempting to understand practical examples, I offer an interpretation of these terms which contrasts with that of Smilansky. Smilansky states: “Still, the Tractatus’ author’s insistence on the brevis as the syncopated unit, and the inability to separate the two techniques [sincopa and traynour] in practice, makes their practical application minimal. They are also incapable to describe all forms of syncopation arising from mensuration-combinations found in practice.” Uri Smilansky, “Rethinking Ars Subtilior,” 175–6. In his dissertation, Smilansky describes two kinds of syncopation. “Internal” syncopation occurs when the disruption of a single voice leads to a “transgression of the borders of its basic rhythmical units […] resulting in rhythmic tension between it and other voices” (p. 176). Smilansky states that this type of syncopation is consistent with medieval theoretical descriptions. As I will show, medieval theorists describe syncopation as a “division” of a perfection before its regrouping. This may occur in tandem, or in conflict with other voices. Smilansky’s “external” syncopation results from the “structural or large-scale need for resolution” of the position of perfections in relation to the perceived global metric organizational scheme of a song, as is inscribed in modern transcriptions that contain barlines.


perfections. The vivid shapes and colors of such notations would have facilitated such a
process of regrouping by visually inscribing the boundaries of perfections and imperfections
upon the folio, enabling readers to identify disparate units of musical time, and thereby to
locate important moments of realignment among parts in the counterpoint. This can
provide one explanation for how complex notations can aid a reader navigate rhythmically
challenging music without referring to a score.

These observations challenge the idea that notations that appear complex to a modern
reader would necessarily have posed significant challenges for medieval musicians. Indeed, in
the examples below, I will show how some notations—but by no means all—facilitated ease of
reading. The belief that certain late-medieval notations are inherently complex, I suggest,
arises because medieval songs are typically studied for the purpose of edition making, rather

---

15 This bears similarity to the process modern cognitive scientists refer to as “chunking,” i.e., the
mental grouping of notes. Applying Mary Carruthers’s observations about memory in the Middle
Ages to a musical context, Anna Maria Busse Berger has already argued that chunking played an
important role in the memorization of late-medieval motets. Mary Carruthers, The Book of Memory: A
Study of Memory in Medieval Culture (Cambridge and New York: Cambridge University Press, 2008), 105;
Busse Berger, Medieval Music and the Art of Memory, 199. Extending this application to reading, I suggest
that the process of fracturing and regrouping of perfections described by theorists resonates with the
process of chunking that expert readers of novel notations would have had to have undertaken in
order to navigate visually and rhythmically intricate songs. Anna Zayaruznya has also recently argued
that modern cognitive studies may be used productively when considering how medieval people may
have experienced their music. Anna Zayaruznaya, “Intelligibility Redux: Motets and the Modern
Medieval Sound,” Music Theory Online 23, no. 2 (June 2017).

16 This resonates with Anne Stone’s observation that songs written in the _ars subtilior_ style constitute
notated ornamentation, and that these provide evidence for an unwritten tradition of discanting. This
is because at times the notation foregrounds important structural points of realignment. Stone,

17 For instance, I do not consider the notational riddle canons that were used intentionally to make
music more difficult to read. It appears that such canons often appear in conjunction with music that
is less rhythmically intricate than the examples discussed here.
than from the perspective of a performer. Studying a song from the editor’s perspective entails a different kind of reading and looking from that of a performer. In the context of the present chapter, one of the most significant differences is that a modern editor must find a way of expressing the rhythmic values of medieval songs in modern notation, a process that entails assigning precise durations to every note. To achieve this, they must pour over the shape of every note and consider its duration in comparison with all others, so that the song can fit perfectly within the temporal spans prescribed by modern barlines. This may be contrasted with the process of reading medieval notation, which projects a sense of the grouping of temporal units, and the regrouping of voices at cadences without necessarily placing as much emphasis on describing the precise duration of notes. A reader of this notation must therefore group together many notes at once. It is thus not the individual shape of a note, but rather the picture of the notes as they relate to one another and form patterns that informs a performer about how they should read mensural notation.

There are no substantial, innovative theoretical sources about seemingly complex notations that rival the earlier fourteenth-century treatises discussed in Chapter 1, such as

---

18 Margaret Bent has already drawn attention to some of the problems that result from the editing of medieval songs. Alterations imposed upon medieval music by the modern score can result in misleading over-prescriptiveness. For example, the vertical alignment of the score results in a more dogmatic prescription of rhythm than is always present in contextual mensural notations. Similarly, placing a note on a modern staff implies that it represents a specific pitch, a concept that would have been alien to medieval singers, who relied upon relative, not fixed pitch. Mensural notation is sufficiently conceptually different from our own modern notational system that much meaning is thus lost in the process of edition-making: editing takes a song from an original format that was tailored to its material, reimagining it within a wholly different conceptual medium. The modern score, as a performance directive, suggests interpretations of rhythmic and metrical groupings that were not necessarily inscribed within the original notation. Bent, “Editing Early Music,” 385–9. Rob Wegman observes that modern scores are often deemed to be “faithful to the original notation” only insofar as the “unfamiliar” attributes of medieval notation has been removed, such as “notation in parts, alteration, proportion, ligatures, [and] mensural relationships.” Wegman, “Sense and Sensibility,” 300.

19 Anne Stone has proposed that a reader-centered approach to analysis of late-medieval songs is productive. She applies this method in a study of the first-person voices of self-reflexive repertory, observing that the meaning of songs can undergo considerable change depending on the perspective of a reader. Anne Stone, “Self-Reflexive Songs and Their Readers in the Late 14th Century,” *Early Music* 31, no. 2 (2003), 182–5.
Marchetto’s *Pomerium*, Jean des Murs’s *Notitia*, or Jacobus’s *Speculum musice* in their length or scope. The substantial early fifteenth-century theoretical sources (to be discussed in Chapter 5) that discuss complex notations do so in the context of many other contemporaneous musical practices, suggesting that medieval theorists themselves may not have compartmentalized songs in terms of their complexity. The sources that consider what would today be regarded as notational complexity in the greatest detail are the *Tractatus figurarum* and the *Ars cantus mensurabilis mensurata per modos iuris*, both anonymous and believed to have been copied in the later fourteenth century on stylistic grounds. It is worth noting that neither author states that the notational practices that they describe constitute complexity.

In what follows, I will outline the notational system of the *Tractatus figurarum* before considering how *traynour* is theorized. I will then consider how *traynour* is applied in practice in Guido’s well-known *Or voit tout en aventure*. In the latter part of the chapter I will discuss the theorization of syncopation and consider how it is applied in practice. I will also address the question of why *traynour* and syncopation are at times conflated by medieval theorists, arguing that *traynour* may at times be viewed as a subset of syncopation, just as medieval theorists sometimes state that it is.

---

20 See Chapter 1 for further discussion of these treatises.

21 Balensuela argues that the appearance of the motet *Rex Karole/Leticie pacis/Virgo prius* in the *Ars cantus mensurabilis mensurata per modos iuris* points towards a date after 1375/6. The provenance of this treatise is unknown. However, Balensuela has observed that some attributes of the treatise, such as the musical examples, may point towards Italian and specifically Florentine provenance. Balensuela, “Introduction,” in *Ars cantus mensurabilis*, ed. and trans. Balensuela, 82–3. The *Tractatus figurarum* is believed to have been written in England and is one of the best sources of information about the theory of complex notations. For many years it was assumed that the treatise had been written by the composer Philippus de Caserta, as a result of Coussemaker’s transmission of an attribution to him in the *Codex Faenza*. In his more recent edition of the treatise, Philip Schreur suggests that its authorship is in fact unknown. Philip E. Schreur, “Introduction,” in Anonymous, *Tractatus figurarum*, ed. and trans. Schreur, 2–5.
The Notational System of the *Tractatus figurarum*

Following contemporaneous custom, the author of the *Tractatus figurarum* begins his discussion of notation by introducing the basic noteshapes—the duplex longa ♭, longa ♯, breve ●, semibreve ●, and minim ♩. He also describes semiminims ♦ (called “imperfect” minims) that are worth three-quarters of a minim. This means that four semiminims sound in the time of three minims: MMM = YYYY. These notes are distributed into the four prolations, i.e. the four ways of organizing minims and semibreves into duple and triple units. Where tempus is perfect, an unsigned breve may contain three semibreves; where tempus is imperfect, it will contain two semibreves. Similarly, where prolation is major, an unsigned semibreve may contain three minims; where prolation is minor, it will contain two minims. Minim equivalence occurs when the minim is stable and determines the length of every other note. This relationship is depicted in Figure 2. Breve equivalence occurs when shorter notes vary in duration to accommodate a steady breve, as can be seen in Figure 3.

---


24 For further discussion of the term “prolation” in the context of the work of the Italian theorist Johannes Vetulus de Anagnia, see: Chapter 2.
Figure 2: The Four Prolations, minim equivalence

Figure 3: The Four Prolations, breve equivalence
The concept of equivalence is particularly important within the theory set out in the
*Tractatus figurarum*, since the author invented new noteshapes to describe the relationship
between shorter notes where breve equivalence is maintained.25

Et licet magistri instruxerunt nos in his figuris ac etiam in quatuor mensuris
principalibus, videlicet in tempore perfecto maioris prolationis et in tempore
imperfecto ipsius, in tempore perfecto minoris prolationis et in tempore imperfecto
ipsius. Tamen non docuerunt quomodo super tempus imperfectum minoris
discantare debere mus perfectum minoris, et e converso, et sic de singulis temporibus
quod clare singulariter inferius patebit.

Granted the masters instructed us in these noteshapes and also in the four principal
mensurations (namely in perfect tempus of major prolation and imperfect tempus of the
same, and in perfect tempus of minor prolation and imperfect tempus of the
same), yet they did not teach us how we ought to discant perfect tempus of minor
prolation over imperfect tempus of minor prolation (and conversely), and so on for
the individual tempora that will clearly and individually be shown below.26

The author states that in the past, students were taught the four prolations. However, their
teachers did not explain how these prolations could be sung “super” [over] one another whilst
retaining a stable breve. When black full mensural notes are written, the author assumes that
minim equivalence is maintained. However, special noteshapes or coloration become
necessary where breve equivalence occurs.27

The author begins his discussion with void notation,28 which is here synonymous with
red notation. Typically, red notation is used to write imperfect notes in a passage where black

25 Stone has argued that novel noteshapes were introduced in this way for the purpose of signing the new mensural relationships that arose out of the mingling of the breve equivalence of the Italian *trecento* system and the minim equivalence of the fourteenth-century French system. Stone, “Che cosa c’è di più sottile riguardo L’Ars subtilior?” 17.


27 Arguably, the idea that different mensurations may be superimposed is similar conceptually to the principle outlined in Vetusl’s *Liber de musica*, whereby different divisions may be “mixed” together. However, Vetuslus achieves this by using a minimal counting unit—a durational atom. I discuss this practice further in Chapter 2.

28 A black full semibreve ♦; a void semibreve ∗.
notes may be perfect. Figure 4 provides examples of this kind of coloration, adapted from the *Libellus practice cantus mensurabilis*, a widely transmitted fourteenth-century theoretical treatise associated with the theorist Jean des Murs.\(^{29}\) In the first example of Figure 4, black breves are perfect, containing three semibreves; red breves are imperfect, containing two semibreves. Black and red semibreves are equal in length. Similarly, in the second example, black semibreves are perfect, containing three minims; red semibreves are imperfect, containing two minims. Here, black and red minims are equal in length. The earliest instantiation of this kind of coloration, referred to as “color of imperfection” occurs in Philippe de Vitry’s motet *In nova fert*, copied in *Pn1#6*, f. 44v. Color of imperfection was used commonly in practice throughout the fourteenth century.

Figure 4: Red coloration as it is discussed in the *Libellus*\(^{30}\)

\(^{29}\) The authorship of this treatise is unknown. However, it includes many ideas that are derived from des Murs’s theory, even if he played no part in the compilation of the treatise itself. Anonymous, *Ars practica mensurabilis cantus secundum Iohannem de Muris: Die Recensio maior des sogenannten ‘Libellus practice cantus mensurabilis,’* ed. Christian Berktold (Munich: Verlag der Bayerischen Akademie der Wissenschaften: in Kommission bei der C.H. Beck’schen Verlagsbuchhandlung München, 1999), 48–50.

\(^{30}\) Reverse coloration, i.e., a change from perfect to imperfect *tempus* was also condoned in fourteenth-century theory, but in practice color of imperfection is much more common. Anna Zayaruznaya, “The Making of Philippe de Vitry,” (draft).
In the *Tractatus figurarum*, the author expands on the possibilities afforded by color of imperfection to incorporate what Bent has termed “coloration for proportional change.” This occurs when minim equivalence is absent, and a proportional relationship exists between notes of different coloration types. The most common subset of this kind of notation, which Bent terms “sesquialtera” coloration, occurs when there is a 3:2 proportion between the spans of black minims and red or void minims, as is shown here: $\frac{3}{2}$. In the *Tractatus figurarum*, the author applies this principle of coloration to every simple note, theorizing *sesquialtera* coloration on every level of the mensural hierarchy. The relationship between void and black notes is illustrated in Figure 5. The author further elucidates that although void notes may be regarded as proportional to black notes, they may also be derived arithmetically, i.e., a void note may be formed through the removal of one-third of the value of a black note. This process of deriving void notes from black notes is distinct conceptually from the principle of coloration described in the *Libellus*, whereby red notation is said to result in a change of mensuration. As I will outline in further detail below, the anonymous author of the *Tractatus figurarum* also applied the principle that notes can be derived either arithmetically or proportionally to his system of special noteshapes. This enabled him to justify conceptually the theorization of a wide variety of rhythmic possibilities.

---

31 Margaret Bent, “The Old Hall Manuscript: A Paleographical Study” (PhD diss., Cambridge University, 1969), 217. Bent distinguishes color of imperfection from color for proportional change on the grounds that minim equivalence is present in the former, but absent in the latter. Margaret Bent, “Principles of Mensuration and Coloration: Virtuosity and Anomalies in the Old Hall Manuscript,” unpublished draft, 5. I thank Margaret Bent for sharing this ahead of publication.


33 “Unde si in aliquo cantu reperiantur longe negre, rubee vel vacue: negre sunt modi perfecti et rubee vel vacue sunt modi imperfecti.” Anonymous, *Ars practica mensurabilis*, ed. Berktold, 48. [If in any song black, red, or void longae are found, black [longae] are of the perfect modus and red or void are of the imperfect modus.]
In the *Tractatus figurarum*, each void note is compared with its black mensural equivalent “cum proprietate” [with propriety], and is said to be worth two-thirds of the value of a black note of the same form. Although the author always measures each note in relation to a black mensural note in perfect *modus*, *tempus*, and major prolation, the combination of all void notes would result in the creation of a parallel mensuration, also perfect in *modus* and *tempus*, and major in prolation, but in which each note was two-thirds of the length of a black mensural note. This is similar in concept to the system outlined in Vetulus’s *Liber de musica*, described in Chapter 2, in which two parallel sets of notes are theorized. The first “proper” set of divisions is built up from three minims: a proper minim of the least extension (3 atoms), a proper minim of the lesser extension (4 atoms), and a proper minim of the greater extension (6 atoms). The second “improper” set of divisions is also built up from three minims: an improper minim of the least extension (2 atoms), an improper minim of the lesser extension (3 atoms), and an improper minim of the greater extension (4 atoms). Vetulus’s improper and proper divisions are not an exact equivalent of those of the *Tractatus figurarum*: while the greater and least proper and improper extensions are in *sesquialtera* (3:2) proportion,
the lesser proper and improper extensions are in sesquitertia (4:3) proportion. Nevertheless, there appears to be a parallel between the idea prevalent in both these treatises that an improper set of notes may be derived from a proper set of notes, and that the improper notes will be shorter than and proportional to the proper ones.34

Having established the significance of void notation, the author of the Tractatus figurarum provides a complete and systematized collection of special noteshapes (primarily dragmae ⊡ and caudated semibreves ⊠), that are changed through coloration, half-coloration, and the addition of flags to create a variety of durations. To use Jason Stoessel’s term, they are introduced initially as “arithmetic” noteshapes.35 Arithmetic noteshapes are formed through the addition of the duration of two notes to one another to create a “composite” note.36 This manner of deriving a note can be contrasted with proportional noteshapes that are formed when a group of minims equivalent to a breve unit is replaced by a different number of dragmae, resulting in the superposition of different mensurations. Stoessel makes the general statement that this process arose out of a desire to write the newfound proportionality that was prevalent in fourteenth-century art.37

The notational system of the Tractatus figurarum is logical: the disposition of stems, coloration, and flags add together to determine the duration of a note. The sum of the top

34 Further links are present between the transmission of these two treatises because the partial copy of Vetulus’s “Quid sit prolatio” appears beside the partial copy of the Tractatus figurarum in the fifteenth-century manuscript Cid39, ff. 122r–123v. Schreur, “Introduction,” in Anonymous, Tractatus figurarum, ed. and trans. Schreur, 29.


36 Stoessel has argued that arithmetic noteshapes are found most commonly in the compositions of Matheus de Perusio found in MOe5.24. Stoessel, “The Captive Scribe,” 230–1. For a discussion of the different types of dragmae, see: Jason Stoessel, “Symbolic Innovation: The Notation of Jacob de Senleches,” Acta musicologica 71, no. 2 (1999), 152–4.

and the bottom halves of each note determines its length. For example, in Table 1 the half-colored semidragma with lower flag in row 6 is worth 1.5 minims. This is because it is worth the duration of its upper and lower halves combined, that is a minim plus a void semiminim. The void semiminim is worth two-thirds of the full semiminim. Since the full semiminim is worth three-quarters of a minim in duration, the void semiminim is worth half a black full minim. This system may be contrasted with the many repertorial examples in which the durations of notes must often be determined by context, not by shape alone. Table 1 lists all of the noteshapes employed in the *Tractatus figurarum*, comparing these with black mensural notation.38

Table 1: Composite noteshapes in the *Tractatus figurarum*39

<table>
<thead>
<tr>
<th>Composite noteshape</th>
<th>Composite parts</th>
<th>Duration in minims</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>†.</td>
<td>.†.</td>
</tr>
<tr>
<td>2</td>
<td>†</td>
<td>†††</td>
</tr>
<tr>
<td>3</td>
<td>†</td>
<td>†††.</td>
</tr>
<tr>
<td>4</td>
<td>†</td>
<td>†††.</td>
</tr>
<tr>
<td>5</td>
<td>†</td>
<td>††††</td>
</tr>
<tr>
<td>6</td>
<td>†</td>
<td>†††</td>
</tr>
</tbody>
</table>

38 This arithmetic process is also illustrated by the practice of dotting. Two kinds of dots are described in the *Tractatus figurarum*. Like the dots of addition in standard fourteenth-century theory, the author’s dot of addition adds one half of the value of a note to itself, resulting in the perfection of the note. However, the author associates the dot itself with a note that is half of the duration of the dotted note. This enables him to theorize a dotted perfect semibreve worth four minims. He also describes a hollow dot, which adds the value of a void semiminim (half of a minim) to the duration of any note it follows. Anonymous, *Tractatus figurarum*, ed. and trans. Schreur, 78–9, 83.

39 Schreur describes these notes in the following: Schreur, “Introduction,” 15–20. A table of these arithmetic noteshapes can also be found in Stoessel, “The Captive Scribe,” 227.
The relationships between the noteshapes of the *Tractatus figurarum*, contextualized within the four prolations, are depicted in Figure 6 below. In column 1 of the figure, the four basic mensurations in simple black notes are shown. Since minim equivalence is assumed between each black mensural note, the duration of all black mensural notes is fixed: perfect semibreves are always the same in duration. They are longer than imperfect semibreves by one minim. The breves in column 1 vary in duration depending on the number of minims that they contain. For example, a breve under \( \circ \) is worth nine minims, 1.5 times the length of \( \circ \) or \( \circ \) breves, which are six minims in duration. In the rows, breve equivalence is maintained. Special noteshapes facilitate the writing of different mensurations whilst retaining breve equivalence. Although some notes may be used to express more than one mensuration—such as the \( \frac{1}{2} \), which can be used to write the four notes of \( \circ \) in the time of the six minims of either \( \circ \) or \( \circ \), or six notes in the time of nine under \( \circ \)—they nevertheless each imply a particular kind of proportion. In this case, the timespans represented by the black full minims and the half-colored, single-flagged semidragma depicted here \( \frac{1}{2} \) are in subsesquialtera \((2:3)\) proportion with one another.

Figure 6: Superimposed mensurations using noteshapes

<table>
<thead>
<tr>
<th>Breve equivalence</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minim equivalence</td>
<td>1</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
</tr>
<tr>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
</tr>
<tr>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
</tr>
<tr>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
</tr>
<tr>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
</tr>
<tr>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
</tr>
<tr>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
<td>( \circ )</td>
</tr>
</tbody>
</table>
The epilogue to the *Tractatus figurarum* contains the most comprehensive account of *traynour* in fourteenth-century music theory.\(^{40}\) Aside from this source, the only other theoretical treatise that uses a variant of the term *traynour* is Tewkesbury’s *Quatuor principalia* (to be discussed below). *Traynour* is thus discussed very infrequently by music theorists. In the Seville copy of the *Tractatus figurarum*, the scribe provides an extended list of examples that illustrate how *traynour* could be applied in practice.\(^{41}\) The scribe includes a tenor in breves in each of the four prolations, above which a cantus is written using the special noteshapes that are theorized earlier in the manuscript. He uses these notes to create proportional conflict with a tenor, though only implicitly, since the tenor of each example is written only in breves. Without the shorter note values of the tenor, its subdivision into semibreves and minims is imagined. For example, in Figure 7, two half-colored caudated semibreves with a flag are written in the time of a breve in perfect tempus and major prolation. As Table 1 shows, these caudated semibreves are formed from the combination of a dotted perfect semibreve (worth four minims) and a void semiminim (worth half of a minim). This creates an implicit *subsesquialtera* (2:3) proportional relationship between the timespans represented by the perfect semibreves and the two caudated semibreves. Perfect semibreves each contain three of the minims depicted in Figure 7. In conjunction with the half-colored single-flagged semidragma \(\uparrow\), these notes can be used to write imperfect tempus with minor prolation \(<2,2>\) in the time of perfect tempus with major prolation \(<3,3>\).

---

\(^{40}\) Schreur, “Introduction,” 20–1.

\(^{41}\) See 5.2.25
The conclusion of the *Ars cantus mensurabilis mensurata per modos iuris* also provides examples in which *tempus* and prolation differ between voices. The author achieves this by using mensuration signs as well as special noteshapes. As was the case in the *Tractatus figurarum*, the dragmae of this text are worth two “perfect” minims (i.e., black full minims). Void minims are said to be “imperfect”; four sound in the time of three black full minims. The author complains that some scribes write three of these imperfect minims in the time of four erroneously. Just as black full dragmae are worth two black full minims, void dragmae are worth two void minims. Two void semiminims sound in the time of a black full minim, and three double-flagged semidragmae sound in the time of two black full minims.

The system of notation set out in the *Ars cantus mensurabilis mensurata per modos iuris* presents a less standardized picture than that of the *Tractatus figurarum* because noteshapes may represent different durations in different contexts. It is possible that this occurred because

---


43 The durations represented by black full minims are at times in *sesquitertia* (4:3) proportion with void minims, or at others *sesquialtera* (3:2). Similarly, four semiminims sometimes appear to be written for three minims, but also at sometimes three semiminims for two minims. At times, the durations of black full breves are in *sesquialtera* (3:2) proportion with those represented by void breves, but at others in *dupla* (2:1) proportion.
the author of the *Tractatus figurarum* theorized a way for writing *traynour* that was systematized *a priori*, whereas the author of the *Ars cantus mensurabilis mensurata per modos iuris* utilized examples from fourteenth-century repertory. That the writing of special noteshapes should be less standardized in practice compared to theory may arise in part because multiple notes are visually grouped together during performative reading. In practice, it is not necessarily the individual shape of a note alone, but also the patterns that notes form that influence a performer’s experience of reading. Here, as is the case in the examples from repertoire shown below, context plays an important role in determining the duration of a note.  

*Guido’s Or voit tout en aventure*

*Guido’s Or voit tout en aventure* is copied on f. 25v of *Ch564* and is one of the most discussed examples of seemingly notationally complex songs. The song is notable for its use of three different noteshapes—\(\text{H} \), \(\text{E} \), \(\text{Y} \)—all of which sign the same duration, i.e., one-twelfth of a breve. A simple dragma \(\text{D} \) is also used, which is equal in duration to the minim \(\text{M} \), i.e., one-sixth of a breve. The caudated semibreve \(\text{N} \), worth four minims, is also used at times. Having chosen to include special noteshapes in his composition, Guido complains about the displeasing new figures with which composers are expected to write music in the text of his song, and states that these are applied by “chance.” He claims that this new style is contrary

---

44 Recall that a similar pattern was found in the application of the greater, lesser, and least divisions in the theory of Johannes Vetus versus that of the anonymous author of the *Rubrice brevis* discussed in Chapter 2.

45 This song was the subject of Ursula Günther’s seminal article in which she coined the term *ars subtilior*. However, as Günther notes, it is by no means one of the most notationally complex songs copied in *Ch564*. Günther, “Das Ende der Ars Nova,” 108.

46 While this note is equal in duration to the minim phenomenally, it is also conceptually equal to 1.5 minims. This is because the simple dragma always appears accompanied by a semidragma to represent an iambic rhythmic gesture, a pattern that I will suggest implies imperfection.
to the “perfect” and “good” art of Philippe de Vitry that went before, and is associated with the disorder of the Marchettan style. In the last stanza, the narrator states that nothing in Marchetto of Padua’s system can be perfected, and that the figures “traire” [draw] and “trayt [drag] the eye away from the good manner.”

Günther, Stone, and Stoessel have each provided a different reading of the notation of Or voit. These authors’ interpretations of the three figures worth one-twelfth of a breve—\(\frac{1}{12}\), \(\frac{1}{12}\), \(\frac{1}{12}\)—are compared with their arrangement in the original manuscript in Figure 8 below.

Günther writes her edition of the song in 6/8 throughout, with the exception of measures 1 and 10, where she uses two single 9/8 measures to account for what she reads as a

\[\begin{align*}
\text{Or voit tout en aventure} & \quad \text{Now everything is left to chance} \\
\text{Puis qu’[a]insi me convient fayre} & \quad \text{Because it is thus necessary for me} \\
A la nouvelle figure & \quad \text{To write with the new figures,} \\
\text{Qui doit a chascun desplayre.} & \quad \text{Which displeases everyone.} \\
\text{Que c’est tresout en contraire} & \quad \text{It is completely contrary} \\
\text{De bon art qui est parfayt:} & \quad \text{To the good art that is perfect.} \\
\text{Certes ce n’est pas bien fayt.} & \quad \text{Certainly it is not well done.}
\end{align*}\]

\[\begin{align*}
\text{Nos faysons contre nature} & \quad \text{We compose against nature} \\
\text{De ce qu’est ben fayt defayv:} & \quad \text{And thereby destroy that which is done well,} \\
\text{Que Philippe qui mais ne dure} & \quad \text{For which Philippe, who is no longer alive,} \\
\text{Nos dona boin exemplaire.} & \quad \text{Gave us good example.} \\
\text{Nos laissons tous ses afayres} & \quad \text{We leave all his works} \\
\text{Por Marquet le contrafayt.} & \quad \text{Because Marchetto does the opposite.} \\
\text{Certes ce n’est pas bien fayt.} & \quad \text{Certainly it is not well done.}
\end{align*}\]

\[\begin{align*}
\text{L’art de Marquet n’a mesure.} & \quad \text{The art of Marchetto has no measure} \\
\text{N’onques rien ne sant parfayv;} & \quad \text{And never can anything of it be perfected;} \\
\text{C’est trop gra[n]t outrecuidure} & \quad \text{It is too presumptuous} \\
\text{D’ansuir et de portrayre} & \quad \text{To follow and to draw} \\
\text{Ces figures, et tout trair} & \quad \text{These figures, and to drag} \\
\text{L’oull varieus de bon trayt.} & \quad \text{The eye away from the good manner.} \\
\text{Certes ce n’est pas bien fayt.} & \quad \text{Certainly it is not well done.}
\end{align*}\]

lengthening of the measure by one semibreve.\textsuperscript{48} Her method of transcription rests upon the assumption that the song’s prevailing mensuration is imperfect tempus with major prolation. She transcribes the three figures worth one-twelfth of a breve—\(\text{\textbullet} \), \(\text{\textbullet} \), \(\text{\textbullet} \)—as modern sixteenth notes. According to Günther, these notes are superfluous and therefore interchangeable: “Man hätte das Werk […] wesentlich einfacher notieren können, nicht so, daß Gleiches durch die Notationsweise verschieden erscheint”\textsuperscript{49} [One could have notated the work in a manner that is much simpler, so that the same (durations) would not appear different as a result of the way they are notated]. This is reflected in her edition of the song, in which she does not distinguish between the beaming of sixteenth notes.

In contrast to this, Stone distinguishes between semiminims, which appear only in groups of two \(\text{\textbullet} \) \(\text{\textbullet} \) \(\text{\textbullet} \); double-flagged semidragmae, which appear in groups of six (Stone transcribes these in two groups of three \(\text{\textbullet} \) \(\text{\textbullet} \) \(\text{\textbullet} \)); and single-flagged semidragmae, which appear accompanied by simple dragmae in an iambic rhythm \(\text{\textbullet} \) \(\text{\textbullet} \) \(\text{\textbullet} \).\textsuperscript{50} Since semiminims

\textsuperscript{48} There is no indication of this in the notation of the original manuscript. See: Günther, “Das Ende der Ars Nova,” 117–20.

\textsuperscript{49} “In der Übertragung ergibt sich daher oft eine Sechzehntelunterteilung der vorherrschenden 6/8 Bewegung. Den Sechzehnteln der Transkription entsprechen im Original aber drei unterschiedliche Notenformen. Im Faksimile sieht man sie gegen Ende des oberen Systems kurz hintereinander: Es handelt sich um Dragmen, die oben und unten ein Fähnchen aufweisen, und normale Semiminimen und um Dragmen, die nur oben mit einem Fähnchen versehen sind. Letztere erscheinen stets im Wechsel mit einfachen Dragmen, die in der Länge wiederum den Minimen gleichen. Die rhythmisch identischen Oberstimmentakte 3 und 9 konnten daher zum Beispiel unterschiedlich notiert werden, entweder mit Minima oder mit Dragma an letzter Stelle.” Günther, “Das Ende der Ars Nova,” 109. [In the transcription a division of the prevailing 6/8 motion into sixteenth-notes often arises. But the sixteenth-notes of the transcription correspond with three different noteshapes in the original. In the facsimile, one can see towards the end of the uppermost system one after the other: dragmae with upper and lower flags, normal semiminims, and dragmae that are flagged only on the upper stem. The last of these appear constantly in exchange with simple dragmae, which are equivalent in duration to minims. Thus, the rhythmically identical upper voice measures 3 and 9 could, for example, be notated differently. Either with minims or dragmae at the last place.]

\textsuperscript{50} In this she follows Greene, who beams together sixteenth notes into threes where these represent \(\text{\textbullet} \), sixteenth note–eighth note pairs where they represent the iambic rhythm \(\text{\textbullet} \), and sixteenth notes into twos where they represent semiminims \(\text{\textbullet} \). \textit{PMFC}, vol. 18, 80–2.
and double-flagged semidragmae represent the same duration, Stone nevertheless states that these notes are “ridondanti; esse sono temporaneamente equivalenti a una semiminima più una minima, raggruppate in modo tale da implicare una doppia divisione della semibreve” [redundant; temporarily equivalent to a semiminim plus a minim, grouped in such a way as to imply a double division of the semibreve]. She states the scribe’s use of “redundant” notations is emblematic of the irony of the text and the music, which laments the way that new notations are “not well done.” The irony is thus located in the contradiction between the text, which complains about new noteshapes, and the music, which uses them. To this, Jason Stoessel adds a third explanation; that the two semidragmae are distinct in meaning. He groups the double-flagged semidragmae in pairs — and the single-flagged semidragmae into units of three . He agrees with Stone that the text portrays irony. Although he does not explain this explicitly in prose, he groups sixteenth notes together with eighth notes in his edition where they represent semiminims . This implies that, where these semiminims occur, the breve is divided into three parts. To this extent, the way that I envisage the grouping of notes accords most closely with Stoessel’s reading. He edits the song in modern staff notation, but with a mensuration sign in place of a modern 6/8 meter sign.

51 Stone, “Che cosa c’è di più sottile riguardo L’ars subtilior?” 11.

52 Stone, “Che cosa c’è di più sottile riguardo L’ars subtilior?” 11. Tanay also offers an ironic reading of the text. She suggests that the ambiguity of the text—which is located in Guido’s refusal to indicate whether or not he approves of the new style—is characteristic of the ambiguity of humanistic discourse. Tanay, “Between the Fig and the Laurel,” 168.


Building upon these readings, I provide here a new interpretation of the notation and text of Or voit. I suggest that the song itself is not “in” imperfect tempus with major prolation, or $c\,$, at all. Instead, and in keeping with the way traynour is described in the Tractatus figurarum, the individual shapes of notes can project certain tempora and prolations (mensurations). Mensuration is thus inherent within these individual notes, but is not intrinsic to the song as a whole.\footnote{Günther, “Das Ende der Ars Nova,” 117–20; PMFC, vol. 18, 80–2; Stone, “Che cosa c’è di più sottile riguardo L’ars subtilior?” 11; Stoessel, “The Captive Scribe,” 201–4.} This leads me to offer an interpretation in which each of the three figures worth one-twelfth of a breve—\begin{music}\musicchar{n}4, \musicchar{n}4, \musicchar{n}4—aid in projecting a different mensuration to a reader, even in the absence of longer notes that would confirm the distribution of the various time-units of each

\footnote{I discuss this idea further in Chapter 5.}
mensuration in its entirety. Namely, they project imperfect *tempus* with major prolation <2,3>, imperfect *tempus* with minor prolation <2,2>, and perfect *tempus* with minor prolation <3,2>, respectively. These three different ways of dividing the breve into twelve parts are also similar to the three ways of distributing the twelfifold division of the breve of the Italian *trecento*, termed *duodenaria*. Since the notation of *Or voit* tells the reader not only about rhythm, but also provides information about the wider hierarchical relationship between notes, individual shorter notes can help to prepare the reader to transition between the three different ways of dividing the breve.\

Having established a different way of reading the notation of *Or voit*, I also suggest that a new way of understanding the irony of this piece may be considered. As H. P. Grice has observed, irony can be defined as a statement in which the speaker says something that is untrue to an audience who knows that what has been said is false. The speaker does this in order to convey another proposition that is not stated directly. As I will show, the text of *Or voit* is ironic because it gives the appearance of being derisive of its own nonsensical notation, whereas in reality the notation is logical. The narrator thus falsely claims to disapprove of the notation, which in reality is precise and efficient. I suggest that the joke would have been apparent to a medieval audience because they would have appreciated the unique senses conveyed by the three notes that represent the same duration. In the case of Guido’s *Or voit*, this is made particularly likely, since *Dieu gart*—also composed by Guido—is notated very

57 Karen Cook has suggested that two kinds of semiminim are used in Binchois’s *Mon seul et souverain desir* to project differing prolations: black full semiminims sign perfect *tempus* with minor prolation <3,2> and void (hollowed-out) semiminims sign imperfect *tempus* with major prolation <2,3>. Karen M. Cook, “A New Reading of Binchois’s *Mon seul et souverain desir*” *Plainsong and Medieval Music* 24 (2015), 167–88.

58 I discuss this concept, which is termed “metric preparation” in modern parlance, in further detail in Chapter 5.

similarly, and is copied on the recto of the same folio.\textsuperscript{60} If we conjecture that a reader (or a group of readers) might have even been leafing through \textit{Ch564} and trying out the songs in order, they would have already practiced reading a notational system that is very similar to that of \textit{Or\ voit}.

Figure 8 shows that each of the three notes worth one-twelfth of a breve are used only in the context of specific patterns. The double-flagged semidragma \( \downarrow \) appears in groups of six, summing up to the duration of one semibreve. The single-flagged semidragma always occurs accompanied by a dragma in groups of two or four \( \uparrow \uparrow \downarrow \downarrow \). Although simple dragmae \( \uparrow \) are equal in duration to minims, the pattern implies that each half-perfect semibreve unit is worth three single-flagged semidragmae \( \downarrow \). From this, I intuit the implicit existence of a perfect note worth half of a perfect semibreve, or 1.5 minims. The simple dragma itself is a logical candidate for this: \( \uparrow = \uparrow \downarrow \downarrow ; \uparrow \uparrow = \uparrow \downarrow \downarrow \downarrow \). Not only does the pattern \( \uparrow \uparrow \) imply imperfection, but simple dragmae are commonly described in music theoretical texts and utilized in repertory to depict a duration worth 1.5 minims.\textsuperscript{61} This duple division of the semibreve results in quadruple

\textsuperscript{60} \textit{Ch564}, f. 25r.

\textsuperscript{61} According to the author of the second Berkeley treatise, the duration of this dragma \( \uparrow \) is calculated from the sum of its two constituent parts, i.e., its upper and lower stems. The upper stem “lightens” the note, i.e., removes part of its value. This means that a semibreve \( \uparrow \) becomes shorter through the addition of an ascending stem; it becomes a minim \( \downarrow \). The lower stem, on the other hand, makes the note “heavier” by one half, i.e., it adds half of the duration of the minim to itself, resulting in a note which is 1.5 minims in duration. Anonymous, \textit{The Berkeley Manuscript}, ed. and trans. Ellsworth, 126–9. Sources that write of a simple dragma worth 1.5 minims include the \textit{Compendium totius artis motetorum}, edited in Johannes Wolf, “Ein anonymer Musiktraktat aus der ersten Zeit der ’Ars Nova,’” Kirchenmusikalisches Jahrbuch, vol. 21 (1908), 36; Anonymous X, “De minimis notulis,” in \textit{Scriptorum de musica Medii Aevi}, ed. de Coussemaeker, 414; de Leno, \textit{Regulae de contrapunto}, ed. Seay, 31; and Vitriacan \textit{Ars nova} witnesses, such as: Anonymous, \textit{Philippi de Vitriaco Ars nova}, ed. Gilbert Reaney, André Gilles, and Jean Maillard, Corpus scriptorum de musica, vol. 8 (American Institute of Musicology, 1964), 65.
division of the breve into two semibreves each worth two simple dragmas, i.e., imperfect tempus with minor prolation $<2,2>$.\(^{62}\)

Lastly, as Figure 8 shows, a tripartite division of the breve into three parts (perfect tempus with minor prolation or $\odot$) is also found within the song, and is associated with the semiminim ♩. This can be established because the semiminim appears in conjunction with the caudated semibreve ♩. The caudated, or major semibreve ♩ is worth four minims or two imperfect semibreves, implying that the breve is no longer divided into two perfect semibreves, but instead three imperfect semibreves, each worth two minims. Since the semiminim is associated with perfect tempus and minor prolation, it arguably projects this mensuration, even in sections where the breve is not (yet) divided explicitly into three imperfect semibreves. Consider, for example, the two extracts transcribed in Figure 9. The first occurs in the contratenor in the A section, and the second in the cantus in the B section.

In the first extract, the two semiminims imperfect the breve by removing a duration equal to one minim from it, as depicted by the numerals above the notes. The breve is thus worth five minims. Because the semiminims project perfect tempus with minor prolation, the rhythm $\Rightarrow\Rightarrow\Rightarrow$ preempts the triple division of the breve that occurs via the red coloration $\bullet\bullet\bullet$ that follows. In the second extract, a similar rhythm is notated with a caudated semibreve (worth four minims) followed by two minims $\bullet\bullet\bullet\bullet$. In both instances, the rhythm preceding the coloration implies the threefold division of the breve, preparing the transition into the three colored semibreves. The semiminims, seemingly redundant and exchangeable with the two semidragmas, arguably help the reader to transition into the new triple division of the breve.

\(^{62}\) Guido’s Dieu gart also arguably features imperfect dragmas. The notation of this song is similar to that of Or voit, with the exception that there are no semiminims. Instead, the double-flagged semidragma ♩ alone takes on the role of depicting the duple division of the minim. The single-flagged semidragma often appears with the dragma depicting a trochaic rhythm $\bullet\bullet\bullet\bullet$. Two single-flagged semidragmas also appear at the opening of Dieu gart unaccompanied by dragmas, and appear to be depicting the duple division of the minim, similar to the double-flagged semidragmas.
By including seemingly redundant noteshapes, the author of *Or voit* is thus able to present a singer with much more information than a durational reading of these notes as medieval equivalents of sixteenth-notes can. The seemingly redundant shapes project both duration and mensuration, and thus provide a singer with information about the subdivision of longer notes. This supports Stone’s assertion that a more appropriate name for notationally complex songs such as *Or voit* than the *ars subtilior* [more subtle art] is the “l’arte più precisa” [the more precise art]. Figure 10 represents visually the three ways of dividing up the breve using noteshapes.

Figure 9: Semiminims in context

![Figure 9: Semiminims in context](image)

Figure 10: Notation of *Or voit*, three mensurations

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

63 Stone, “Che cosa c’è di più sottile riguardo L’ars subtilior?” 9.
That these notes should sign different tempora and prolation supports a reading of the text, I would suggest, in which a pun on the term traienour is used. Stoessel has argued that the term traienour was derived from the French trainer.⁶⁴ In the text of the poem, the term traire is used to describe a process of drawing the eye away from “the good manner.”⁶⁵ However, the use of figures in Or voit is also comparable to traienour as it is described in the Tractatus figurarum, i.e., as a process of visually distinguishing contrasting superposed mensurations.

Another aspect of the text that bears note is the narrator’s assertion that “Marchetto’s art” lacks “measure.” Here Guido references Marchetto of Padua’s theoretical division of the breve into up to twelve parts, as outlined in the Pomerium (c. 1319).⁶⁶ Stone has argued that this refers to the Italian notational system, in which breve equivalence results in varying durations of minimal noteshapes. This can be contrasted with the French system, in which minim equivalence determines the length of all other notes. This means that the duration of semibreves in Italian music varies, while the duration of the breve remains the same.⁶⁷ Taking this reading further, the notation of the song—which sees the breve divided into twelve parts in three different ways—is comparable to the so-called duodenaria [twelfth] division of the breve.⁶⁸ In the theoretical system set out in the Pomerium, the twelve semibreves that make up

---

⁶⁴ Stoessel, “Symbolic Innovation,” 138. Günther translates the term traire into German as “umformen” [to transform] or “übersetzen” [to translate]. She suggests that this section of the poem refers to the process of transferring noteshapes from the French to the Italian system, and thereby corrupting them. Günther, “Das Ende der Ars Nova,” 108.


⁶⁶ See Chapters 1, 2, and 3 for more detailed discussion of Marchetto’s theory.

⁶⁷ Stone, “Che cosa c’è di più sottile riguardo L’ars subtilior?” 13.

⁶⁸ In the Pomerium, Marchetto writes explicitly about only one of these—the perfect division of the breve into three semibreves (marked red in Figure 11 below). However, the remainder of these divisions can be extrapolated from his theoretical system, in which all the various permutations of twofold and threefold note groupings are condoned. One distinction between Marchetto’s twelfofold divisions of the breve and the system of Or voit is that Marchetto’s imperfect breve is 2/3 the duration of his perfect breve. As such, the division of this breve into twelve parts, which he mentions briefly, would be shorter than its perfect equivalent. da Padova, Pomerium, ed. Vecchi, 170.
the breve do not have to be distinguished visually from each other; all can be notated as simple lozenges •. The duration of each note is ascertained by means of knowledge of the patterns of the via naturae [way of nature]. Stems are added only for clarification of rhythms that deviate from this rule: the via artis [way of artifice]. In Or voit, on the other hand, Guido does distinguish between these three duodenaria divisions of the breve notationally. I compare the noteshapes of Or voit with the undifferentiated semibreves of Marchetto in Figure 11:

Figure 11: The three duodenaria divisions of Guido’s Or voit compared to Marchetto’s undifferentiated semibreves

<table>
<thead>
<tr>
<th>Three duodenaria divisions with undifferentiated semibreves</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="" /></td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The notation of Guido’s Or voit as three duodenaria divisions</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2" alt="" /></td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>[•]</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
<tr>
<td>•</td>
</tr>
</tbody>
</table>

Again, this reading supports an interpretation in which the text projects irony. The first few lines of the song state: “Now everything is left to chance, because it is thus necessary for me to write with the new figures, which displeases everyone.” However, the notation of the

---

69 See Chapter 1.
song leaves little to chance, and is instead far more prescriptive than would at a first glance appear to be necessary. Written via artis, with additional stems, the song is indeed “compose[d] against nature,” that is contrary to Marchetto’s via naturae, whereby no stems are appended to semibreves because they are interpreted by means of a pattern that is known prior to reading the notation of a song.\textsuperscript{70} The text of \textit{Or voit} is thus ironic insofar as it complains about the incomprehensibility of complex notations, even though its own complex notational system is wholeheartedly coherent.

\textbf{Syncopation}

Unlike \textit{traynour}, syncopation was discussed widely by fourteenth-century theorists.\textsuperscript{71} It is often described as a “divisio” [division] of a perfection or imperfection by means of a mediating note that displaces is parts. The parts of the divided perfection are “reducitur” [reduced or led back] to complete the perfection. Consider, for example, the following definition of syncopation from the \textit{Libellus}:

\begin{quote}
Unde sincopa est divisio circumquaque figure per partes separatas, que numerando perfectiones ad invicem reducuntur; et potest fieri in modo, tempore et prolatione.\textsuperscript{72}

A syncopation is a division on every side of a figure by separate parts; these perfections are reduced to one another by numbering. And this can be carried out in \textit{modus}, \textit{tempus}, and prolation.
\end{quote}

\textsuperscript{70} Stoessel offers an alternative interpretation. He states: “The text of \textit{Or voit tout en aventure} could equally describe the plight of a French composer wishing to extend his notation beyond the confines of his indigenous notation, thereby seeking to reproduce the freedom apparent in Italian music’s division of time” Stoessel, “Symbolic Innovation,” 139.

\textsuperscript{71} For concise descriptions of syncopation as they occur in mensural music, see: Deford, \textit{Tactus, Mensuration, and Rhythm}, 42–4.

\textsuperscript{72} Anonymous, \textit{Ars practica mensurabilis}, ed. Berktold, 65.
In keeping with contemporaneous sources, the author describes syncopation as a division of a perfection whose parts are “reduced to one another,” or regrouped, by “numbering.”

At times, this process of numbering is described using the term “computo -are,” [to compute, reckon, or sum up], emphasizing the process of counting parts of the perfection that a musician undertakes as they navigate a syncopation.

Figure 12 shows an example of a syncopation from the *Ars cantus mensurabilis mensurata per modos iuris*. The author states that this is extracted from the motet *Ida capillorum/Portio nature/Ante tronum.* In the figure, the numerals indicate a duration equivalent to one minim. Syncopation is achieved here through the insertion of a dot to prevent imperfection of the first semibreve of the extract. The minim that follows this semibreve cannot imperfect the semibreve that follows it, due to the rule *similis ante similem*. According to this rule, if two notes of the same kind, such as two semibreves, are juxtaposed where prolation is major, the first has to be perfect. The second can be imperfected (reduced in length by one-third), providing that it is not followed by another semibreve. I provide a transcription for reference.

---


74 “Unde sincopari dico quando reducciones aliquarum notarum diversarum ab invicem et distancium ad invicem fiunt earum perfeciones computando.” “For I use the term “syncopation” when reductions of some various notes—proximate to each other and remote from each other—are made by reckoning their perfections.” Anonymous, *The Berkeley Manuscript*, ed. and trans. Ellsworth, 132–3.

In Figure 12, all of the semibreves are perfect, including the fifth, which is followed by a dot of addition that prevents imperfection. The second semibreve thus divides the perfect semibreve (3 minims) and imperfect breve units (6 minims). As the author tells us, the first minim of the passage is thus grouped together (reducitur) with the minim rest and the minim that follow the syncopation. Together, they fill out the perfection, as is illustrated by the lower box of Figure 12. The composer further emphasizes this by placing a dot after the rest, which prevents alteration of the final minim. Syncopations of the type shown in Figure 12 are ubiquitous in repertory of the fourteenth and fifteenth centuries. Much of the time, they are inserted in exactly the same way as the example shows: a rest or note results in the division and displacement of part of a perfection that is subsequently resolved and regrouped.

In the context of theoretical descriptions of syncopation, the term “reductio” [leading back] refers, I would suggest, to the thought process that a musician must undertake in order to process a syncopation. The musician must retain in their memory the first part of a divided perfection.
perfection and lead the separated parts of the perfection back together in order to locate the boundaries of perfections. This results in a pattern of reading that incorporates the observation of extended passages of music notation.

*Syncopation and Coloration*

In other examples, syncopations are combined with coloration and special noteshapes, resulting in a notational texture in which the disparate parts of syncopated perfections are inscribed visually onto the folio. The practice of using color to delineate the parts of a perfection is outlined by the author of the Vitriacan *Ars nova* witness copied in *Vat307*, as follows:

Rubeae aliquando huc illuc in balladis, rondellis et motetis ponuntur, quia reducuntur ut ad invicem possint cum alis perfectionibus computari, ut in Plures errores.\(^{78}\)

Red notes are sometimes placed here and there in ballades, rondeaux, and motets because they are reduced to one another and can be summed up with other perfections, as in *Plures errores*.

As the author explains, red coloration may be used to indicate that notes are “reduced” or “led back” to one another. As we will see, this practice was applied to a range of types of colors and noteshapes in the repertory. These notations, I suggest, aid a reader, who can identify the interplay of disruption and regrouping of perfections by grouping together noteshapes that match one another in color and shape.\(^{79}\) It also inscribes important moments of alignment between voices visually.

---


\(^{79}\) Jason Stoessel has argued that visual demarcation of perfections in Senleches’s *En attendant esperance*, to be discussed below, would have aided a performer. Stoessel, “Symbolic Innovation,” 142.
That coloration and special noteshapes can make visible the disparate parts of divided perfections serves to highlight that syncopation and *traynour* cannot at times be separated from one another: red coloration may be used to facilitate the writing of perfect *tempus* with minor prolation <3,2> in the time of imperfect *tempus* with major prolation <2,3>; at the same time, such coloration also arguably displaces—and thus syncopates—the semibreve units of imperfect *tempus* with major prolation. *Traynour* may thus at times be seen as a subset of syncopation, one that creates displacement between more than one layer of notes by means of the superposition of two different mensurations.80

Similarities between syncopation and *traynour* were also observed by a handful of late-medieval theorists. The author of the *Tractatus figurarum* states that *traynour* is a “fortior,” a “more energetic” manner than syncopation.81 It is possible that this statement refers to the fact that *traynour* results in the syncopation of multiple layers simultaneously. *Traynour* may thus be seen to be “stronger” than a simple syncopation of the kind seen in Figure 12. In his *Quatuor principalia*, Book IV (1351), Tewkesbury also conflated the two, devoting a section to an attack on syncopation, which he also terms *treyns*.82 This practice, he claims, entails the

---

80 In her analysis of Matteo da Perugia’s *Le greygnour bien*, Maria Teresa Rosa Barezzani terms this phenomenon a “doppia sincopazione,” [double syncopation] where “gli elementi che costituiscono le *partes separatae* risultano dissociati nella colorazione” [the elements that comprise the separate parts (of the syncopation) are written in a different color]. Maria Teresa Rosa-Barezzani, “Una rilettura di *Le greygnour bien* di Matteo da Perugia,” *Philomusica* 1, no. 1 (2001). Cohn explains the relationship between syncopation and hemiola-type dissonances as follows: “A hemiola-type substitution engages many of the same phenomenological processes as a syncopation, but its structure is quite distinct, as is the environment in which it can arise. Substitution of period-equivalent pulses is situationally unconstrained; it can apply to a pulse of any speed, in any meter, at any moment. By contrast, the only pulse that can be replaced by a pulse of different periodicity is one that participates in two different classes of adjacent minimal meter, one duple and one triple. The replacing pulse also adjoins a duple and triple meter, but permutes their order, exchanging ⟨3 2⟩ and ⟨2 3⟩.” Cohn, “Meter,” 223.


82 Like the word *traynour*, this appears to be a further variant of *traire*. Schreur, “Introduction,” 20.
uttering of four minims in the time of three. Commonly, four semiminims are sounded in the time of three minims in later Italian sources in order to account for the eightfold and twelvefold divisions of the breve, termed octonaria and duodenaria, respectively. Tewkesbury is derisive of this practice, which is impossible in his system, since the minim by its very nature is indivisible. He states that the resulting rhythm from the superposition of minims and semiminims would either leave a minim to spare, or create a treyns or syncopation that is impractical to perform.

---

83 “Quod tres minimae non aequipollent quatuor et de sincopis et treyns. Unde notandum quod quandocunque quatuor minimae separatim pronuntiantur quae a multis semiminimae vel crochutae aut dragnae nominantur, aequipollent brevi imperfectae de minori prolotione. Si enim tres aequaliter pronuntiantur, semibrevi de majori prolotione aequipollent. Tamen multi credunt unam esse mensuram, cum quis quatuor distinctas pronuntiatis minimas, dummodo alius pronuntiat tres; in hoc enim decepti sunt, quia ratio eis contradicit, cum aequipollentia inter illas non est nec etiam talis aequipollentia in longis nec in brevibus, nec in semibrevis inventur […]. Nam si ille idem in tanta velocitate tres pronuntiaret minimas quemadmodum et quatuor, aut remaneret pausa unius minimae, aut una illarum trium foret minor duas minimae continens, et hoc patet potest hujus scientiae expertero et nulli alteri, quia tam velociter minima pertransit, ut ejus morula a multis non recordatur; et ideo credunt quatuor aequipollere tribus, Judicantibus per auditum aequipollentiam inter predictas minimas fore, dict Boycius. Non omne judicium auribus dandum est, sed ratione quae falli non potest. Aequipollentiae enim supradictae atque reductiones musicam pronuntiandi difficultates causant; quae quidem difficiat, tractus gallice treyns, et sincope a multis nominantur.” “That Three Minims are not Equal to Four, and on Syncopation and treyns. It must be noted that whenever four minims (which are named by many ‘semiminimae,’ ‘crochute,’ or ‘dragme’) are pronounced separately, they are equal to an imperfect breve of minor prolation. If three minims are pronounced equally, they are equal to a semibreve of major prolation. Many believe the measure to be one when someone pronounces four distinct minims the way another pronounces three. In this, they are deceived, for reason contradicts them, as these minims are not equal, nor are the longae, or breves, or semibreves […]. For if he pronounced three minims with the same velocity as four, there would remain a rest of one minim, or one of those three would be a lesser [semibreve] containing two minims. And thus it can be shown to a person who is experienced in this branch of knowledge (and to no other) that the minim passes with such velocity that its short span of time is not remembered by many; and on that account they believe that four are equal to three. To those who judge by ear that the aforesaid minims are equal, Boethius says: ‘Not every judgement is to be given to the ear, but to reason, which cannot falter.’ The above said equivalence and reductions cause difficulties in pronouncing music; these difficulties are named ‘tractus,’ by the French ‘treyns,’ and ‘syncopations’ by many.” Aluas, “The ‘Quatuor Principalia Musicæ,’” 455, 703 (modified).

84 See, Chapter 1.

Syncopation and *traynour* are commonly combined in late-medieval notationally complex repertory; the notation itself aids the reader in navigating such intricate passages. I clarify this process with an example from Antonio Zacara da Teramo’s *Sumite karissimi*. Copied on ff. 11v–12r of MOe5.24, *Sumite karissimi* is regarded as one of the most rhythmically intricate examples of later medieval repertory, and is replete with syncopations. Despite the rhythmic challenges presented by *Sumite karissimi*, its notational makeup is relatively conventional and uncomplicated in comparison with other late-medieval examples, and therefore would presumably have posed few difficulties conceptually to a performer fluent in contemporaneous notational practices. Zacara (or his scribe) made use of only three types of coloration in *Sumite karissimi*: black full notes project imperfect *tempus* with major prolation; red full notes project perfect *tempus* with minor prolation. Red void coloration is also used in a manner consistent with a number of other songs copied in Ch564 and MOe5.24. Red void breves are half the length of both red full and black full breves. These red void breves are in turn divided into two red void semibreves and four red void minims. Two types of semiminim are also used. Red full semiminims occur in the contratenor. Three of these sound in the time of two red full minims. Similarly, red void semiminims occur in the *cantus* voice. Three of these take the time of two red void minims, as illustrated in Figure 13.

---

86 Willi Apel went so far as to state: “This piece may be said to represent the acme of rhythmic intricacy in the entire history of music.” Apel, *The Notation of Polyphonic Music*, 431. Stone has offered a very compelling interpretation of the complex rhythms of the song as notated diminution. See: Stone, “Glimpses of the Unwritten Tradition,” 88–91.

87 Smilansky has also argued this. See: Smilansky, “Rethinking Ars Subtilior,” 164.
Most of the time, the perfections of *Sumite karissimi* are notated using one type of coloration. For instance, a perfection that is notated using red full coloration can be divided and distributed across long timespans, yet all of these disparate parts will still be composed of red full notes. Consider, for example, the extract of the cantus copied in Figure 14, where black and red full perfections, and red void perfections are interspersed to create a long chain of syncopations. The lines lead out from each note to a central gathering point—a breve unit—to depict the grouping of disparate parts of perfections undertaken by a reader of this notation. Despite the intricacy of this passage, a reader can perceive in a single glance that it comprises two red void breves, two red full breves, and two black full breves. All of the breve units of this passage are thus satisfactorily completed. The uniformity of the coloration
facilitates the grouping together of breve units. The three red semibreves that follow the syncopations themselves compose another perfection, and a point of realignment between all the voices.

Figure 14: *Sumite karissimi* cantus, B section opening\textsuperscript{88}

A comparison between the notation of the original manuscript and a modern transcription can further elucidate the contrasting reading practices demanded by this notation. Figure 15 provides a diplomatic transcription of Kurt von Fischer’s and F. Alberto Gallo’s edition of the extract shown in Figure 14. Through a comparison between these two versions of the extract of *Sumite karissimi*, one can observe that unlike the original notation, which emphasizes the grouping of disparate parts, the modern transcription highlights dissonance between the perceived global periodicity of the perfect breve unit, as inscribed by the barlines, and the long train of syncopation. The transcription is busy: the reader must

\textsuperscript{88} *MOe5.24*, f. 11v. Used by permission of the Ministry for Cultural Heritage and Activities and for Tourism. Estense Galleries, Estense University Library.
take into account much visual information in order to comprehend the rhythms. The many ties also lead the transcription to take up a significant amount of space on the page, even in the absence of the tenor and contratenor.

Figure 15: Diplomatic transcription of Kurt von Fischer’s and F. Alberto Gallo’s edition of cantus, mm. 10–14

Arguably, the opposite is true of the original notation, where the coloration highlights continuity between the breve units by demarcating them clearly. The division and regrouping of divisions, on the other hand, are barely visible in the modern transcription. Instead, the eye is drawn to the intricacies of the displaced time units against the barlines. One may consider the extent to which this encourages the reader to think in shorter units (down to the level of the thirty-second note), unlike the original notation, which highlights the breve spans.

**Syncopation as a Mediating Group**

The author of the *Ars cantus mensurabilis mensurata per modos iuris* also discusses syncopations that incorporate special noteshapes and coloration, i.e., arguably localized *traynour*. He provides an example of this kind of syncopation from a *Gloria* by a certain “Frater Minor,” i.e., a

---

89 *PMFC*, vol. 13, 202. Notes are here reduced 4:1.

90 That the notation emphasizes spans also arguably reflects the “metric” profile of mensural notation. As Boone has argued, the meter of mensural music may be seen to be composed of hierarchically ordered timespans, rather than the neutral pulses of modern meters. I discuss this further in Chapter 5. Graeme M. Boone, “Marking Mensural Time,” *Music Theory Spectrum* 22, no. 1 (2000), 31.
Franciscan friar. Here, the author uses two dragmae to create perfect tempus with minor prolation where black semibreves are written in major prolation. He describes this kind of syncopation as a “mediating group.”

Figure 16 illustrates that syncopation is here introduced by the two dragmae. The vertical dashed lines demarcate breve units (worth six minims), and the horizontal lines indicate whether a time-unit is present. Where this unit is implicit, but not sounded, a horizontal dashed line is drawn. Each dragma is worth two minims. The semibreve preceding the syncopation projects major prolation. A dot of division prevents the minim that follows from imperfecting the first semibreve. We can assume that the perfect semibreve unit is implicitly present in the following breve unit because the author states that it is syncopated: it appears that he imagines two underlying perfect semibreve units (as illustrated by the dashed horizontal line), which are disrupted by the two dragmae. We may also think of this another way: together, the two minims plus two dragmae arguably project minor prolation. The dragmae thus result in the notation of what is arguably localized perfect tempus with minor prolation <3,2> in the time of imperfect tempus with major prolation <2,3>. Again, I provide a transcription for reference.

---

91 This is implicit because the dragmae are seen to be sounding against the perfect semibreve unit.
Examples of this kind of syncopation are also present in notationally complex repertory, and can help to elucidate how *traynour* and syncopation are at times combined with one another. To illustrate this process, consider the opening of the A section of the *cantus* of *Sumite karissimi* in Figure 17, where two intermediary groupings—six red void semiminims and a red full breve—result in the insertion of a timespan worth seven minims. The diagram provides a reading that shows how black full breve units (worth six minims) are divided and regrouped. As can be seen in the figure, making sense of this grouping requires some mental gymnastics, and appreciation of the notion that the red void minim and red full breve units can be grouped with the incomplete breve units written in black full notation on either side of them. The first black semibreve depicted in the lower portion of Figure 17 is perfect. It is followed by a minim rest that has dots placed on either side of it to prevent imperfection of the semibreve that precedes it, and alteration of the minim that follows it. This incomplete

92 In the transcription, notes are reduced 2:1.
breve unit is broken up by the iambic minim–imperfect semibreve grouping that follows. The first breve unit is completed by the two minimis that follow the iambic minim–imperfect semibreve unit (marked by the numerals 5 and 6 on Figure 17). One breve unit is now complete. The iambic unit is then grouped with the six red void semiminims, which together are worth three minimis. Two breve units are now complete. Red coloration shows that the breve that follows is imperfect, and worth four minimis. Two minim–semibreve iambic units follow, adding up to a perfect breve unit. This leaves the two black full minimis that follow to be grouped with the red breve. Four breve units are now complete.

Figure 17: Intermediary groupings in the opening of the A section of Sumite karissimi\textsuperscript{93}

\textsuperscript{93}MOe5.24, f. 11v. Used by permission of the Ministry for Cultural Heritage and Activities and for Tourism. Estense Galleries, Estense University Library. In the transcription, notes are reduced 2:1.
A reading of the syncopations of this rather complicated passage illustrates that full perfections are not always notated with the same kind of coloration. This draws attention to the necessity of grouping longer phrases visually when reading this kind of notation, and recognizing patterns that complete perfections. In analyzing medieval songs in this way, it is also important to bear in mind that the notes of this passage could be grouped multiple different ways. For instance, an alternative reading may group semibreve units together in a more localized way, resulting in the exchange of perfect and imperfect semibreve units without the long syncopations visualized in Figure 17. This emphasizes the individual agency of a performer in making sense of groupings.94

Jacob de Senleches’s En attendant esperance

Mediating groups are combined with divided perfections to facilitate the notation of some of the most intricate examples of syncopation (and with it traynour). To illustrate this process, I conclude with an example from Senleches’s En attendant esperance. Two inscriptions of En attendant esperance have survived. One is copied on f. 44r of Ch564, and the other on ff. 39v–40r of MOe5.24. For the purpose of this discussion, I make use of the copy from MOe5.24.95

94 I will discuss the interpretation of mensuration further in Chapter 5.

En attendant esperance is widely regarded as one of the most rhythmically and notationally complex songs of the later Middle Ages.\textsuperscript{96} The perceived notational complexity of this song is established primarily by a group of semidragmae. Otherwise, En attendant esperance makes use only of three types of coloration. As I will show, the coloration of this song and the semidragmae, to be discussed below, delineate semibreve and breve units. This leads me to suggest that while the song undoubtedly represents a challenge for performers, the notation can be said to facilitate ease of reading, providing that the reader knows that perfections should be grouped together. When perfections are grouped, the notation can help to clarify the boundaries of the temporal units of the piece.

Figure 18 represents visually the durational relationships between the notes of En attendant esperance, excluding the black void semidragma, which I will discuss below. Black notes project imperfect tempus with major prolation \(<2,3\rangle\). Red notes thus project perfect tempus with minor prolation \(<3,2\rangle\). Red void coloration is also used in a manner similar to Sumite karissimi: two red void breves take up the time of one black full imperfect breve. Each red void breve contains two red void semibreves and four red void minims. Eight red void minims thus fill the time of one black full imperfect breve (or one red full perfect breve) \(<2,2,2\rangle\).

Sometimes, red void minims are paired with red void semidragmae to fill out semibreve units. Three of these semidragmae take the time of two red void minims.\textsuperscript{97}

\textsuperscript{96} For instance, Jason Stoessel writes of the song: “The use of special figures in his [Senleches’s] La harpe de melodie and En attendant esperance is only exceeded by Rodericus’ Angelorum psalat and matched by the works of composers such as Guido.” Stoessel, “Symbolic Innovation,” 136.

\textsuperscript{97} For discussions of the noteshapes of this song, see: Stone, “Writing Rhythm,” 157–63; Stoessel, “Symbolic Innovation,” 148–54.
En attendant esperance has gained a reputation for being one of the most notationally challenging songs of the later Middle Ages principally because it makes use of two distinctive semidragmae. These include a black void semidragma $\blacklozenge$, which always appears in a group of three, accompanied by a single red void semidragma $\redlozenge$. This red void semidragma appears additionally in groups of six, or in groups of three, accompanied by void red minims $\blacklozenge$. These gestures are highlighted by the boxes in Figure 19:

---

$\footnote{These flags are drawn as hooks in Ch564.}$
Controversy has arisen primarily over the song because these semidragmae have been interpreted differently by various editors. Both Willi Apel and Gordon K. Green transcribe these noteshapes two different ways, as is shown in Figure 20. Anne Stone, on the other hand, argues that each noteshape has a fixed meaning and that the sense of special noteshapes should be ascertained both from their context and shape.  

---

99 M0e5.24, f. 39v. Used by permission of the Ministry for Cultural Heritage and Activities and for Tourism. Estense Galleries, Estense University Library.

Figure 20: Semidragmae in *En attendant esperance* transcribed into modern notation\(^{101}\)

<table>
<thead>
<tr>
<th>MOe5.24</th>
<th>Apel</th>
<th>Greene</th>
<th>Stone</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image9" alt="Diagram" /></td>
<td><img src="image10" alt="Diagram" /></td>
<td><img src="image11" alt="Diagram" /></td>
<td><img src="image12" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image13" alt="Diagram" /></td>
<td><img src="image14" alt="Diagram" /></td>
<td><img src="image15" alt="Diagram" /></td>
<td><img src="image16" alt="Diagram" /></td>
</tr>
</tbody>
</table>

Of these three transcriptions, Stone’s is the most convincing because its organization presupposes that the meaning of special noteshapes can be ascertained by grouping them.

together into perfections, and because each noteshape is assigned only one duration.\(^{102}\) From this perspective, the duration of the black void semidragmae can be ascertained by taking into consideration the fact that six red void semidragmae fit into the time of one black full perfect semibreve. This means that each red void semibreve is also worth one-half of one black full perfect semibreve. Since void semidragmae always appear in groups of three accompanied by a single red void semidragma, one can conclude that they span a duration that sounds at a proportion of 5:3 with that of the red void semidragmae. This relationship is represented in Figure 21 below, with a perfect black full semibreve for comparison.

\(^{102}\) The author of the *Ars cantus mensurabilis mensurata per modos iuris* did not condone the use of one noteshape to depict different durations within the same song (with the exception of notes that are perfect vs imperfect). This is reflected in a passage in which the author complains about the use of reverse coloration in Landini’s *Donna che d’amour*: “Et Nicholas de Aversa, Ordinis Celestinorum, cum dixit, quod Cecchus de Florentia in discantu illius due ballative posuit semibreves rubeas imperfectas et male, salva pace, quod in hoc non peccavit in tenore ponendo semibreves rubeas cum sit minoris prolotionis tenor ille. Parcat mihi ergo reverentia utriusque, quod male intellexerunt regulam magistri Johannis de Muris, cum dixit: si nigre sunt perfecte Rubee crunt imperfecte et e converso; quia illud et e verso non notat varietatem temporis, modi, vel prolotionis, sed identitatem.” “And when Cecchus de Florentia [Landini] in the Discant of his ballata placed—and wrongly—red imperfect semibreves, Nicholas de Aversa, of the Celestine Order, said in a spirit of peace that in this he did not transgress [intellectually], but he did transgress [intellectually] in placing red semibreves in the Tenor—since that Tenor is of minor prolation. Therefore, spare me the reverence for either of them, for they badly understood the rules of Master Johannes de Muris, when he said: ‘if black notes are perfect, then red will be imperfect and conversely’; because that statement ‘and conversely’ does not note a variety of *tempus, modus,* or prolation, but the same.” Anonymous, *Ars cantus mensurabilis*, ed. and trans. Balensuela, 239–40 (translation slightly modified). According to Balensuela, the author’s philosophical objection to coloration here is rooted in the principle associated with Ockham that “a plurality is not to be posited without necessity” (p. 53). However, it is also possible that the author’s objection is not to the fact that dotted semibreves may be used in place of red, but rather the use of the same coloration to indicate two different mensurations—in the time of—and in the context of the same piece. This is because the author refers specifically to the use of coloration in the tenor, where two void semibreves are equal in duration to a breve, but not the *superius*, where void semibreves are the same in duration as black full semibreves, but contain three, not two parts. He also emphasizes that coloration should not result in a variety of *tempora, modi,* or prolations within the same piece. Johannes Vetus de Anagnia—the protagonist of the preceding two chapters—also alludes to the principle of parsimony to argue that only the five simple noteshapes were necessary to describe all rhythmic parameters, even complex ones. Here, this precept is used for the opposite purpose, i.e., to argue that noteshapes may represent a variety of durations and that any besides the five simple shapes are superfluous.
Figure 21 provides a literal description of the relationship between these notes, but does not provide an accurate picture of the utility of such shapes to a performer, for whom it may be supposed that a 5:3 proportion would have been either challenging to execute, or else might demand excessive fidelity to the notated manuscript. Thanks to our exposure to the avant garde music of the twentieth century, a 5:3 proportion in a modern score signs exactly that (and is written as such). However, since late-medieval notations emphasize groupings, the semidragmae here arguably represent simply four notes sounded within the time of one perfect semibreve, the fourth of which is shorter than the rest. Since the gesture described by the special noteshapes here may be seen as ornamental rather than structural, I would suggest that the notation’s purpose is less to ensure that a singer of the cantus should execute each note precisely at a ratio of 5:3, but rather that all three voices should be aligned at the conclusion of the perfect semibreve unit.

---

103 This is not to imply that the shape of a note was unimportant. As Stoessel has observed, scribes at times went to considerable trouble to ensure that the details of special noteshapes—such as their stems and flags—were drawn correctly. He provides the example of *Amor da po’che*, copied in Pu568, f. 79v. Stoessel, “Scribes at Work, Scribes at Play,” 66–7.
As I outlined in the introduction, notational and rhythmic complexity are typically regarded as defining features of the so-called *ars subtilior* style, and have historically been cited as evidence that some late-medieval repertory is unperformable and academic. The pieces I have discussed in this chapter—all of which would typically be categorized under this label—would undoubtedly have been challenging to perform. Yet, I have argued that at times their notations arguably facilitate ease of reading. This indicates, I would suggest, that it may be productive to rethink the idea that such notations are complex per se. The extent to which something is perceived to be complex, I would suggest, is culturally and historically contingent. What may seem complex or obscure to a modern eye may perhaps have posed few challenges conceptually to an expert medieval reader, to whom the idea that perfections are grouped together would have been second-nature. In stating this, I do not wish to suggest that such notations were simple, either. Arguably, historical notations differ from modern notations not only in their form, but also, arguably, in the way that they were perceived. The notations discussed here provide evidence that medieval musicians might have looked at and compartmentalized their notations differently than does a person today, accustomed as they are to the standardized and aligned parts of modern scores and the practice of sight-reading. It also invites us to consider the kind of performer who would have engaged with such written exemplars, i.e., a professional, not a novice. Given that such a person would have been immersed in both the written and aural culture of the music of this period since childhood, we should not shy away from acknowledging that their ability to read their own notations may have far surpassed our own. What may seem complex, difficult, or even impossible to musicologists today, may have posed few difficulties to expert medieval singers.

104 Greig has also suggested that a performer of the contratenor of da Teramo’s *Sumite karissimi* might have been an expert who was in high demand as a performer. Greig, “Ars Subtilior Repertory,” 205.
Chapter 5: Mensuration and Preparation

Figure 1 shows Baude Cordier’s rondeau Belle, bonne, sage, as it is copied at the opening of Ch564. Due to its distinctive shape and befitting text, the song has come to be known as a classic example of Augenmusik, or “music for the eyes.”¹ The song can be seen by a reader not only as notated music, but also enjoyed as a beautiful image of a heart. This aspect of the song cannot be heard by a listener, and has been used as a justification for the position that this song, along with Cordier’s other picture song Tout par compas² and Senleches’s La harpe de melodie³ are feasts for the eyes as much as for the ears. The visual appearance of Belle, bonne, sage is integral to its symbolic meaning, which is located in the manuscript as much as it is in sound.

² Ch654, f. 12r.
³ Cn54.1, f. 10r.
Figure 1: Baude Cordier’s *Belle, bonne, sage*\(^4\)

\(^4\) *Ch654*, f. 11v.
Figure 2 shows a detail of the cantus of the rondeau. From a close examination of this extract, it can be seen that the scribe performed some editing on the void notation. As Jason Stoessel has observed, what were before five minims, three semibreves, and a minim have been transformed into five semibreves, three breves, and a semibreve. This can be seen both by observing the top of the semibreves, where minim stems have been erased, as well as the staff line behind the third breve, which was partially erased when the scribe scraped away the old semibreve. Figure 3 compares these two readings.

Figure 2: *Belle, bonne, sage*, detail

![Figure 2: Belle, bonne, sage, detail](image)

Figure 3: Old versus new void notes in cantus of *Belle, bonne, sage*

<table>
<thead>
<tr>
<th>Before erasure</th>
<th>After erasure</th>
</tr>
</thead>
<tbody>
<tr>
<td>P P P P V V V V</td>
<td>P P P P V E E V</td>
</tr>
</tbody>
</table>

As Stoessel explains, the scribe chose to alter these notes so that the proportion signed by the void coloration was written in relation to the black notes immediately preceding them,

---

5 A full semibreve ●; A void semibreve ○.


7 *Ch654*, f. 11v.
i.e., the black notes following the 3 sign. The void semibreves are worth half of a black full semibreve following the 3 sign. This kind of coloration would presumably have been familiar to a late-medieval reader, since, as I will illustrate further below, void coloration was often used to sign a dupla (2:1) proportion. Before the erasure took place, what were then void minims signed a dupla (2:1) proportion with the black minims preceding the 3 sign (see Figure 1). Taking this further, we may say that the scribe chose to alter the notation to reflect that it would be read sequentially. Rather than representing the proportional values of the void notes in relation to those following the c sign, the scribe took into account the process that a reader would undertake when observing the composition, and when imagining the proportional changes one by one.

The scribe’s choice to include this erasure arguably points towards a sensitivity for the performer on the part of scribes and composers that goes beyond the visual or symbolic representation of the song that is conveyed by describing Belle, bonne, sage as Augenmusik. It indicates that the notated song served not only as a delight for the eyes, but also as a tool for the musician as they thought through the proportions of this piece. In this chapter, I develop the work of Chapter 4, which argued that late-medieval complex notations at times facilitated ease of reading, but that engaging with such examples also entails a different kind of looking from reading modern scores. I suggest that late-medieval complex notations at times lend themselves to a performative kind of reading, and one in which the notation and rhythms of a composition may serve as a kind of visual analysis of complex proportions. Compositions that

---

8 Stoessel states that the void coloration signs a sesquitertia (4:3) proportional relationship. This is true of the minims—implicitly, since no void notes shorter than the semibreve are written in this extract—but not of the semibreves or breves, which sign a dupla (2:1) proportional relationship. Stoessel, “Scribes at Work, Scribes at Play,” 69.

9 Again, Stoessel states that all the void notes before the erasure sign a sesquitertia (4:3) proportion with the durations of the black notes preceding the 3 sign. Stoessel, “Scribes at Work, Scribes at Play,” 69.
feature such notations may thus be seen not only as “music for the eyes,” but also for the mind.

To illustrate this, I will first consider what mensuration was from the perspective of late-medieval theorists. I will propose that mensuration in the medieval sense was conceived of as a way of organizing musical time that can be observed in particular notes and the patterns they form. The notation of a song may thus be said to “project” mensuration. I support this claim by observing that late-medieval theorists distinguished linguistically between individual notes, which are said to reside “in” a mensuration, and songs that are said to be “of,” but not “in” mensurations. To this extent, mensuration may be regarded as a “performative act” insofar as it resides in individual notes, but is realized through the agency of a performer.  

Second, I discuss a common phenomenon in which rhythms are chosen that establish a common unit between the music before and after a proportional shift, a practice that in modern parlance is termed “metric preparation.” I suggest that the existence of a number of songs that feature notational devices that help to guide the reader through proportional shifts provides evidence that mensural notation was chosen to portray the sounded, but also at times the thought.  

In arguing that mensuration resides in notes and in the minds of performers, and that notation was at times used to visualize both the sounded and the thought, I take an approach that combines the study of historical theoretical ideas with an analytical method that takes the

---

10 As I discussed in Chapter 2, Zayaruznaya has argued that\textit{prolatio} in the general sense may also at times be regarded as a “performative act.” Zayaruznaya, “A Minor History of \textit{tempus} and \textit{prolatio}.”

11 Johannes V etulus de Anagnia also chose to assign multiple notes the same duration (see Chapter 2). He achieved this by theorizing a common counting unit—the atom—among all notes. Unlike the examples discussed here, V etulus does not always visually distinguish such notes from one another. While I suggested that this choice was justified by his speculative approach to the study of musical time, V etulus nevertheless arguably attempts to solve some of the problems that are also addressed in the context of the notational systems discussed here. Namely, because he theorizes layered hierarchies with multiple levels, many different temporal spans may serve as a counting unit in his system. Equivalence may be located between divisions that are proportional to one another by traversing up and down these hierarchies, a process that he represents visually in his tree diagrams.
perspective of a hypothetical medieval performer. As I discussed in the previous chapter, and as has been observed in recent analytical studies of late-medieval songs, taking the perspective of a performer provides a useful tool for considering the conceptual underpinnings of late-medieval notational systems. This is because the meaning of a song can alter radically depending on whether one considers it from the perspective of an editor, listener, reader, or even between different voices. In analyzing notations from the perspective of a hypothetical performer, I suggest that one can gain insights not only into the mindsets of performers, but also notators. Medieval notators wrote for their contemporaries, and thus would have brought to their work expectations about the conceptual knowledge of the musicians who would have used their manuscripts.

**Mensuration**

In his *Tractatus practice de musica mensurabili* (Padua, 1408), the Italian theorist, mathematician, and physician Prosdocimus de Beldemandis provides rules for recognizing “mensuras cantuum” [the measures of songs]. He prefaces this section as follows:

> Sequitur capitulum de modo cognoscendi mensuras cantuum. Unde ad hoc cognoscendum opportet premittere aliquas regulas, quibus intellectis poterit quilibet boni ingenii cognoscere cujus mensure sit quilibet cantus sibi propositus, si ipsum bene examinabit.

---


The following chapter is about recognizing the mensurations of songs. In order to recognize this [mensuration], it is appropriate to set out some rules, with which all knowledgeable people using their intellects will be able to recognize what the mensuration is should any song be set in front of them, if they examine it well.

Prosdocimus explains that knowledgeable readers of mensural notation can discern the mensuration of a song, providing that they “examine it well.” That is, by using the rules that Prosdocimus sets out.

As Jason Stoessel has observed, Prosdocimus elaborates on how a person may recognize mensuration by distinguishing between “intrinsic” and “extrinsic” notational signs. Intrinsic signs are “essential” to songs, and consist of the shape of notes, their groupings, the disposition of rests, and the use of dots. Extrinsic signs, on the other hand, are “accidental” to songs, and consist of attributes such as mensuration signs. From the perspective of a reader, intrinsic signs may be regarded as essential (i.e., pertaining to the essence of the song, as well as necessity) insofar as they enable a reader to determine modus, tempus, and prolation at any given moment. Extrinsic signs, on the other hand, are not essential for most readers and are therefore accidental to songs. Stoessel’s intervention here is to observe that intrinsic signs would have sufficed for medieval readers fluent in mensural

---

15 Stoessel, “The Interpretation of Unusual Mensuration Signs,” 182–3; de Beldemandis, Expositiones, ed. Gallo, 130–2. Tanay has argued convincingly that the terms “intrinsic” and “extrinsic” as utilized by the author of the Tractatus figurarum refer to the mathematics of limit decisions, whereby when a perfection is composed of a single note it is perfect “intrinsically,” and when a perfection is formed either from a group of notes or a dotted note it is perfect “extrinsically.” Tanay, Noting Music, 226–7.

16 Ugolino of Orvieto also states that mensuration signs are “extrinsic” to songs. “Et sic habemus extrinsea signa quibus mensurarum perfectionem et imperfectionem cognoscimus.” Ugolino di Orvieto, Declaratio musicae disciplinae. Book IV, ed. Albert Seay, Corpus scriptorum de musica, vol. 7 (Rome: American Institute of Musicology, 1959–1962), 201. [And thus we have extrinsic signs by which we recognize the perfection and imperfection of mensurations.] However, he also advocates for the use of mensuration signs to “show” (ostendere) what the mensuration is. This is consistent with his own compositions, which contain many mensuration and proportion signs. Ibid., 197–8. Arguably, this reflects the pattern of changes in the customary use of mensuration and proportion signs, which became increasingly common in the fifteenth century, but were still used comparatively rarely at the turn of the century. For a comprehensive survey of mensuration and proportion signs, see: Anna Maria Busse Berger, Mensuration and Proportion Signs: Origins and Evolution (Oxford: Clarendon Press, 1993).
In cases where such signs were insufficient, Prosdocimus tells us that an ensemble would simply have tried out a passage of music, further emphasizing the contingency of mensuration signs.

Stoessel’s observations draw attention to the differing conceptual approaches of a medieval vs modern reader to mensuration and meter. While a modern reader might regard a meter sign as “intrinsic” or “essential” to a musical score insofar as it prescribes the notated meter of a piece or section of music in its entirety, a medieval reader would have determined the mensuration not by a mensuration sign, but instead by observing the relationship between individual notes. This observation poses the following problem: if mensuration is determined through the observation of individual notes, but yet takes the form of a hierarchical system of organizing notes, where is it located? Ruth DeFord touches on this issue, observing that in mensural music, there are two kinds of measurement—abstract and concrete. Concrete measurement is represented using notation, while abstract measurement consists of “a hierarchical grid in which the smaller values function as subdivisions of larger ones.” This hierarchical grid, as well as the relationships between notes, can be determined through a set of prescribed rules. As Anne Stone has observed, this hierarchy could take on the form of a “time-unit map” that was situated in the mind of a performer.

---

17 The distinction is particularly apparent in repertory of the later fourteenth and early fifteenth centuries that Stoessel considers because the use of mensuration signs was not standardized.


19 A common method for the recognition of mensuration, and one that is described in the Vitriacian *Ars nova* copied in Vat307, entails observing the disposition of rests. The author also provides a description of the various signs that could be used to “designate” mensuration. Gray, “The Ars Nova Treatises,” 42–4.


In modern musicological literature, songs are typically described as being “in” mensurations, pointing towards (implicitly), the first of DeFord’s designations of measurement. To take this interpretation to its extreme, one may say that the hierarchies of mensuration are conceived of as existing in an abstracted realm, and can be accessed in part through analysis or performance. Each song is written “in” a given mensuration, from which it may deviate momentarily, in a manner akin to a piece of Western Art music of the standard repertory, which is written in a given key and may modulate to other keys before returning to cadence in the tonic. Although this is an exaggerated view of the way that mensuration is described, it is nevertheless the case that the idea that mensuration is in some sense prior to songs is implicit within the way they are transcribed. Often, editors place a meter sign at the opening of songs, or at times a mensuration sign. These signs may be replaced throughout the song through changes in the meter signature or mensuration. However, this may be seen as a momentary disruption before the return of the “correct,” or “global” mensuration of the piece.

To determine where mensuration is located, it is productive to consider the language with which mensuration is described in theoretical treatises. Theorists are remarkably consistent in the way they describe mensuration. Songs are said to be “of” a mensuration, but

---

22 A move away from this model can be observed in the many diplomatic transcriptions of late-medieval songs that do not assign mensuration or meter signs at all. See, for instance: Desmond, *Music and the moderni*; Anna Zayaruznaya, *Upper-Voice Structures and Compositional Process in the ars nova Motet* (London and New York: Routledge, 2018). Andrew Hughes and Margaret Bent also elected not to include meter signs in their edition of the Old Hall manuscript, and instead provided an “instruction to beat the basic pulse.” Andrew Hughes and Margaret Bent, eds. *The Old Hall Manuscript*, vol. 3 (American Institute of Musicology, 1969), XII. For a discussion of the various kinds of editorial techniques that are practiced by modern editors of medieval music, see: Margaret Bent, “Early Music Editing, Forty Years On: Principles, Techniques, and Future Directions,” in *Early Music Editing*, ed. Dumitrescu, Kügle, and Berchum, 241–72.

23 Christopher Hasty makes a similar observation in relation to modern theories of musical meter that speak of “the meter” of a piece “as something given in advance that need not itself be subject to change during the course of the piece.” Christopher Francis Hasty, *Meter as Rhythm* (New York: Oxford University Press, 1997), 8.
Mensuration may thus be viewed as both a localized phenomenon that resides in notes as they are sounded, imagined, or composed. Songs are not “in” a given mensuration, but rather are made from a mensuration or mensurations. In the context of a song, mensuration exists in individual notes insofar as these notes are read and sung by musicians. Mensuration as a measure (mensura) is in some sense a faculty of the mind (mens). To further clarify the difference between being “in” a mensuration, and being “of” a mensuration, compare the language of the two passages from Prosdocimus’s *Expositiones*:

Quando est aliquis cantus in quo quelibet brevis in eo reperta non imperfecta ab aliqua semibrevis vel valore nec perfecta per punctum nisi dividendo est perfecta, dicitur esse de tempore perfecto; si autem non sic sit, dicitur esse de tempore imperfecto.

When there is a song in which any breve found within it that is not imperfected by a semibreve or its value, nor perfected by a dot unless by a dot of division, is perfect, it is...
said to be of the perfect *tempus*; if on the other hand this is not the case, it is said to be of the imperfect *tempus*.

...  

Prima pars autem dividitur in partes quatuor, secundum quod de valore quatuor figurarum sive notarum determinat; quia primo determinat de valore maxime, secundo de valore longe, tercio de valore brevis, quarto et ultimo de valore semibrevis.  


The first part is divided into four parts, according to which he [Jean des Murs] determines the value of the four figures or notes; because he first determines the value of the maxima, second the value of the longa, third the value of the breve, fourth and lastly the value of the semibreve. Here is the second: The longa is in perfect *modus*. Here is the third: the breve is in perfect *tempus*. Here is the fourth and last: The semibreve is in major prolation.  

In the first extract, Prosdocimus provides the reader with guidance on the treatment of breves in relation to perfect and imperfect *tempus*. He observes in standard fashion that when *tempus* is perfect, breves can be written that are perfect without a dot of addition, and that they may be imperfect only when they appear concurrently with an imperfecting semibreve or its value. The opposite is true of imperfect *tempus*. He adheres to contemporaneous linguistic norms, and uses the word “*de*” [of] to describe the *tempus* of this song. For Prosdocimus, a song may be “*in*” neither perfect nor imperfect *tempus*, but rather must be “*of*” one of these. In the second example, Prosdocimus describes the values of the various figures, following Jean des Murs. In contrast with the first extract, he states that a longa is “*in*” perfect *modus*. The same is true for every other note, in accordance with its given prolation. Thus breves are “*in*” perfect *tempus*; semibreves are “*in*” major prolation.  

Theorists use the term “*de*” (or the genitive) to describe the mensuration of songs and “*in*” to describe the mensuration of notes with remarkable consistency. Thus far, I have

---

28 de Beldemandis, *Expositiones*, ed. Gallo, 32
located no instances in which a theorist states that a song is “in” a given mensuration. Indeed, the opposite appears to be the case. In the Vitriacan *Ars nova* witness copied in *Vat307*, the author states not that mensurations contain songs, but rather that songs contain mensurations, as follows: “Modus imperfectus et tempus imperfectum continentur in *Adesto*,”[30] [Imperfect modus and imperfect tempus are contained within *Adesto*]. That medieval theorists distinguished between songs, which contain mensurations and can be “of” mensurations, and notes which are “in” (or at times “of” mensurations) is indicative of an implicit need to draw a subtle conceptual distinction between these two ideas.

J. N. Adams has undertaken a detailed analysis of the use of the term “de” in medieval Latin, and his observations can help shed light on the distinction that theorists such as Prosdocimus wished to make. As Adams explains, *de* was used in medieval Latin increasingly as an alternative to the genitive.[31] He discusses a number of uses of the genitive with *de*. Among these, he observes that the partitive genitive was commonly used with *de* to indicate that a part of something had been removed from a greater whole—“a part of the page was torn away.” Where the partitive quality of the genitive is less apparent, *de* was at times used to imply instrumentality.[32]

---

29 Similar language is found in a canon to an anonymous *Credo* in *Lhv57950*, ff. 62v–63r, which describes the mensurations of “three songs in one”: “Tres cantus in uno reperies. Primo est de tempore imperfecto imperfecti incipiens sine pausa. Secunda de tempore perfecto imperfecti. Tertius de tempore perfecto incipiens cum pausa” [You will find three songs in one. The first is of imperfect tempus of imperfect (prolation), beginning without a rest. The second is of perfect tempus of imperfect (prolation). The third is of perfect tempus beginning with a rest.] This fact is not reflected by translations of theoretical treatises, in which “de” is typically translated as “in” in English, implying modern ideas that a song is “in” a mensuration in the same way that one might say that a song is “in” a meter.


As I noted above, *de* is used interchangeably with the genitive in theoretical treatises to describe the mensuration of songs. This reflects contemporaneous linguistic norms and indicates, I would suggest, that *de* may be seen as synonymous with the genitive in late-medieval descriptions of the mensurations of songs. However, the partitive genitive is an inappropriate designation for the use of *de* in relation to mensuration; one could not say that the perfect *tempus* is somehow “removed” or “weakened” as a result of a song that is of the perfect *tempus*. Instead, it appears to be used in the more common sense of the genitive of material, whereby something is made out of something else. Unlike the partitive genitive, the substance out of which the object is made does not undergo removal of a part. For example, in the phrase the “stakes of very strong wood,” we know that the stakes are made of wood, but the wood itself is an abstract concept. We do not get the sense that a particular tree was cut down to fashion the stake. Applying this concept to mensuration, it appears that theorists believed that there was a source of mensuration (albeit in a general sense), and that it could be used to fashion the mensurations of songs.

That individual notes can be “in” certain mensurations, but longer groups of notes (such as a song) can be “of” mensurations reinforces the idea that mensuration is an attribute of songs that arises from the organization of notes into patterns. The patterns of notes—the signs that are intrinsic and therefore essential to songs—“show” or project a certain mensuration or mensurations, which may then be distinguished by a reader. Unlike modern notation, where meter (in the notational sense) is imposed upon a song primarily by a meter

---

33 Adams, *Social Variation*, 271.

34 I would hypothesize that for medieval people, the source of mensuration was located in the intellect, and was the *scientia* or knowledge of music itself, that is the musical *habitus*—the habitual knowledge of music that came about through a combination of contemplation and habituation through practice. I will return to this idea in the epilogue.

35 See Chapter 4 for further discussion of pattern recognition as it relates to the use of novel notations.

sign (but also in tandem with other notational features such as barring), mensural notation cannot be read unless notes are analyzed and some sense of localized mensuration is determined.\textsuperscript{37} To this extent, mensuration may be said to arise from the patterns formed by specific notes as they are analyzed by the reader, who determines how they are organized—which mensuration they are “in.”

\textit{Jacob de Senleches’s Fuions de ci}

That mensuration is a localized phenomenon to the extent that it exists in notes, but a global phenomenon insofar as it is sourced as an abstract material to fashion songs, is made particularly evident, I would suggest, in repertory that eschews easy classification into a given mensuration. In the following example, I consider the notational characteristics of Senleches’s \textit{Fuions de ci}, a song in which a seeming misalignment between intrinsic signs and counterpoint problematizes whether a fixed sense of \textit{tempus} or prolation can be located over the course of extended sections. The complicated nature of the rhythmic groupings of this song also highlight the possibility that the perceived mensuration of a given group of notes may differ depending upon the perspective of an individual performer. My analysis draws attention to the difficulty inherent in distinguishing between syncopation and what may be argued to be a localized change of mensuration in this repertory.

Figure 4 shows an extract of Jacob Senleches’s \textit{Fuions de ci}. The two boxes in this figure highlight the disposition of rests in this passage. In the first box, a minim is followed by two minim rests. In the second, a semibreve is followed by two semibreve rests. When two minim rests are written out beside one another, as they are in the first box in Figure 4, this is usually

\textsuperscript{37} Adams emphasizes the “local” force of the preposition \textit{de} in “expressing the source of a substance.” Adams, \textit{Social Variation}, 300.
taken as an indicator that prolation is major. This is because a rest worth two minims where prolation is minor would equate to the duration of a semibreve, and would thus typically be drawn as a semibreve rest. The same is true of the semibreve rests shown in the second box. These would typically indicate that tempus is perfect because a rest worth two semibreves would be equal to the length of an imperfect breve, and would be drawn as a breve rest.

Table 1 provides a breakdown of these common intrinsic notational signs as they relate to each of the four prolations.

Figure 4: Extract of the opening of the cantus of *Fuiions de ci*38

<table>
<thead>
<tr>
<th>Measure</th>
<th>Disposition of rests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect tempus</td>
<td>§ = ••• = □</td>
</tr>
<tr>
<td>Imperfect tempus</td>
<td>⊙ = •• = □</td>
</tr>
<tr>
<td>Major prolation</td>
<td>§ = ••• = □</td>
</tr>
<tr>
<td>Minor Prolation</td>
<td>⊙ = •• = □</td>
</tr>
</tbody>
</table>

38 Ch564, f. 17r.
Because both minim and semibreve rests are drawn out in the extract shown in Figure 4, one may jump to the conclusion that the whole passage is “in” perfect tempus with major prolation. However, when attempting to align the counterpoint, it becomes apparent that all of the semibreves of this passage are in fact imperfect, despite the way the minim rests are drawn in the first box. Further, the first breve in the middle of the passage contains six minims, while the second contains four, indicating that similis ante similem is applied for perfect tempus with minor prolation to these notes. This has led editors to state that Fuiions de ci is “in” perfect tempus with minor prolation, and to transcribe the song as if this is the default mensuration of the song. The rest units are explained as syncopations. This would mean that the minim rest divides the imperfect semibreve unit. Because triple minim groupings such as that highlighted in Figure 4 often appear in isolation, the breve units that contain them are also divided and displaced over long timespans.

Figure 5 provides a reading of the opening of the cantus as if the song were in perfect tempus with minor prolation. The numerals in the boxes above the transcription depict minim units on a scale from 1–6, reflecting that a breve unit in this reading contains six minims. Each box contains the value of one breve (six minims), and shows that the breve units are divided and distributed across long timespans, resulting in highly complex and overlapping syncopations. For example, while the first breve unit remains unsyncopated, the second is divided up into three imperfect minim units, which are themselves interrupted by a unit worth three minims, and two full breve units. A unit worth three minims follows and remains incomplete until the trochaic rhythm towards the end of this passage (the upper box in Figure

39 For example, Jason Stoessel states: “Both works [Fuiions de ci and En seumeillant] are composed in minor prolation, Fuiions in perfect tempus and En seumeillant imperfect. A constant feature of both works is the syncopation of one or more voices.” Stoessel, “The Captive Scribe,” 198. Stoessel also places a mensuration sign [c] at the opening of his edition of Fuiions de ci, further reinforcing the idea that the song is “in” perfect tempus with minor prolation. Apel transcribes the song in 3/4 (p. 77). His transcriptions are defined by an approach in which songs are said to be “in” mensurations. He criticizes the use of “incorrect” mensuration signs. Apel, ed. French Secular Music, 9.
5), a standard rhythmic figure that heralds the arrival of the cadence.\textsuperscript{40} I include a transcription for reference.

Figure 5: Syncopations of Figure 4\textsuperscript{41}

While a reading in which the opening extract is “in” perfect tempus with minor prolation can be made sense of analytically in the manner shown in Figure 5, I would suggest that this does not reflect a performer’s experience of singing this extract. There are a number of reasons for this. First, it seems highly unlikely that a performer would keep track of the disparate parts of perfections over the long timespans illustrated in Figure 5. The intricate rhythmic interplay between duple and triple groupings, as well as the dispersing of the parts of the perfect breve unit would rapidly throw them off their location in the perfection. Second, the frequent interjection of triple minim groupings, and particularly those that are


\textsuperscript{41} In the transcription, notes are reduced 2:1.
accompanied by intrinsic notational signs—juxtaposed minim rests—arguably project specialized major prolation at times.

Triple minim groupings are particularly common in the contratenor, where they can be said to dominate the texture. Figure 6 provides a transcription of the A section of *Fuions de ci*. In all three voices, gray boxes highlight the (abundant) triple minim groupings.

Figure 6: A section of *Fuions de ci* with triple units marked

By themselves, the frequent triple minim groupings are insufficient to disprove that a section of a song is projecting perfect *tempus* with minor prolation. This is because there is some overlap between perfect *tempus* with minor prolation <3,2> and imperfect *tempus* with

---

42 The gray boxes provide a fixed reading of the triple units. However—as I will discuss further below—the notation of this song is ambiguous. As such, this should not be read as a definitive analysis of the song, but rather as one of a number of possible readings.
major prolation \langle 2,3 \rangle. Namely, under both mensurations the breve contains six minims.\textsuperscript{43} The principal difference between the two mensurations—that undotted semibreves may be perfect where prolation is major, and that undotted semibreves are always imperfect (unless they are altered) where prolation is minor—can be obscured by rhythms. For example, consider the rhythms of the contratenor in bb. 22–3. In these breve units (assuming that a breve unit is six minims in duration), there are four triple-minim groupings. If we assume that the passage projects perfect tempus with minor prolation, the triple minim units result in localized syncopations of the imperfect semibreve units. Alternatively, if we assume that the passage projects imperfect tempus with major prolation, the semibreves are imperfected by the juxtaposed minims and minim rest. Regardless of which interpretation we choose, the rhythm is exactly the same.

This short passage is representative of the wider ambiguity of the notation of \textit{Fusions de ci}, and illustrates the potential for ambiguity in mensural notation.\textsuperscript{44} This may be contrasted with the notation of Senleches’s \textit{En attendant esperance} and da Teramo’s \textit{Sumite karissimi} discussed in the previous chapter, where coloration was used to distinguish perfections from one another.\textsuperscript{45} It shows that the notation of a song may at times be interpreted several different ways, and indicates, I would suggest, that while mensuration is inherent in songs insofar as their intrinsic signs may project certain groupings, its realization is also contingent upon the decisions of individual performers. Even where the notation of a song projects a certain

\textsuperscript{43} Reaney has suggested that the interchangeableness of perfect tempus with minor prolation \langle 3,2 \rangle and imperfect tempus with major prolation \langle 2,3 \rangle was a common attribute of early fifteenth-century song and associates this in particular with English repertory. Gilbert Reaney, “The ‘International’ Style and the Oxford Manuscript, Bodleian Library, Canonici Misc. 213,” \textit{Musica disciplina} 41, 1380–1430: An International Style? (1987), 24.

\textsuperscript{44} Smilansky has discussed the potential for ambiguity in late-medieval notations such as those of Olivier’s \textit{Si con cy gist}. Smilansky, “A Labyrinth of Spaces,” 138–9.

\textsuperscript{45} This reinforces the observation I made in the introduction—and articulated by Stone—that the kinds of complexity present in late-medieval repertory vary from piece to piece. Stone, “Ars subtilior,” 1134.
mensuration, this does not necessarily determine its rhythmic profile.⁴⁶ In the contraténor, the proliferation of dotted semibreves, the placement of imperfect semibreves before other semibreves, and the altered semibreves (bb. 17, 22) project perfect tempus with minor prolation. At the same time, the abundant triple minim groupings in this voice (as shown by the highlighted gray units) result in constant syncopation.

Because of the difficulty of navigating the extremely long and complex syncopations of this piece, the juxtaposed minim rests arguably serve yet another purpose—to instruct the reader to count a localized triple minim unit, and thereby to count in minims.⁴⁷ Arguably, it would be extraordinarily challenging to count breve groupings in this composition due to the persistent displacement of these units. A more intuitive interpretation of the opening of Fuions de ci may thus see the reader switch between a number of different groupings depending on their location in the song. In this instance, the minim with juxtaposed minim rests (b. 2) and the triple grouping (bb. 6–7) can be read as triple minim groupings (major prolation); the perfect breve (bb. 3–4) and the semibreve with juxtaposed semibreve rests (bb. 7–8) can be read as perfect breve groupings (perfect tempus). The remainder of the notes can be read merely as imperfect semibreve units (minor prolation), but without clearly defined tempus. The minim provides a common unit for all notes. This reading is shown in Figure 7.

⁴⁶ Graeme Boone also observed this phenomenon in his analysis of Ciconia’s Sus une fontayne. Boone, “Marking Mensural Time,” 15.

⁴⁷ Stone has argued that red coloration is used to instruct a reader to count minims and semibreves, whereas black notation instructs the reader to count semibreves and breves in Se je cudoie, copied in Ch564, f. 27v. Anne Stone, ed., The Manuscript Modena, Biblioteca estense, a.M.5.24: Commentary (Lucca: Libreria musicale italiana, 2005), 155. Daniel Leech-Wilkinson has suggested that minim rests were at times utilized in late-medieval repertory to signal to a performer how a piece should be articulated. He has hypothesized that Senleches in particular might have chosen to document the characteristics of earlier performances. Leech-Wilkinson, “Articulating Ars Subtilior Song,” 6–11, 13. It is also arguably the case that the semibreve rests in b. 8 achieve a similar goal, and instruct the reader to count imperfect semibreves after the trochaic semibreve–minim grouping of bb. 6–7.
In Figure 7, the gray boxes span parts of the extract in which a given unit is notationally and rhythmically present (indicated by the notes to the left of the diagram). As the boxes show, the minim serves as a common unit for this extract. Imperfect semibreve units are also very common; with the exception of the two triple minim units, the imperfect semibreve unit is always present. However, the grouping of these imperfect semibreve units remains largely ambiguous. Only two triple imperfect semibreve units are projected by the notation (bb. 3–4 and 7–8). The remainder of the imperfect semibreves could arguably be grouped into twos or threes. It is even possible that the singer would not have kept track of longer units at all, and used the semibreve as the longest timespan in order to overcome the ambiguity of the breve units.

That the minim rests serve not only to syncopate longer notes, but also to project localized major prolation and thereby to instruct the reader to count in minims, indicates that notations of this period were at times chosen that could tell performers not only how to sound timespans, but how to count them. I now examine this idea in further detail through the lenses of notational and rhythmic preparations.

48 In modern metric theory this is termed the “unit pulse.” Cohn, “Complex Hemiolas,” 302.
Preparation

The idea that it is possible to ease a transition between two proportionally distinct pulse-hierarchies is described in meter literature as “metric preparation” or “metric priming.” Harald Krebs has discussed this concept in relation to nineteenth-century repertory, stating that metric preparation occurs when a transition from metric consonance to dissonance takes place gradually. This is achieved when “two attacks […] create the time span about to be featured within an actual dissonant level.”\(^{49}\) This refers to the use of a preparatory rhythm that introduces a pulse that is shared between both the “consonant” and “dissonant” layers. By entraining to this shared pulse a performer can transition between the consonant and dissonant layer without having to navigate a challenging proportional shift.

In the context of late-medieval song, it would be anachronistic to speak of the preparations that occur between proportional passages as “metric preparation” because the term implies the existence of a dissonant layer that is subordinate to or conflicting with a consonant layer. As I observed in the previous chapter, syncopations are conceived primarily as “divisions” and “regroupings” of perfections, rather than as dissonances per se. Further, because songs are not “in” a given mensuration (which here stands in for what modern theorists such as Krebs might refer to as meter), it would be incorrect to speak of a dissonant layer that sounds in conflict with a consonant layer. Even though black full notes (or at times void notes, as will be illustrated below) may be regarded as a “default” notational device, it does not necessarily follow that they represent a hierarchically prior and therefore consonant mensuration.

To consider what preparation might be in late-medieval music, it is thus first necessary to examine how meter may be conceived of in this repertory. According to Graeme Boone, medieval meter differs from modern conceptions of meter that describe hierarchies of neutral pulses or durationless time-points. He suggests that meter in mensural music can be theorized more appropriately in terms of hierarchically ordered timespans, and that the term *tactus* can be used to describe the periodicity of mensural music.50 *Tactus* refers to the physical motion of singers, or the process of “touch” that they underwent in order to keep time. Boone argues that *tactus* sits in opposition to the neutral pulse of modern metric theory both because it implies duration, and because its association with physicality encompasses the notion of hierarchy.51 Boone further suggests that the neutral pulse of modern metric theories may be replaced with *ictus*. *Ictus* is a “variable, point-related emphasis” that is present on a variety of rhythmic levels in mensural music and that often, but by no means always, corresponds to mensuration.52 Responding to Boone’s analyses, David Maw has developed what he terms a “fully metrical understanding” of Machaut’s music. In his theory, uniform beats are distinguished qualitatively from one another according to their position within the measure. This develops Boone’s model, in which *ictus* is distinguished primarily quantitatively.53

DeFord has also provided a framework for the analysis of mensuration and rhythm through the lens of *tactus*. Again, DeFord treats *tactus* in relation to repertory written in the fifteenth century and beyond—a context slightly later than the examples addressed in this chapter. As she observes, the term *tactus* was not fixed, and incorporated concepts such as the

50 Boone suggests that this reflects the Aristotelian definition of time as a “measure of motion,” that was prevalent in the Middle Ages. This is because Aristotelian theorization of time problematizes the idea that a given moment can exist, thereby negating the prospect of a neutral extensionless pulse. Boone, “Marking Mensural Time,” 31.


physical motion of tapping, the time-unit present in periodic rhythms, or the time-unit associated with a mensuration sign. Each of these definitions could be applied to the concrete or abstract (theoretical) quantity of the time-unit. Serving as a note by which all others in a piece are measured, the tactus could be subdivided or grouped to form a framework of mensural levels. At times more than one note could simultaneously take on the role of the tactus—depending on the compositional makeup of a piece or the gestures of a given performance—leading the tactus to move between different levels over the course of a piece. Because tactus is related to the contrapuntal structure, rhythm, and text setting, mensural structure can be hierarchical. However, the relationships between each of these factors are complex and at times contradictory, further complicating the hierarchical picture of a piece.

These definitions of meter in mensural music consider how such music would have been experienced from the perspective of a listener. As I discussed in the previous chapter, the experience of a performer of this repertory is arguably distinct from that of a performer who reads from a modern score, or indeed a listener. Although it is the case that modern ensemble performers often read music in parts, medieval repertory is consistently edited in score layout. A performer of late-medieval repertory, on the other hand, would have had access visually only to the individual parts of a composition. Thus, to consider the relationship between notation and the experience of musical time, the individual voices can be considered in

54 DeFord, Tactus, Mensuration, and Rhythm, 51–2.
55 DeFord, Tactus, Mensuration, and Rhythm, 82.
56 DeFord, Tactus, Mensuration, and Rhythm, 82.
57 Exceptions to this may be found in the keyboard tablature of manuscripts such as Fzč117 and Lbl28550. Fzč117 is a particularly curious example, because the entire codex contains mensuration strokes to delineate the breve unit, in a manner similar to a modern barline.
isolation from one another. The following examples take this approach, and consider how both rhythms and notations were chosen to aid an individual performer in their navigation of complex proportions. I will illustrate that notations were chosen that could instruct a performer how to count sounded temporal units and those that were silently thought.

As Anne Stone has observed, rhythms were at times chosen that could encourage a musician to count a specific time unit, thereby helping a musician calculate a transition between two different proportions. Stone terms this device “metric modulation,” and provides an example in the anonymous rondeau Se j’ay perdu, copied in Ob213, f. 114r. In Se j’ay perdu, this occurs in a passage where the musician must transition between imperfect modus with imperfect tempus and minor prolation <2,2,2>, indicated by the sign ◯, and perfect tempus with minor prolation <3,2>, indicated by the sign ○. As Stone notes, the ◯ sign indicates diminution, as such two breves of ◯ in this passage take the time of one under ○. The durations of the semibreves and minimis under ○ and ◯ are thus in sesquitertia proportion (4:3) with one another. To transition between these two proportions, the scribe inserts the following rhythm using coloration: SSBSS. As Stone observes, coloration here is used to indicate sesquialtera proportion (3:2). This means that the whole unit of the six colored semibreves (counting the breve as two semibreves) takes up the time of two void breves of ◯, and one void breve of ○. A transcription of the passage to which Stone refers is shown in Figure 8, along

---

58 Stone takes this approach in her analysis of Se j’ay perdu (to be discussed below). See: Stone, “Self-Reflexive Songs,” 185–9. Henry Burnam has argued for the inclusion of metric analyses that consider the individual voices of compositions copied in mensural notation. Henry Burnam, “Contradictory Perspectives in Machaut’s Motet 5: Mensuration, materia, Sonority,” American Musicological Society Annual Conference, Minneapolis/ Virtual Conference, 2020. Burnam develops his theory from the so-called “experiential” mensuration that has been theorized by Karen Desmond, whereby the meter of a composition is analyzed as if it were being heard (or performed) in time. Desmond, Music and the moderni, 212.

with an extract of a diplomatic transcription of Stone’s edition of the song for reference. The proportional relationships between notes are illustrated in Figure 9.

Figure 8: Opening of the cantus of *Se j’ay perdu*\(^6\)

![Original notation]

![Alternative notation]

Figure 9: Proportional relationships between notes in *Se j’ay perdu*

![Proportional relationships table]

As can be seen in Figure 9, void semibreves under \(\circ\) are equal in duration to colored breves under \(\triangledown\); void minims under \(\circ\) are equal in duration to colored semibreves under \(\triangledown\). The

---

\(^6\) Stone, “Self-Reflexive Songs,” 191. Notes under \(\circ\) are reduced 4:1, reflecting that the song is written in diminution by means of a verbal canon. This means that notes under \(\triangledown\) are reduced 8:1.
durations of this passage may therefore be notated alternatively by placing the o before the colored passage, and using void notation, as follows:

Figure 10: Alternative notation of Figure 8

Stone suggests that the colored semibreves reintroduce a timespan equivalent to the void minims under o, which provides a shared “beat” between notes under >, o, and perfect tempus with major prolation <3,3> or o. The coloration thus instructs the reader to count colored semibreves that follow the > sign, which are the same in duration as the minims of o.

Figure 11 translates Figure 9 onto Cohn’s ski-hill graph, which provides a two-dimensional matrix for the representation of the proportional relationship between notes. The diagram is similar in concept to Torkesey’s triangle that was discussed in Chapters 1 and 2. However, there are a number of conceptual differences between the two diagrams. First, Cohn’s ski-hill graph represents the relationships between pulses as they exist in musical meter

---

61 Stone, “Self-Reflexive Songs,” 188.

62 As Stone observes, a transcription obscures the subtle interplay between unit levels in this passage because it privileges the “collective mensura,” rather than the different measures of each individual voice. Stone, “Self-Reflexive Songs,” 189.

63 Richard Cohn, “Complex Hemiolas,” 295–326.

64 Cohn discusses the similarities between his model and Torkesey’s in Cohn, “Graph-Theoretic and Geometric Models of Music,” 237–55.
in the modern sense, whereas Torkesey’s diagram represents “variatione sex specierum
notabilium”\textsuperscript{65} [the differences between the six species of “things that can be notated”].
Torkesey is not clear what exactly he means by “things that can be notated.” It is possible that
he is referring to the notes themselves, or their timespans as they are calculated through the
accumulation of simplae, or even both. As he observes in his treatise, timespans can be
grouped when one regards them to be mathematical quantities, i.e. as groups of indivisible
units, or divided when they are viewed as spans of musical time.\textsuperscript{66} As I noted above, scholars
such as Boone and Maw have argued that the meter of mensural music may be thought of
more productively as ordered timespans, rather than the neutral pulse-streams of modern
theories. Thus, while I make use of Cohn’s diagram, I operate under the assumption that the
nodes of the ski-hill graph here represent timespans, rather than pulses per se.

Another conceptual distinction between Torkesey’s triangle and the ski-hill graph is
that Torkesey places his minimally short unit at the top of the triangle, whereas Cohn orders
pulses from slow to fast descending. Adapting this to my reading, in which pulses are replaced
conceptually with ordered timespans, one proceeds downwards from longer to shorter
timespans to read this diagram. The diagonal lines connecting the nodes on the graph
represent integral timespans. To the left, timespans are divided duply; to the right, they are

\textsuperscript{65} Torkesey, “Declaratio trianguli et scuti,” ed. Gilles and Reaney, 58.

divided triply. I include ratios to further aid the reader navigate the *sesquialtera* proportions depicted on the graph.\textsuperscript{67}

Figure 11: Figure 9 mapped onto the ski-hill graph

The ski-hill graph illustrates the difficulty of a given proportional shift by representing graphically the relationship between time-units. Timespans that are integrally proportional to one another can be traversed without significant difficulty. For example, the span of the \( \circ \) void breve at the top of the diagram can be divided into the span represented by the two \( \circ \) void

\textsuperscript{67} In modern metric theory the Greek term hemiola is typically used to describe the 3:2 proportion. Although medieval theorists at times used the term *emiola* to describe this proportion, they most commonly referred to proportions using the Latin terms for rhythmic proportions. An exception to this is *TnJ.II.9*, which makes extensive use of the Greek terms for proportions. Due to the clear evidence of Cypriot influence in the codex, it has been assumed historically that *TnJ.II.9* was copied in Cyprus in the early fifteenth century. However, Karl Kügle has argued recently that the codex was most probably copied in Italy in order to promote Brescian interests on the island, principally through the patronage of Pietro Avogadro. Kügle, “Glorious Sounds,” 648–68. The Greek names may have been employed in this manuscript to describe proportions to emphasize the Cypriot connections of this codex. For a discussion of the Cypriot figures discussed in *TnJ.II.9*, see: Barbara Wiems, “Historical Figures from Cyprus Mentioned in the Manuscript Turin J.II.9,” in *The Cypriot-French Repertory of the Manuscript Turin J.II.9*, ed. Ursula Günther and Ludwigs Finscher (Neuhausen-Stuttgart: American Institute of Musicology, 1995), 55–76. Stone observes that the Greek names for proportions are typically used to describe the proportions of pitch, but that they were also employed by the author of the anonymous Hebrew music theory treatise copied in *Fñ70* to describe rhythmic proportions. See: Stone, “The Ars Subtilior in Paris,” 387.
breves, as shown by the diagonal path leading to the left. These timespans are in *dupla* (2:1) proportion. Following the path to the right the span of the ○ void breve may be divided triply into the spans represented by the ○ void semibreves or ○ full breves. Timespans that are placed across from one another are in *sesquialtera* proportion (3:2). This proportion also does not present significant challenges, since any two timespans that are in *sesquialtera* proportion share a common unit, such as the spans of the ○ void breves and ○ void semibreves, which share the span of the ○ void breve as a common unit. However, the further one moves away on the ski-hill graph through horizontal motion, the more challenging a proportion is to sing. For example, the spans of the ○ void semibreves and ○ void semibreves are in *sesquitertia* proportion (4:3) with one another. This is more difficult to sing because, as is shown on the graph, they traverse two *sesquialtera* pairs.

Having considered the proportional relationships between the timespans represented by the notation of *Se j’ay perdu* on the ski-hill graph, I would suggest that the colored notes provide a means for the musician to transition between ○ and ○ whilst counting semibreves. As Anna Maria Busse Berger has noted, theorists such as Prosdocimus state that in navigating proportions, a musician should compare like notes with like.68 By introducing coloration, the singer can count void semibreves of ○ before transitioning to the colored semibreve—a navigable *sesquialtera* proportion (3:2). The reader can then switch to the void semibreve of ○, which sits in unproblematic *dupla* (2:1) proportion with the colored semibreves. This is easier than a direct transition between the void semibreve of ○ and the void semibreve of ○. The

---

notation thus prepares the reader to transition through what would in modern parlance be regarded as a double-hemiola.69

*Bartolomeo da Bologna’s Que pena maior*

Passages in which notation is chosen that can help to prepare proportional changes are comparatively rare in late-medieval repertory (I will return to some examples below). However, rhythms that provide a shared unit between an outgoing and incoming proportion are ubiquitous. Although not all proportions are prepared in the repertory copied in manuscripts such as *MOe5.24* and *Ch564*, preparations are sufficiently common to be indicative, I would suggest, of a conscious effort to integrate smooth transitions between complex proportions. I provide an example to illustrate how this process can be achieved.

To begin, consider the extract of Bartolomeo da Bologna’s *Que pena maior* in Figure 12.70 I provide a score with note values reduced by half for reference. Figure 13 represents the proportional relationships between the notes of this passage. The upper voice of the passage is preceded by a o mensuration sign, indicating that black full notes are to be read in perfect *tempus* with minor prolation. A proportional grouping is also present at the level of the breve. We can thus theorize *modus*, which is imperfect—each longa can be divided into two perfect breves <2,3,2>. Unconventionally, red coloration here indicates that semibreves are perfect

---

69 Timespans are in double-hemiola when they traverse two hemiola (or *sesquialtera*) pairs. See: Richard Cohn, “Metric and Hypermetric Dissonance in the Menuetto of Mozart’s Symphony in G Minor, K. 550,” *Intégral* 6 (1992), 13.

70 Stoessel has argued that *Que pena maior* constitutes one of the “strongest examples” of the meeting of the intrinsic and extrinsic notational systems, because the durations of notes are contingent not only upon shape and context, but also mensuration and proportion signs. Indeed, a number of specific durations are represented using several different noteshapes in the context of different proportion signs in the song. Stoessel, “The Captive Scribe,” 191.
and contain three minims.\footnote{Zayaruznaya has observed that red notes typically project perfect \textit{tempus} with minor prolation where black notes project imperfect \textit{tempus} with major prolation. Anna Zayaruznaya, \textquotedblleft The Making of Philippe de Vitry\textquotedblright (draft).} The relationship between red breves and longae remains the same \(<2,2,3>\). A numeral 3 proportion sign indicates perfect \textit{tempus} with major prolation \(<2,3,3>\) in the time of the breve unit of perfect \textit{tempus} with minor prolation following the \(\circ\) sign \(<2,3,2>\). The passage also features white void caudated semibreves \(\gamma\), three of which take the time of two imperfect semibreves, i.e., four minims. For each longa unit, there are thus three imperfect void breves, resulting in perfect \textit{modus} \(\langle3,3,2\rangle\). In the contratenor, a half-colored semidragma \(\uparrow\) takes the time of one and a half minims.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure12.png}
\caption{Extract of da Bologna’s \textit{Que pena maior}\footnote{\textit{MOe5.24}, f. 36v. Used by permission of the Ministry for Cultural Heritage and Activities and for Tourism. Estense Galleries, Estense University Library. Notes are here reduced 2:1.}}
\end{figure}
As can be seen in Figure 12, while this passage is preceded by a ♫ mensuration sign, its rhythmic makeup is not characterized by periodicity at the level of the imperfect semibreve. Consider, for example, the first two breve units. Here, trochaic semibreve–minim units are combined with perfect semibreves resulting in syncopations of the imperfect semibreve unit, and with them phenomenal duple division of the breve unit. Following this, a breve is imperfected by a minim rest and a minim, suggesting triple division of the breve. In b. 4, the reader is confronted with two adjacent minim rests. As I outlined above, the way the rests are drawn is usually associated with major prolation. The intrinsic notational signs of this passage
thus imply a mixture of phenomenal triple and duple minim groupings, despite the o mensuration sign.

In b. 6, three void caudated semibreves occur, taking up the time of one imperfect breve. The spans of the black imperfect semibreves are in sesquialtera (3:2) proportion with those of the void caudated semibreves. The black perfect breve unit (worth six minims) also sits in a sesquialtera (3:2) proportional relationship with the unit that the void caudated semibreves span as a group—the span of the void breve, or the imperfected black full breve, both of which span the duration of four minims. The span of the void caudated semibreves may also be subdivided implicitly in half, resulting in a temporal duration equivalent to the minims that follow the 3 proportion sign. The spans of the black full o minims also sit in a sesquialtera (3:2) proportion with the minims following the 3 sign.

Figure 14 translates the relationships between notes onto the ski-hill graph. As the diagram illustrates, one must traverse three levels of sesquialtera (3:2) proportion to transition between black notes following o and the units projected by the void caudated semibreves. The transition that a singer would undertake between these two groupings is thus challenging. Taking into account the duple division of the breve unit into perfect semibreve units <2,2,3>, as is the case in bb. 1–2, this difficulty is compounded, since, as is shown in the ski-hill graph, this grouping is distant from the units projected by the void caudated semibreves by four horizontal levels. The spans of the red (perfect) semibreves sit at a dupla sesquiquarta relationship (9:4) with those of the void caudated semibreves.

---

73 In modern parlance, this would be termed a “complex hemiola.” Cohn, “Complex Hemiolas,” 295.
Despite the difficulty of this passage, I would suggest that the reader is provided with a prop to transition to the void caudated semibreves. Consider again bb. 5–6 of the cantus (see Figure 15 below). In b. 5, the reader sings a breve, imperfected by a minim rest and a minim. In b. 6, another minim and a minim rest lead into the three caudated semibreves. While the rhythms of these two breve units may be interpreted within the framework of perfect tempus with minor prolation, they may also result in two localized imperfect breve units, which prepare the arrival of the void caudated semibreves. This reading is further supported by the rhythm of contratenor, in which the onset of the imperfect breve unit is made audibly present by the higher register (marked by the circle in b. 5). Although the two preceding breve units outline the imperfect breve unit less distinctly, the rhythmic profile does not contradict a reading in which a musician counts imperfect breve units. This is represented in Figure 15, which analyzes the cantus only.

In Figure 15, the vertical dashed lines demarcate perfect breve units (worth six minims following the \( \circ \) sign). The horizontal lines depict the presence of a given time-unit. The full
lines indicate that a given temporal unit is phenomenally present, or implied by virtue of the presence of a longer timespan within which it is contained. For example, the \( \text{\textcircled{0}} \) minim unit is deemed to be present throughout bb. 1–5 even if it is not necessarily sounded throughout this span, such as in the red semibreve units of bb. 1–2. The dashed lines indicate that a temporal unit is potentially present, and thus may serve either as a preparation for a duration that will become actually present, or one that was present, but may no longer be depending on how the musician chooses to feel the music.\(^7\) In this reading, the imperfection of the black full breves results not only in shorter notes, but also creates the potential for a duple grouping of imperfect semibreve units. In other words, the rhythms of bb. 3–5 can be read either in perfect or imperfect breve units, depending on the performer's choice. This is illustrated by the horizontal dashed lines. If the musician chooses to count imperfect breve units, this can help to prepare the void caudated semibreves. Following this, the void caudated semibreves in b. 6 may be divided in two, a duration equal to that of the minims following the 3 proportion sign. If the performer choses to do this, they can use the void caudated semibreves to prepare themselves for the arrival of the triple proportion.

\(^7\) According to Hasty: “Projective potential is […] the potential of a past and completed durational quantity being taken as especially relevant for the becoming of a present event.” This theorization can perhaps help to clarify the preparation that occurs here, since the triple void semibreve (or imperfect breve) unit enables the past rhythms to be interpreted as pertinent to this proportional passage. Hasty, *Meter as Rhythm*, 84.
Figure 15: Preparation for void coloration in the cantus

The extract of *Que pena maior* discussed here provides rhythmic preparation for a brief proportional shift, and in this regard may be viewed as representative of the majority of preparations. However, a handful of compositions feature different notations that sign the same duration. These signs can inform a musician how they should count, thereby preparing them to transition through proportional passages. In the following examples, I will argue that the flexibility inherent within the non-standardized notational systems employed in repertory of this period created the opportunity for preparations to be visualized using notation. Such notations can instruct a performer to count a specific time-unit, and at times an internalized unit that is thought but not sounded. I suggest that examples of preparations such as these, whether they make use only of preparatory rhythms or notation as well, demonstrate that medieval notators shaped their music to the needs of performers.
Je ne puis avoir plaisir

Figure 16 shows an extract of the anonymous virelai, *Je ne puis avoir plaisir*. As the image shows, in addition to the simple black mensural notes, the song features caudated semibreves ⚫, and dragmae ⚫. Red coloration and mensuration/proportion signs (○, c, and □) are also used. In this first example, I will suggest that coloration is chosen that indicates not only how the duration of notes should be sounded, but also how they should be subdivided internally. This indicates that the scribe (or composer) of this song was aware that transitioning between proportional passages can be made easier if a performer counts a temporal unit that is shared between proportional groupings.

Figure 16: Extract *Je ne puis avoir plaisir*\(^{75}\)

At the opening of the song, a combination of intrinsic notational signs and counterpoint point towards the triple grouping of imperfect semibreves, i.e., perfect *tempus* with minor prolation <3,2>. By the fourth breve unit (signed by the star*) a new duple division of the breve unit is introduced by a □ sign, and reinforced by the use of caudated

\(^{75}\) *Ch564*, f. 24r.
semibreves ♯ and dragmae ♯. After a brief return to ○—this time indicated by a mensuration sign—○ returns, this time with red dragmae ♯. As is illustrated in Figure 17, three of these notes sound in the time of a caudated semibreve, and are thus equal in duration to black full minims. Redundant in duration, they nevertheless depict the duple division of the breve into groups of three red dragmae, and are thus distinguished from minims in their groupings.

Figure 17: Notation of "Je ne puis avoir plaisir"77

Figure 18 translates Figure 17 onto the ski-hill graph. As Figures 17 and 18 show, the notation of "Je ne puis avoir plaisir" facilitates the writing of three different ways of dividing up the breve. Black full breves and minims project perfect tempus with minor prolation <3,2>; black full breves, caudated semibreves, and black dragmae project imperfect tempus with minor prolation <2,2>; and black full breves, caudated semibreves or red semibreves, and red

---

76 Stoessel, “The Captive Scribe, 275. This song is also copied in MOe5.24, where the scribe uses ♯ with dragmae.

77 For the sake of simplicity, I am here excluding the brief passage of ○ that occurs in the cantus.
draagmae project imperfect tempus with major prolation $<2,3>$.\textsuperscript{78} Figures 17 and 18 illustrate how these notes relate to one another. The spans of normal semibreves and caudated semibreves are in subsesquiatera (2:3) proportion to one another, as are the spans of the minims and red dragmae with the black dragmae. The unit shared between all notes is the breve (worth six minims).

Because the duration of the breve is shared between notes in $\circ$ and $\circledast$, transitioning between simple black full notes and dragma can be achieved by counting in breves, and switching between dividing this unit into two or three. This process is represented in Figure 19, which analyzes the time-units of an extract of the cantus. The vertical dotted lines mark off each breve unit (worth six minims following the $\circ$ sign). The horizontal lines show the presence of each temporal unit over the course of the extract. As the continuous line at the top of the diagram shows, the breve unit is present throughout this passage and remains undisturbed (for example through syncopation). The lower lines show that breve units 1–3 and 6–7 contain imperfect semibreve units (and therefore minim units, implicitly); bb. 4–5

\textsuperscript{78} Because breve equivalence is maintained through the use of special noteshapes and coloration, this constitutes arguably an instance of traynour in the sense described by the author of the Tractatus figurarum (see Chapter 4).
contain caudated semibreve and dragma units; and bb. 8–9 contain caudated semibreve and red dragma units.

Figure 19: Je ne puis avoir plaisir opening of cantus

Although the breve unit is present throughout the example shown in Figure 19, this is not the case throughout the song. Figure 20 shows a more complicated example, where syncopations disrupt the stable periodicity of the breve. In this passage, the first transition that takes place between ◯ and ◦ in bb. 1–4 presents a minimal challenge because the breve unit remains undisturbed throughout (indicated by the continuous line at the top of the diagram). From bb. 5–8, this stability is disturbed through the interjection of syncopations of the caudated semibreve unit and with it the breve unit (see dashed horizontal lines). Following this, two red semibreves appear in the cantus (b. 8), before the ◯ mensuration sign. The return of the triple imperfect semibreve units associated with perfect tempus is complicated by the

---

79 Ch564, f. 24r. Notes in the transcription are reduced at a value of 2:1.
interjection of another syncopation (this time via a rest) in b. 9. The trochaic rhythmic pattern that ensues is characteristic of notes that project imperfect *tempus* with major prolation. A breve imperfected by two minims (b. 10) signals the return of the phenomenal triple division of the breve unit.

Figure 20: Disruption of the breve unit

Notes in the modern transcription are reduced at a value of 2:1.

---

80 Notes in the modern transcription are reduced at a value of 2:1.
As is illustrated in Figure 21, the red semibreves of b. 8 are equal in length to the caudated semibreves that preceded (\(\uparrow\rightarrow\)). The passage could thus be notated alternatively like this:

Figure 21: *Je ne puis avoir plaisir*, alternative notation

Because red was earlier associated with the triple division of the caudated semibreve (see Figure 19, bb. 8–9), the red here implies the sixfold division of the breve in two groups of three implicit red caudated semibreves \(\uparrow\uparrow\uparrow\uparrow\uparrow\uparrow\).\(^{81}\) I would suggest that the use of red notation here helps to prepare the transition back into black semibreves and minims. Although the singer would already have been required to transition between caudated semibreves and semibreves before, the syncopations of bb. 5–8 disrupt the breve unit. A singer might thus very plausibly switch from counting breves to counting dragmae at this point. By inserting red notes, the scribe informs the singer that although the breve unit is still divided in half, these halves now contain three parts, not two, i.e., a duration equivalent to the black minims to come. The red notes thus encourage the singer to switch from counting black dragmae to the implicit red dragma unit. This makes it easier to transition back to \(\circ\) because the singer is required to navigate the *sesquialtera* (3:2) proportional relationship between the

\(^{81}\) Stoessel observes this implicitly in his edition, where he transcribes these red semibreves as dotted quarter notes, implying the division of these notes into three parts, whereas caudated semibreves are transcribed as duplets.
spans of black and red dragmae (bb. 7–8) and then the *sesquialtera* proportional relationship between the spans of red semibreves and black semibreves (bb. 8–10) in succession, rather than having to traverse two *sesquialtera* pairs simultaneously. This provides greater security in a transition back to \( \circ \), despite the conflict between the threefold division of the breve in b. 10 and the syncopations of the contratenor in bb. 9–10 because the temporal unit equal to minim/red dragmae is shared between red and black semibreves.

**Je la remire sans mesure**

Although what I am here terming notational preparation is uncommon in late-medieval repertory,\(^{82}\) it is interesting to note that a pattern of rhythmic preparation that is very similar to that of *Je ne puis avoir plaisir* can be found in *Je la remire sans mesure*, a virelai copied in *MOe5.24* (f. 34r). The notation of this song is remarkably similar to *Je ne puis avoir plaisir*, with the single exception that it does not feature any red coloration. Throughout *Je la remire sans mesure*, as was the case in *Je ne puis avoir plaisir*, proportional shifts are not generally prepared. However, when a syncopation is introduced using caudated semibreves and dragmae that disrupts the breve unit, this is carefully bookended in such a manner as to allow the musician to transition between aligning themselves with the semibreve and dragma unit.

As is illustrated in Figure 22, the syncopation that occurs in bb. 3–4 disrupts the prevailing perfect breve unit, as well as the caudated semibreve unit, making it easier to count in dragma (shown by the dashed horizontal lines leading from the breve and caudated semibreve, as well as the full line leading from the dragma). Because the minim spans sit in *subsesquialtera* proportion \((2:3)\) with those of the dragmae, and the spans of the imperfect semibreves in *subsesquialtera* proportion \((2:3)\) with those of the caudated semibreves, the singer

---

\(^{82}\) I will provide one more example below.
must navigate two *subsesquialtera* pairs to transition into b. 3 and back in b. 5. This results in a more challenging *sesquitertia* (4:3) proportional relationship (as was the case in the example shown in Figure 20) without the shared breve unit (which is syncopated). The gestures entailing one semibreve followed by two rests in bb. 2 and 5 provide opportunities for the singer to transition gently back and forth between the semibreve and the dragma because they can internally subdivide the breve unit into two (and therefore four) during b. 2. They may undertake this process in reverse in b. 5.

Figure 22: Rhythmic preparation in *Je la remire sans mesure*, contratenor

---

83 The difficulty of transitioning a *subsequialtera* pair is the same as a *sesquialtera* pair, since the two proportions are merely in reverse.

84 *MOe5.24*, f. 34r. Used by permission of the Ministry for Cultural Heritage and Activities and for Tourism. Estense Galleries, Estense University Library. Notes are reduced 2:1 in the transcription.
Leonel Power’s Et in terra\textsuperscript{85}

In this final analysis, I again provide an example in which notation is used to prepare the singer to navigate a proportional shift. This time, the same rhythm is depicted using two different kinds of notation that prepare a \textit{sesquialtera} proportion that occurs between more than two pairs. I suggest that, similar to the examples shown above, notational preparation is used to specify which timespan a singer should count, thereby decreasing the challenge of undertaking proportional shifts.

Described by Margaret Bent as a notational “tour de force,” Leonel Power’s \textit{Et in terra}, copied in \textit{Lbl57950},\textsuperscript{86} ff. 17v–18r, is remarkable in its use of notation. The song contains black and red void coloration, red coloration, proportion signs, and—along with an anonymous \textit{Credo}, no. 72, copied on ff. 62v–63r—is unique in its use of blue coloration.\textsuperscript{87} Because this song is characterized by such unusual notational features—in particular the use of blue coloration, but also the unconventional use of red coloration—the notation appears to hinder performance of the song.\textsuperscript{88} In the following example, I suggest that the scribe chose notation

\footnotesize
\begin{itemize}
\item\textsuperscript{85} As an appendix, I have included diagrams of the notation of this fascinating composition.
\item\textsuperscript{87} Blue coloration is mentioned in two later English treatises by John Tucke (c. 1500) and John Dygon (1530s). See: John Dygon, \textit{Proportiones practicabiles secundum Gaffurium=Practical Proportions According to Gaffurius. A New Critical Text, Translation, Annotations, and Indices}, ed. Theodor Dumitrescu (Urbana: University of Illinois Press, 2006); Roland Woodley, \textit{John Tucke: A Case Study in Early Tudor Music Theory} (Oxford and New York: Clarendon Press; Oxford University Press, 1993). The anonymous Hebrew author whose treatise is copied in \textit{Fn70} and discussed in Chapter 3 also advocates for the use of azure ink. See: Stone, “The Ars Subtilior in Paris,” 387.
\item\textsuperscript{88} Bent, “The Old Hall Manuscript,” 172. In addition to the edition Bent prepared with Andrew Hughes, she has also discussed the peculiar notational features of the song in the following unpublished draft: Margaret Bent, “Principles of Mensuration and Colouration.” See also: Hughes and Bent, eds. \textit{The Old Hall Manuscript}, vol. 1, 44–9.
\end{itemize}
that facilitated ease of reading. Although I will focus primarily on one notational preparation, rhythmic preparations occur throughout the song.

Consider the example shown in Figure 23, which is transcribed from the opening of the song. As the figure shows, the triplex voice begins with black full mensural notes. These are followed by two void breves and a $\cdot$ sign, which is followed by black full notes and red void notes. A mensuration sign is not provided at the opening of the Et in terra. However, following the counterpoint and intrinsic notational signs, it can be determined that the black notes at the opening of this extract project perfect tempus with minor prolation <3,2>. Following convention, void breves are half as long as full perfect breves. Again, following contemporaneous conventions, the $\cdot$ sign indicates a sesquitertia (4:3) proportional relationship between the spans of the black full semibreves and minims that precede the $\cdot$ sign and those that follow. These notes thus project imperfect tempus with minor prolation with breves at a dupla (2:1) proportional relationship <2,2,2>. I provide a transcription for reference.
The relationships between note durations are illustrated in Figures 24 and 25. As one may see in these diagrams, void breves are equal in duration to the black full breves that follow the △ sign.

---

89 This is transcribed from Lbl57950, ff. 17v–18r. As the reader will observe, the black full notes in the triplex voice are reduced 4:1, but those of the contratenor and tenor are reduced 2:1. This is because the song features the so-called “error angelorum,” [error of the English] whereby the black full semibreves of the upper voice (which, recall, project perfect tempus with minor prolation <3,2>) are equal in duration to minims in the contratenor and tenor, whose black notes project imperfect tempus with major prolation <2,3>. I have elected to avoid using ficta in my transcriptions throughout the dissertation. However, ficta can be helpful in a transcription that is used by performers who cannot read mensural notation. Hughes and Bent thus raise the Cs leading to the cadence (b. 3) in the triplex voice in their edition. Hughes and Bent, eds. *The Old Hall Manuscript*, vol. 1, 44.
Figure 24: Relationships between black full notes, void notes, and notes following ♩ sign at the opening of the triplex of Power’s Et in terra.

Because void breves and black full breves following the ♩ sign are equal in duration, one could move the proportion sign to the left of the two void breves, and replace these with black full breves without altering the rhythm of the passage, as is shown in Figure 26.

---

90 For simplicity, I have elected to exclude modus-level groupings from these diagrams. However, modus is present throughout the song, with coloration at times used to sign proportional changes at the level of modus.
Superficially, the void breves could seem redundant, since they are equal in duration to the black full breves that follow the ♪ sign. However, I again suggest that, as we saw in *Je ne puis avoir plaisir*, notation was here chosen that can assist the singer as they navigate the *sesquitertia* (4:3) proportional relationships. Specifically, a singer may switch from counting in imperfect semibreve units (and with them the black full perfect breve unit) to the void breve. This helps a musician achieve a smoother transition to the black full breves following the ♪ sign, which are equal in duration to the void breves, because the void coloration effectively instructs the reader to divide the black full breve in half, resulting in a navigable *dupla* proportion (2:1).

Figure 27 provides an analysis of this preparation. The vertical dotted lines demarcate perfect breve units. As the horizontal line at the top of the diagram shows, the perfect breve unit is shared between notes before and after the proportion sign. For the first two breve units, the intrinsic notational signs pose no difficulties when reading perfect *tempus* with minor prolation. In the third breve unit a syncopation displaces the imperfect semibreve unit, resulting in a trochaic rhythmic pattern that is characteristic of imperfect *tempus* with major prolation. While the void breves that follow (b. 4) prepare the transition into the notes that
follow the ♪ sign, the trochaic pattern of b. 3 in Figure 27 also audibly divides the breve into two parts, and may thus be regarded as further preparation for the void breves.

Figure 27: Notational preparation in Power’s *Et in terra* 91

The examples in this chapter have been drawn from songs where notations or rhythms are chosen that can aid a smoother transition between complex proportions, and that at times instruct musicians to count time units that are thought but not sounded. I have suggested that these examples highlight that songs written using complex notations may at times be regarded as “music for the mind” as much as “music for the eyes.” This resonates with the way that medieval people appear to have conceived of mensuration—as an attribute that exists in individual notes, but that is realized through the experience of a performer or listener.

---

91 *Lbl57950*, f. 17v.
In the analytical examples in this chapter, I have considered the perspective of a musician who ignored the other parts of a composition, and focused primarily on the proportional shifts of their own part. However, in reality performance is a dynamic process that entails many different kinds of listening. Different components of a piece may thus be brought into focus depending on how an individual listener or performer focuses their attention. In modern psychological literature, the different ways in which a person may direct their attention to a specific part or parts of a musical performance is termed “integrative attending.” As Paul Keller has observed, integrative listening may be “prioritized” when a single part or a subset of parts is prioritized over others, leading these parts to be assigned a substantial proportion of attentional resources. It may also be “non-prioritized” when all parts are treated as equally important.

Taking into account the potential for prioritized and non-prioritized listening provides an avenue of future research into the experience of singing and listening to medieval songs. Presented in individual parts, mensural music offers the potential for a plurality of different interpretations that are shaped by how a musician directs their attention while listening, as well as their visual experience reading an individual part. The extreme rhythmic complexity of some late-medieval songs, as well as the flexibility and variety of their visual representations provide a particularly rich locale for such research.

92 In modern psychological literature, this is termed “selective attention.” Where attention is paid to two or more parts, this is termed “divided attention.” Mari Riess Jones and William Yee, “Attending to Auditory Events: The Role of Temporal Organization,” in Thinking in Sound: The Cognitive Psychology of Human Audition, ed. Stephen McAdams and Emmanuel Bigand (Oxford: Oxford University Press, 1993), 70.


A consideration of modern psychological concepts, and indeed modern theories of musical meter, as they relate to medieval music risks falling foul of the charge of “trans-historical humanness.” The analyses of the present chapter take a subjective approach to the study of notation, and one that provokes the question of whether medieval people would have viewed the devices outlined here explicitly as preparation. Ultimately, it may be impossible to tell whether they did. Nevertheless, one way of approaching a solution to this problem, I would suggest, is to consider emic and etic perspectives in tandem with one another. My analytical approach has attempted to achieve this by using medieval theoretical ideas about mensuration to inform a subjective consideration of how a performer might have interpreted the notational signs presented before them. In the end, these analyses represent my own experience of reading this notation after singing and playing from facsimiles regularly over several years. While the experience of a medieval reader will arguably always be inaccessible, a consideration of how a modern person engages with this notation can provide a glimpse, perhaps, into the ways in which expert medieval musicians—far more experienced as they must have been—might have harnessed the flexibility of their notations to make sense of the complex proportional shifts and intricate rhythms of their compositions.

---

95 Christopher Page assumed the existence of this in the following: Christopher Page, Discarding Images: Reflections on Music and Culture in the Middle Ages (Oxford: Oxford University Press, 1993), 190. This was later problematized by Wegman. See: Wegman, “Sense and Sensibility,” 311. Zayaruznaya has argued that using cognitive studies to the music of the past may be less vulnerable to the charge of trans-historical humanness than other ways of applying modern prejudices to past music. Zayaruznaya, “Intelligibility Redux,” n21.

Appendix: Notation of Power’s *Et in terra*, *Lbl*57950, ff. 17v–18r

My interpretation of the notation of this song is very similar to that of Margaret Bent, as she sets out in: Bent, “Principles of Mensuration and Colouration.”
Tenor and Contratenor

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
Epilogue

Science has been taught too much as an accumulation of ready-made material with which students are to be made familiar, not enough as a method of thinking an attitude of mind, after the pattern of which mental habits are to be transformed.¹

In his address to the annual conference of the American Association for the Advancement of Science, the American philosopher John Dewey examined what he perceived to be a defect of modern science education. He lamented that science was too often taught as a body of knowledge, as pure content, and with the end of amassing information. In opposition to this, Dewey proposed that science could more productively be approached as “a mode of intelligent practise, an habitual disposition of mind,”² that is as a way of thinking about the world. Speaking in 1909, Dewey lived at a time before the teleological faith in “progress” had been replaced with the cynicism of postmodernism. Yet his belief that science education should entail the formation of “habits of mind” rather than the mere acquisition of knowledge, and indeed that knowledge of science itself must entail the habitual thought-processes necessary for empirical study, has become a mainstay of scientific education.³

The idea that learning forms habits of the mind has been taken up more recently by Sherry Turkle, who has conducted wide-ranging studies of the effects of computers on psychology. As Turkle observes:

The tools we use to think change the ways in which we think. The invention of written language brought about a radical shift in how we process, organize, store, and transmit representations of the world. Although writing remains our primary information


³ Although this is true in tertiary education and beyond, there is concern among some scientists that this method has not yet become widely established in education prior to the university level. See: Constance Steinkuehler and Sean Duncan, “Scientific Habits of Mind in Virtual Worlds,” Journal of Science Education and Technology 17 (2008), 530–1.
technology, today when we think about the impact of technology on our habits of mind, we think primarily of the computer.\textsuperscript{4}

Comparing the rise of the computer with the invention of written language, Turkle observes that the technologies that we use to disseminate information can have a profound effect on our psychology. She argues that the use of computers affects not only our social interactions and behaviors, but also the way we see the world itself, again the “habits of mind,” that shape our perception of reality.

In the context of historical studies, Leo Treitler has argued that the study of music writing demands that we not only cultivate habits of mind appropriate to our field of study, but that we try to “think ourselves outside our own habits of musical thought and practice.”\textsuperscript{5} In this, he is concerned primarily with the autonomous work concept, an idea alien to any medieval thinker, and one that has hindered attempts to engage deeply with the contrasting patterns of thought that shaped medieval music-making. The same was true for medieval musicians themselves—the advent of music writing in the West, for instance, compelled musicians not only to acquire a new set of skills and texts, but also, as Treitler argues, to replace old habits with new ones.\textsuperscript{6}

In this dissertation, I have offered an alternative picture to the commonly-accepted narrative that the \textit{ars subtilior} was a style that flourished in Avignon c. 1380–1420. I have instead argued that we may productively consider the constituent ideas—philosophical, theoretical, and practical—that undergirded late-medieval musical notational practices. Drawing conceptual, rather than linguistic, geographical, or strict chronological boundaries


\textsuperscript{5} Leo Treitler, \textit{With Voice and Pen: Coming to Know Medieval Song and How It Was Made} (Oxford: Oxford University Press, 2007), 317.

\textsuperscript{6} Treitler, \textit{With Voice and Pen}, 318.
around my project, I have suggested that a deeper understanding of later medieval repertory can be achieved through a consideration of the characteristics of songs and theoretical systems, and the ideas that shape them, rather than through a study of musical style per se. Taking this further, I would like to conclude by proposing that in considering the undergirding concepts that shaped late-medieval music making, we can catch glimmers of the mentalities of past people, of the “habits of mind” that shaped how medieval musicians performed music and perceived the world around them.

The idea that knowledge is a habit has been a subject of discussion for centuries. Famously, it was examined by Aristotle, who theorized the concept of *hexis*—a permanent state of mind that is related both to internal habituation and external action. In the later Middle Ages, Aristotle’s concept of *hexis* was repurposed by philosophers in discussions of the *habitus*. Translatable literally as “habit,” the medieval *habitus* was in certain respects similar to the “habits of mind” discussed by modern thinkers such as Dewey, Turkle, and Treitler. As I mentioned in the introduction, *habitus* in the late-medieval sense were regarded as permanent mental dispositions that arose out of practice, and that in turn played a role in forming the mind and shaping a person. Yet the two ideas do not fit together perfectly: since most medieval philosophers were also theologians, an essential component of the *habitus* was virtue. This may be contrasted with a modern context in which the language of virtue is no longer commonly regarded as a formative component of epistemology. Nevertheless, both medieval theologians and modern cognitive scientists would agree with the general premise that activities, such as music-making, shape our minds, and that these in turn help shape our

---

behaviors, even if the form in which medieval people acquired knowledge—i.e. through a combination of authority, logical reasoning, and some empirical study—differs markedly from modern scientific method, which is primarily empirical, and thus relies to a lesser extent upon reasoning and authority in the absence of empiricism.8

Descriptions of the musical habitus can be found in the works of a number of prominent late-medieval theorists, such as Franco of Cologne,9 Jacobus, Jean des Murs,10 and Prosdocimus de Beldemandis. Among these, Jacobus provides a particularly detailed description of habitus. In Book I of the Speculum musicae, he emphasizes the association between the habitus and facultas, or “facility.” As Harne has observed, Jacobus’s habitus is a “modification of the soul,”11 one that grants “facility in the activity proper to it.”12 It is a habit of the mind that provides a person with the ability to carry out certain tasks that in turn shape a person’s mind and form the habitus. Jacobus’s musical habitus grants a person facility in music. However, Jacobus’s concept of facility differs from that of a modern person. For Jacobus, the musical habitus as facility pertained primarily to the contemplation and comprehension of the harmonic proportions. The practice of music was thus viewed as an extension of and a bringing into act of theoretical knowledge.13

In Book V of his Declaratio musicae disciplinae (before c. 1430–1), the Italian theorist Ugolino of Orvieto also discusses the notion of habitus. According the Ugolino, music is a

---


scientia, or a kind of knowledge acquired through a process of observation of particulars and the resultant mental abstraction of concepts described above. As a scientia, music may be regarded as a habitus, and therefore a universal. In this, Ugolino adhered to the view held by other “realists,” whereby a universal is a concept that is abstracted from observed particulars within which it is instantiated. This interpretation may be contrasted with the “nominalist” theory of the English Franciscan William of Ockham (c.1287–1347). According to Ockham, abstraction took place directly within the active intellect. Unlike their realist contemporaries, nominalists believed that the active and passive parts of the intellect were inseparable from one another, and that universals were mere mental concepts that were not instantiated within observed particulars.14

Because Ugolino regarded music as a scientia—and thereby a habitus—he believed that knowledge of music was derived through perception, abstraction, and reasoning. Ugolino emphasized the interconnectedness of music performance and speculation in his definition of the musical habitus. He argued that the musical habitus encompassed knowledge of all kinds of music, including the threefold definition of musica mundana, humana, and instrumentalis of Boethius. Acquired through reason, demonstration, and experience the habitus pertained to music as a speculative discipline, but also as an ars. The musical habitus was thus acquired through performance, not reason alone.15

Ugolino’s ideas about the ontology of music provide a particularly useful lens through which to consider late-medieval beliefs about the cognition of music because his work embraced both the theoretical and the practical. On the one hand, his views on the musical habitus were heavily influenced by a set of anonymous Questiones believed to have been

---


15 di Orvieto, Declaratio musicae disciplinae, ed. Scay, 93.
compiled in the later fourteenth century by an Italian theorist. It is likely that this text was used in university teaching, and as such can serve to provide a glimpse into the late-medieval student curriculum and experience. On the other, Ugolino was himself a composer, whose works are copied in Fsl2211, a Florentine palimpsest that has recently been made accessible through multispectral imaging. His compositions are replete with the kinds of complex rhythms and proportional shifts that have been discussed in the repertory considered in this dissertation.

That the acquisition of knowledge and with it the musical habitus was of central importance to Ugolino is made evident by his decision to order the various books of the Declaratio from the practical knowledge of music to the celestial music of the heavenly bodies rooted in number, through to speculative music. This reflects the process of the abstraction of universal knowledge of music from particulars: familiar notions are more easily comprehended than those that are unfamiliar. Since practice is more familiar than theory, it precedes theory. Moreover, knowledge of practical music is formed via activity in both the active and passive intellects. This sits in contrast to speculation, which occurs only within the passive intellect. The structure of Ugolino’s theoretical text thus mirrors the progression from active to passive intellection that a person passes through as they learn and grow cognitively.

The idea that knowledge of music constitutes a way of thinking, or a habit of mind, invites us to consider what the components of late-medieval medieval habits of thought might

---


17 Murdoch, “Music and Natural Philosophy,” 135.

18 Andreas Janke and Claire Macdonald, “Multispectral Imaging of the San Lorenzo Palimpsest (Florence, Archivio del Capitolo di San Lorenzo, Ms. 2211),” Manuscript Cultures 7 (2014), 113–25. A facsimile of this manuscript has also recently been published, and has been made freely available online. See: Janke, Andreas, and John Nádas, eds. The San Lorenzo Palimpsest, Florence, Archivio del Capitolo di San Lorenzo, MS. 2211: Introductory Study and Multispectral Images (Lucca: Libreria Musicale Italiana, 2016), https://www.fdr.uni-hamburg.de/record/8637#YHRg27RKj6G, accessed April 14, 2021.
have been—both from our perspectives, and from the perspectives of medieval people themselves. Some of the components of what may be regarded as the medieval *habitus* have already been discussed in scholarship. For instance, Bent’s notion of the “internalized grammar” of late-medieval repertory resonates with the idea of a permanent and habitual musical facility. Bent argues that this grammar, while unfamiliar to a modern musician, would have been second nature to an educated late-medieval musician, and argues that the components of this grammar would have encompassed the rules of counterpoint and *musica ficta*.19

In Chapters 4 and 5 of this dissertation, I argued that reading complex notations would have demanded not only a different body of knowledge, but also a different way of looking at the folio, and one that would have been developed through the observation of the intrinsic notational patterns of mensural music. I proposed that this contrasting way of looking can explain how notation that appears abstruse and unplayable to a modern analyst may have facilitated ease of reading and memorization for a medieval musician, even if the individual noteshapes might have been novel. This accords with Bent’s observation that the rules of medieval counterpoint and the application of *musica ficta*—which may seem obscure from the perspective of a modern analyst—would have been second nature from the perspective of a medieval reader.

Taking this further, I would suggest that we might consider whether the rhythmic and notational attributes of late-medieval repertory might also be subsumed within a musician’s musical grammar. For instance, the idea that the grouping of notes into perfections may take precedence over the shape of an individual note when reading rhythm was already present in the early–mid fourteenth-century notational systems discussed in Chapter 1. Facility in music

---

reading was arguably part of the conceptual toolbox of the elite, educated late-medieval musician—from the perspective of a medieval person their musical *habitus*—and one that would have shaped how they would have looked at the notated folio. This way of looking would have been informed, one may surmise, by years of rehearsing and memorizing songs from notated manuscripts.

A consideration of the habits of mind that were formed by and that shaped medieval music-making can also help to situate the theory of Johannes Vetulus de Anagnia discussed in Chapters 2 and 3. Vetulus’s writing—obscure and eccentric from the perspective of a modern reader—nevertheless provides a comprehensive system for the organization of musical notes, and through this the representation of the disparate parts of the world. Because his treatise is so difficult to understand, it also illuminates the contrasting habits of mind that Vetulus cultivated in and anticipated of his readers. He expected his readers to have internalized the patterns of expression that characterize contemporaneous music-notational and philosophical systems. His system is also so complex that it is difficult to make sense of unless a reader can undertake the feat of memorization that we might imagine that a medieval reader or Vetulus himself performed by holding in their mind the various names and durations in atoms of every note. This is made most evident, perhaps, by his tree diagrams—to even comprehend their meaning, a reader is expected to retain in memory far more notes than are represented on the folio. While a modern reader may make reference to tables to follow Vetulus’s treatise—as I have in this dissertation—the complex and nebulous structure of *Liber de musica*, I would suggest, leaves a physical trace of the kind of internal map that Vetulus himself held in his mind as he recited his treatise to his scribe.

That a consideration of the representations of time in late-medieval music should reveal insights into the habits of mind of interlocutors past and present invites us to reflect on the study of historical style. Notions of chronology, provenance, and style are central
components of historical inquiry and define our knowledge of medieval music. Yet the musical practices that are compartmentalized through notions of perceived style were also arguably molded by an unwritten history that was situated within the minds of past people—a history that shaped practice, but that was also shaped by practice. While this history is challenging, and often impossible to access, traces of it can be glimpsed in all of the historical materials that have survived to this day. Studying these traces is valuable because it allows us to gain deeper insights into past music, and in doing so to interrogate the productiveness of our own habits of thought. By drawing attention to the hitherto unacknowledged connections between theoretical notions of time that were represented in contrasting forms, but whose development nevertheless appears to have been motivated by similar concerns, I hope to have illustrated that musical practices may be thought of productively in terms of their constituent ideas and the patterns that they form. Through this, I aim to have provided a constructive solution to the problems inherent within the anachronism of the perceived notion of the ars subtilior style, one that opens the door to further debate and inquiry.
Commentary to the Translation of Johannes Vetulus de Anagnia’s *Liber de musica*

The following appendix contains the first English translation of Johannes Vetulus de Anagnia’s *Liber de musica*.¹ For the purposes of this dissertation, I made use of Frederick Hammond’s immensely useful edition of the treatise, as well as its transcription in the *Thesaurus musicarum latinarum* database.² Most of the time, I followed Hammond’s transcription. However, on occasion I altered the text to correct minor typographical errors to reflect *Vat307*. All of these changes are italicized and documented in the footnotes to the translation. My emendations are not intended to correct the edition comprehensively, which would require a more extensive overhaul in the form of a new edition.

In the translation, I attempted to remain faithful to the original Latin text, while removing superfluous words that are redundant in English and customarily ignored, such as *videlicet*, *scilicet*, *tamen*, and so on. Where gerundives are used in the Latin, I occasionally replaced these with an imperative to better reflect English syntax where such sentences as “it must be noted” sound stilted. Further details of my specific linguistic choices are discussed below. At times, the construction of Latin syntax demands that a reader refers back to information that has already been stated that would be repeated in English. Any extra words or phrases of this nature that were added to aid comprehensibility are contained within square brackets.

---

¹ One complete medieval copy of *Liber de musica* has survived, contained within *Vat307*, a miscellany dated to the c. 1350s–60s by Francesca Manzari and Jason Stoessel. The other two versions include a partial copy of “Quid sit prolatio” [What is an utterance?], which appears in a fifteenth-century miscellany, and an eighteenth-century copy that was made for Padre Martini. For further information about the dating of these sources, see: Chapter 2.

Although very little is known about Vetulus, some aspects of his language reveal information about his life. He makes persistent, if at times haphazard, appeals to the authority of revered past authors, a practice termed *auctoritas*. This, along with his use of legal language, indicates that Vetulus may have been educated in the liberal arts. He also makes reference to the liberal arts early in the treatise, stating that music is the “sixth” among the liberal arts. Hammond has further suggested that Vetulus was a cleric on the basis of an inscription in *Vat307*, which celebrates Vetulus as “Reverendi Magistri Johannis Vetuli de Anagnia, musice doctoris” [Reverend Johannes Vetulus de Anagnia, learned in music]. His extensive and faithful citations of the Bible contrast with his references to music theory and philosophy, which are sometimes laden with errors, further support this claim. Where possible, my translation attempts to convey the tone of his borrowings of legal, theological, and philosophical language. To aid comprehension of such passages, I provide explanatory footnotes detailing Vetulus’s sources, as well as the terms he uses that are likely to be unfamiliar to a modern reader. At times these are expanded from Hammond’s commentary, as indicated in the footnotes.

*Liber de musica* is divided roughly into three parts. In the first, introductory section, Vetulus provides an etymology of music and introduces the two kinds of music—plainsong and mensural music. In this brief section he discusses the hexachords of plainsong and the supposed tetrachords of the *ars nova*. Each hexachord is provided with an etymology, and is associated with a part of his tripartite model of being. The influence of the vernacular is

---


5 See Chapter 3 for further discussion of this unusual choice.

6 According to Vetulus, human beings are composed of flesh, soul, and good will.
evident in such etymologies, in which Vetulus makes use of dative or ablative gerunds that are typical in romance languages such as Italian.

Mensural music is discussed in the second part of the treatise. Vetulus begins by offering a pseudo-Aristotelian/ Augustinian definition of time as a span of motion, and introduces the temporal atom that will serve as the minimal unit of his mensural hierarchy of notes. Derived from the division of the year, month, and parts of the day, it is worth 5/36 of a modern second. Before introducing the hierarchical system that is based on this atom, Vetulus again appeals to authority, this time to the thirteenth-century theorist Franco of Cologne. Vetulus’s own hazy knowledge of Franco’s system is here revealed by his conflation of the rhythmic modes with his own system of organization of the mensural hierarchy, which bears little relation to Franco’s theory.

Vetulus’s confusion draws attention to one of the challenges of translating this treatise: a Latin term such as *modus* [mode] cannot be translated into English without some loss of meaning. The term *modus* can at times portray the general sentiment of a “kind” of note or measure, or a “type” of syncopation. At others, the term *modus* refers to the theoretical practice by which a span of a longa is divided into two or three breves, termed imperfect *modus* and perfect *modus*, respectively. Yet this sense of *modus* is sometimes indistinguishable from the term *modus* as a “way” of dividing any note into two or three parts. Vetulus’s assumption that his own way of dividing notes is synonymous with Franco’s rhythmic modes creates an impasse for the translator: one cannot translate the term *modus* here without excluding one of the senses to which Vetulus is referring. In cases such as these, I attempt to adhere as closely as possible to what I perceive to be the sense Vetulus wishes to convey, even if this is music-theoretically inconsistent. All instances such as this are highlighted within the explanatory footnotes.
In this section, Vetulus also introduces each type of note, providing it with an etymology, and quantifying it in atoms. He describes some basic music-theoretical concepts, such as the idea that notes can be imperfect (duple) or perfect (triple). He also introduces the concept of *prolatio*, or “prolation.” In general, the term *prolatio* conveys a sense of “bringing forward,” “putting forth,” or “pronouncing,” or may be translated simply as an “utterance.”? In musicological writings, the term has most commonly been associated with the division of the semibreve into minims. Major prolation occurs where semibreves are worth three minims. Semibreves in minor prolation are worth two minims. Prolation is also used in reference to the four prolations of French mensural theory, which include both the division of breves into semibreves and semibreves into minims.

Vetulus’s use of the word *prolatio* is distinct from the standard music-theoretical use of the term. Its first sense, defined early in the treatise, is very similar to the general concept conveyed by Vetulus’s *modus* as a “way” of dividing. It is a generic description for the division of notes into two or three parts; I translate this kind of *prolatio* as “utterance.” In the second sense, the term *prolatio* is used to refer to the extension of a note. To understand this concept, it is first necessary to outline in brief Vetulus’s divisions. I provide a comprehensive discussion of these in Chapter 2.

Vetulus follows Marchetto of Padua in distributing notes into divisions—the *duodenaria* (twelvefold), *novenaria* (ninefold), *octonaria* (eightfold), *senaria* (sixfold), and *quaternaria* (fourfold). Vetulus combines the Marchettan divisions with the *gradus* system, commonly associated with Jean des Murs. Vetulus’s *gradus* system is expanded to such an extent that it no longer closely resembles that of des Murs. Nevertheless, his work transmits the general principle that notes

---

can be organized into tripartite hierarchies, providing a second name for each type of note—maior “greater,” minor “lesser,” and minima “least.” The division of a note is determined both by the number of shorter notes that it contains and by the way in which the duple and triple groupings within these notes are distributed. Thus a greater perfect breve (duodenaria) will contain twelve minims, a lesser (novenaria) nine, and a least (senaria) six. A greater imperfect breve (octonaria) will contain eight minims, a lesser (senaria) six, and a least (quaternaria) four. A greater semibreve contains three minims, a lesser two, and a least one (it is a minim).

Vetulus further distributes each of these notes into “subdivisions” or “extensions,” which he terms subdivisiones or prolationes. In this sense, the term prolatio describes the duration of a note in atoms. Vetulus’s prolatio maior thus does not signify that there will be three minims for each semibreve. Instead, a note that is “of the greater extension,” will be the longest within its own division. For example, a minim of the greater extension contains six atoms, a minim of the lesser extension contains four, and a minim of the least extension contains three. Similarly, a greater perfect breve of the greater extension contains seventy-two atoms, a greater perfect breve of the lesser extension contains forty-eight atoms, and a greater perfect breve of the least extension contains thirty-six atoms.

In the translation, I used the term “extension” as a substitute for prolatio to convey that Vetulus’s prolationes or subdivisiones vary in duration, even though they may contain the same number of parts. This reflects the style of the translation in general: I retained the standard translations of music-theoretical terms where Vetulus’s use was conventional, but used a different word where his application was unconventional. Terms that Vetulus used in accordance with convention include tempus, which refers either to the span of a breve or the twofold or threefold division of the breve; recta, which refers to a note that is not altered (doubled in length); numerus,

---

which can at times refer to the English “number,” but at others to the concept of a “rhythmic unit.” The same is true of some philosophical terms, such as *differentiae*, which are differences that distinguish Aristotelian species as described in his *Categories*.

Through a close reading, it can further be ascertained that Vetulus refers to two parallel sets of divisions in this section of the treatise. The first set of “proper” divisions are constructed from the three minims described above. The second “improper” divisions are constructed from three shorter minims—an improper minim of the greater extension (4 atoms), an improper minim of the lesser extension (3 atoms), and an improper minim of the least extension (2 atoms). Where Vetulus refers to the improper divisions covertly, I include explanatory notes.

In addition to these music-theoretical concerns, the first half of *Liber de musica* takes on particular significance by introducing Vetulus’s major philosophical intervention: he assigns symbolic significance to the numerical proportions present in his theorization of the mensural hierarchy. For instance, Vetulus refers to the “nine choirs of angels” that represent the lesser larga, which contains nine breves. This symbol, which is derived from Pseudo-Dionysius’s *De coelestis hierarchia*, is representative of Vetulus’s wider project to relate musical proportions to his image of the earth and heavens. Vetulus’s devotion to this project is revealed by his use of the term *ascendo-ere* [lit. “to ascend], which he states reflects his belief that the division of plainsong into mensural music, and ultimately longer notes into shorter ones, represents the ascent of the human soul as it praises God. This is further reinforced at the end of the first half of the treatise, where Vetulus includes six tree diagrams representing the division of the greater, lesser, and least largae, and the greater, lesser, and least perfect breves. Breaking with convention, Vetulus’s tree diagrams ascend like natural trees. As I outline in Chapter 3, Vetulus’s decision to draw ascending trees was probably influenced by the work of the

---

Catalan mystic Ramon Llull. In order to convey the deeper theological significance of
Vetulus’s linguistic choice, I translated the word *ascendo -ere* as “to ascend.” In music-
theoretical terms this refers to the division of longer spans into shorter ones. Similarly, I
translated *descendo -ere* as “to descend,” since this represents the descent from God to humanity.
It is also used to refer to the grouping of shorter notes into longer ones. That Vetulus should
have used these terms throughout his treatise, and not only in relation to the tree diagrams,
illustrates the central importance of this visualization of the mensural hierarchy to his system
as a whole.

In the latter part of *Liber de musica*, Vetulus turns to notation, describing the rules
governing the drawing of ligatures, the use of dots, imperfection, and alteration. Vetulus provides
each of the divisions described in the first part of the treatise with musical examples. A significant
portion of this section is devoted to a discussion of syncopation.¹⁰ Syncopation takes place when
the imposition of a dotted note or rest results in the division of a perfection or imperfection.
When order is restored and the syncopation concluded, the disparate parts of the divided
perfection are grouped together. Vetulus describes this process using the terms *refero -ere*, which can
be translated as a “bearing,” “giving,” or “drawing back,”¹¹ and *reduco -ere*, which also conveys a
sense of “leading,” “conducting,” or “bringing back.”¹² The term *refero -ere* describes the process
of a note being sent back conceptually to an earlier note in order to complete a perfection. The
term *reduco -ere* describes the notes being brought together into a group. In my translation, I use
the term “group together” to describe this process.

At times, Vetulus’s descriptions of music-theoretical concepts are contradictory. For
instance, he cites the well known rule *similis ante similem*, which decrees that if a note that can

---
¹⁰ For a more detailed discussion of syncopation, see: Chapter 4.


be perfect in a given mensuration without addition of a dot is followed by a note of the same kind, this note will be perfect. In a number of locations, Vetulus defies this rule. The following passage serves as an example:

Vel sic: \( \frac{1}{4} \) aut ut patet hic: \( \frac{1}{4} \) et tune prima erit minima, et refertur ad secundam quae dicitur minor semibrevis. Tertia et quarta vadunt sicut prima et secunda, videlicet tertia minima, et quarta altera minima aut minor, quod idem est, et ultima maior.

Or thus: \( \frac{1}{4} \) or as is shown here: \( \frac{1}{4} \) and then the first [note] will be a minim, and it will be grouped with the second, which is called a lesser semibreve. The third and fourth [notes] proceed like the first and the second, namely the third is a minim, and the fourth is an altered minim or lesser [semibreve], which are the same, and the last is a greater [semibreve].

As Vetulus explains, the first two notes create an iambic rhythm—they are a minim and a lesser semibreve (worth two minims). He sets out two alternative methods for representing the iambic rhythm that follows. In the first instance, he follows standard practice and writes a minim followed by an altered minim (a minim doubled in length to fill out a triple unit), and finally a greater semibreve, worth three minims. In the second, he writes in place of the minim–altered minim pair another minim–lesser semibreve pair. This example is theoretically inconsistent, and contradicts Vetulus’s earlier statement that like notes before like are perfect because the penultimate lesser or imperfect semibreve is followed by a greater or perfect semibreve. This is one among many inconsistencies in Vetulus’s theoretical treatment of music that occur throughout the treatise. These are highlighted in the footnotes to aid a reader who is familiar with mensural theory.

As I outline in Chapters 2 and 3, the at times haphazard nature of Vetulus’s work results from his speculative approach to the study of music theory—he is concerned less with providing a practically applicable theoretical system than describing one in which the world of music may be seen as a reflection of the celestial hierarchy and a vehicle for the
contemplation of the divine. His work is highly intricate, yet at the same time riddled with errors. It is also in certain respects graphically conservative; after leading the reader through all the various visualizations of the divisions of the breves into shorter notes, Vetulus includes a brief discussion of the semiminim, which he acknowledges tentatively. His ambivalence towards this note is in keeping with the overall aims of his work to use only the simple noteshapes. He justifies this choice earlier in the treatise by appealing to the principle of parsimony associated with Ockham, “it is pointless to do with more what can be done with less.” Liber de musica concludes with a charming profession of thanks for the saving of the right hand of the scribe, and the customary laudation.

Before embarking on reading this challenging text, it may be helpful to note that Vetulus assumes a lot of his reader. Reflecting, perhaps, the impressive tradition of memorization that defined medieval learning, Vetulus expects the reader to hold in their mind much information. This information includes, importantly, the number of atoms contained within each note, as well as the various names of notes. Anna Maria Busse Berger has already suggested that Vetulus’s text incorporates mnemonic devices, such as his infamous tree diagrams.13 His highly repetitive descriptions both of his mensural hierarchy and the rules of mensural notation back up this claim; they read as if one is learning or reciting all of the various combinations of the parts of music by rote. This at times leads Liber de musica to be highly obscure and difficult to understand, a challenge that is compounded where Vetulus makes mistakes. It thus may be worthwhile for a reader to consult the table of the largae on p. 76, the table of names on p. 84, and the tables of the divisions on pp. 89 and 102 as they traverse this text.

Liber de musica

Since we must discuss the art of music, it is first necessary to consider what music is, what the subject is in itself, where its name originates, and its purpose. For music is a knowledge that softens the hardness and perverseness of the heart of the human body for contemplation of the heavens. And Boethius testifies to this in the second [book] of the Consolation because he was in a position of misfortune and wanted to receive consolation. He said: “Let the persuasion of sweet rhetoric appear, which will only keep to the right path [if] it does not abandon our practices, [and] which accompanies melodies now in a lighter, now in a graver mood with music native to our home.”

The subject is that which is done through complete knowledge [of music], namely the fullness of sounds and their melodies. And music is named from the Greek moys, which is water, and logos, which is knowledge or speech, because this knowledge was found near water, and for good reason. For just as water washes away dirt and restores bodies, so does this knowledge lessen the sorrows of the mind and raise it to joyfulness. The end to which it strives is the complete praise of God.

---

1 This text is quoted from de Anagnia, Liber de musica, ed. Hammond, 26–97 and the electronic version of this text prepared by Stephen E. Hayes, Peter M. Lefferts, Kirk Ditzler, and Thomas J. Mathiesen https://chmtl.indiana.edu/tml/14th/VERLDM.

2 Boethius, De consolatione philosophiae. Hammond.

3 “Adsit igitur rhetoricae suadela dulcedinis, quae tum tantum recta calle procedit cum nostra instituta non deserit cumque hac musica laris nostri vernacula nunc leviore nunc graviore modos succinat.” “So let us use the sweet persuasiveness of rhetoric, which can only be kept on the right path if it does not swerve from our precepts, and if it harmonizes, now in a lighter, now in a graver mood, with the music native to our halls.” Boethius, The Consolation of Philosophy, ed. and trans. S.J. Tester (Cambridge, MA: Harvard University Press, 2014), 176–7.

Nam omnes voces ipsum deum laudare debent, quod probatur per sacram paginam in plerisque locis et maxime per psalmistam ubi dicitur, Iubilate deo omnis terra\(^5\) et caetera.

Musica est enim duplex, scilicet positiva et mensurativa, et sicut duplex est musica ita duplex est nota. Videlicet una quae expectat ad musicam planam et alia quae spectat ad musicam mensuratam ad quam omnes notae reducuntur. Et dicitur nota a nosco, noscis quia per ipsam noscitur quicquid in arte musicae agitur. Et dividit nota secundum musicam planam in sex, videlicet ut, re, mi, fa, sol, la. Nam per istas sex notae tota musica noscitur. Ratio huius est haec, quia secundum philosophos talis scientia inter liberales\(^{[27]}\) artes sextum tenet gradum. Et quia sicut dicit apostolus Iacobus, Omne datum optimum\(^6\) et caetera, talis scientia repraesentat sextum donum spiritus sancti, quod est donum pietatis. Nam sicut pius et misericors diligit pacificos et reconciliat discordes, sic haec scientia diligit sonoritatem vocum et mensuram, et discordantiam ipsarum corrigit et reducit ad consonantiam et mensuram. Sed istae sex notae possunt reduci ad quattuor notas secundum reductionem artis novae, quae sunt ut, re, mi, fa. Et hoc quare: Quia sicut quattuor sunt elementa de quibus totus mundus et ca quae sunt in mundo composita sunt, sic totus cantus per praedictas quattuor notas componitur et versatur. Et ad istas notas ingredimur per tres claves, scilicet \([sqb]\) quadrum, naturalem et \(b\) rotundum.

For all sounds must praise God because it is written in sacred scripture in numerous places and most particularly in the psalms where it is said, “Shout with joy to God, all the earth,” and so on.

There are two kinds of music, unmeasured and measured, and just as there are two kinds of music, so [are there] two types of notes. One pertains to plainchant and another pertains to measured music, to which all notes are reduced. And the word “nota” [note] is named from [the verb] “nosco,” [to know] you know, because whatever is done in the art of music is known through this. And in plainchant, there are six notes, namely \(ut, re, mi, fa, sol,\) and \(la\). For all music is known through these six notes. The reason for this is that, according to philosophers, such a knowledge holds the sixth degree among the Liberal Arts. And because, as the Apostle James says, “Every perfect gift,” and so on, such knowledge represents the sixth gift of the Holy Spirit, which is the gift of piety.\(^7\) For just as a pious and merciful person loves the peaceable and reconciles disputes, so too does this knowledge love measure and the fullness of sounds, and it corrects its own discord and brings it back to consonance and measure. But these six notes can be reduced to four notes according to the reduction of the \(ars\ nova\), which are \(ut, re, mi,\) and \(fa\). And this is why: since there are four elements out of which the whole world and things that are in the world are made, all song is composed and meditated upon by means of the four aforesaid notes. We engage with these notes through the three species of hexachord, namely the hard \([quadrum]\), the natural, and the soft \([b\ rotundum]\).


\(^6\) James 1:17. Hammond.

\(^7\) The seven gifts of the Holy Spirit originate in patristic writings.
Et hoc quare, quia in natura humana tria sunt, scilicet caro quae ex quattuor elementis constat, et hoc repraesentat prima clavis quadrangularis quae nascitur in G quod g dicitur a gravando.

Est enim in humana natura forma substantialis, scilicet anima in qua est voluntas et habet potestatem contemplandi, et hoc repraesentat secunda clavis naturae quae est in C. Tertia clavis est in b rotundo, quae repraesentat bonam voluntatem quae est inter animam et corpus, et nascitur in F. Et sic naturalis substantia per suam voluntatem reflectit se ad dilectionem corporis quod est de quattuor elementis, et aliquando se exaltat et hilarat ad dei laudem per mollitiem et lenitatem spiritus. Sic secunda clavis, scilicet naturae, potestatem habet ingrediendi ad primam et tertiam. Et haec de musica plana dicta sufficiant, quid per philosophos melius et sufficientius est tractatum.

Postquam aliqualiter visum est de musica plana, videatur de musica mensurabili.

And this is why: because there are three things in human nature, namely the flesh, which is made of the four elements, and the first species of hexachord of the quadrangular [solmization syllable],\(^8\) which begins with G represents this, which is called g from “gravando” [weighing down].

There is also substantial form in human nature, namely the soul,\(^9\) in which there is will, and it has the power of contemplation,\(^10\) and the second natural species of hexachord represents this, which is in C. The third species of hexachord is in round b,\(^11\) which represents the good will between the soul and the body, and begins with F.\(^12\) And through its own will a natural substance turns itself back to bodily pleasure, which is of the four elements, and it sometimes exalts itself and rejoices in the praise of God through the softness and smoothness of the spirit. Thus the second species of hexachord, namely the natural, has the power to enter the first and third [hexachords]. And these words about plainchant suffice, which has been discussed better and sufficiently by philosophers.

Having considered plainchant to some extent, let us consider measured music.

---

\(^8\) The hard hexachord.

\(^9\) The doctrine that the body constitutes matter and the soul constitutes substantial form is referred to as hylomorphism. It was developed by Aristotle and discussed widely by late-medieval scholastics.

\(^10\) Memory, understanding, and will are the three essences of the soul as discussed by Augustine in his *De Trinitate*.

\(^11\) The soft hexachord.

\(^12\) The term “good will” here probably originates in Augustine’s works, such as the *Confessions* Book VIII, Chapter 10, where Augustine contends that a person who has been called to faith by God’s grace will come to it by means of good will. The usage here is also similar to John Wyclif’s notion of the connection between the body and soul that originates in God's will. See: Chapter 3.
Mensurabilis musica est quae consistit in tribus notis ad similitudinem trinitatis, in qua omnia quae sunt in rerum natura consistunt et ab ipsa derivantur et ad ipsam reducuntur. Dicendo Christus de seipso, Ego sum alpha et omega, id est primum et finis omnium rerum. Ita istae tres notae sunt principales quoad figuram, nomen et numerum, cum in istis tribus copulentur valores omnium mensurarum, figurarum, nominum et numerorum et ab eis descendunt omnes mensurae, species figurarum, nomina, numeri, modi, maneries modorum, tempora, divisiones temporum, maneries divisionum, prolaciones et maneries prolationum. [fol. 1v]

Videndum est quid sit mensura.

Mensura est quantitas temporis determinata per ipsum tempus in quo ipsa nota profertur. Unde tempus secundum philosophum sic diffinitur: Tempus est mora motus mutabilium rerum, sed tempus prout spectat ad musicum non est tempus sed id quod agitur in tempore, videlicet harmonia cantus et vocum melodia quae per tempus mensuratur.

De divisione temporis.

Dividitur tamen tempus per annum, menses, hebdomodas, dies, quadrantes, horas, punctos, momenta, uncias et atomos. Atomus vero indivisibilis est.

Measured music is that which consists of three notes in the likeness of the Trinity, in which everything in existence subsists, and they are derived from it and are brought back to it. Christ [said], speaking of himself: “I am Alpha and Omega,” that is “the beginning and end” of all things. Indeed, these three notes are first with respect to shape, name, and number because in these three the values of all measures, noteshapes, names, and numbers are bound together, and all the measures, species of noteshapes, names, numbers, modi, mensurations of the modi, tempora, divisions of the tempora, mensurations of the divisions, extensions, and mensurations of the extensions are derived from them.

Let us consider what measure is.

Measure is a quantity of time determined through the tempus in which a note is uttered. According to the Philosopher, time is defined as follows: “time is a span of motion of changeable things.” But the tempus for the musician is not time, but that which is put into motion in time, namely the harmony of song and the melody of sounds, which are measured by the tempus.

On the division of time.

Time is divided into the year, months, weeks, days, quadrants, hours, points, impulses, ounces, and atoms. The atom is indivisible.

---

13 As he observes at the very end of Liber de musica, these three notes are the greater and lesser semibreves and the minim. He chose these notes presumably because they group to form all others.

14 The term numerus [number] here could also be translated as “rhythm,” as I have chosen to do so in other locations. See: Commentary.

15 This is a variant of the ubiquitous Aristotelian definition of time as a “number of motion of the before and after.” See: Chapter 3.

16 Blackburn and Holford-Strevens, The Oxford Companion to the Year, 663.

17 A similar description of the division of the year is found in Jacobus’s Speculum musicæ, Book 7, Chapter 44. See: Chapter 3.
Obmissa divisione omnium temporum, videndum est sicut dividitur dies naturalis, ubi cognoscitur mensura temporis secundum musicum.


Et istud tempus dividitur in tres partes ad similitudinem trinitatis. Et dicitur tempus perfecte medie quod tempus dicitur breve, et breve est respectu aliorum superiorum. Licet sit longum respectu aliorum tempora divisionum minorum et minimarum prolationum.

Viso de mensura, videndum est quid sit figura et quot sunt species figurarum. Rubrica.

Dicendum est quod figura est forma notae facta ad repraesentationem vocis seu mensurae temporis ad utilitatem discentium inventa ad cognoscendum proprietates notarum simpliciter figuratarum et ipsarum ligaturarum et carundem perfectiones et imperfectiones et semiimperfectiones et semiimperfectiones.

Having set forth the division of all times, let us consider how the natural day is divided, where the measure of time according to the musician is discerned.

It must be said that the day is divided into four principal quadrants. A quadrant contains six hours. Four points proceed from the hour. A point contains ten impulses. An impulse contains twelve ounces. An ounce contains fifty-four atoms. And note that a musician perceives the right and perfect tempus from the ounce, neither the greater nor the lesser, but the medium, which is principally square in form in the likeness of the four parts of the world in which the Trinity appeared in human flesh in the Sixth Age of the World.

And the tempus is divided into three parts in the likeness of the Trinity. And it is said that the tempus perfectly in the middle is called the breve, and it is short with respect to the others above. It is long with respect to the other divisions of the tempora of the lesser and least extensions.

Having considered measure, let us consider what a noteshape is and how many species of noteshapes there are. Rubric.

It must be said that a noteshape is a form of a note made for the representation of a sound or a measure of the tempus for the purpose of learning, invented so that the properties of notes, more simply of figures, and of their ligatures, and the perfections and imperfections and semi-perfections and semi-imperfections of these same [notes], can be perceived.

18 An atom is worth 5/36 of a second. Bartolomaeus Anglicus divides the year into atoms in a similar manner in his De proprietatibus rerum. See: Chapter 3.

19 The Six Ages of the World are described in Augustine's De catechizandis rudibus.

20 Like other late-medieval theorists, Vetulius’s perfections are triple and his imperfections duple. Semi-perfections and semi-imperfections are half as long as their equivalent perfections or imperfections.
Let us consider what propriety and opposite propriety in notation are [and] how they differ. Rubric.

Ligated notes with propriety ascending lack a stem and descending have a stem, and this is the difference [between them]: all ligatures with propriety begin with a breve and without propriety the first note is a longa.

Let us consider what opposite propriety is.

Opposite propriety exists wherever we find a stem ascending from the left side of the first note at the beginning of a ligature square or oblique in body either descending or ascending.

On [the word] “name.”

[The word] name is said to come from “notatio” [noting] because everything that is known is known by its name.

Let us speak of the propriety of noteshapes because some [noteshapes] are simplex and others composite.

A simplex noteshape is detached from others. A composite [noteshape] is attached to others. A ligature is a binding together of simple noteshapes governed by the necessary stems.

Having spoken of noteshapes, let us now speak of the perfections and what they are.
Perfectio est sine defectu quae in sola trinitate consistit, quae semper significatur per ternarium numerum ad cuius similitudinem perfectio modi dicitur, quae per ternarium numerum reductur. Imperfectio modi dicitur quae non ascendit ad ternarium numerum nisi ad binarium. Numerus est secundum philosophum collectio de unitatibus congregata. Et ita secundum musicum est congregatio notarum vel atomorum in uno corpore. Modi aut mensurarum divisionum prolationum sunt multi vari et diversi ut inferius declarantur.

Tamen omnes reducuntur secundum principales, videlicet ad perfectum et ad imperfectum. Et nota quod quando loquimur principaliter de modo, non loquimur de tempore diviso perfecto neque imperfecto, sed divisum tempus reductur secundum modum perfectum aut imperfectum quia principales modi reperiuntur in temporibus.

Viso de modo, videndum est de divisione temporum.

The perfection that subsists in the Trinity alone is without defect, which is always signified by a ternary number [ternarium numerum] after whose likeness a perfection is named, which is grouped into a ternary rhythmic unit [ternarium numerum]. An imperfection is said to be that which does not ascend into a ternary but rather into a binary rhythmic unit. According to the Philosopher, a number is an assembled collection of units. And thus according to a musician it is a collection of notes or atoms in one body. The kinds of measures, divisions, or extensions are multiple, various, and diverse as will be demonstrated below.

All [of these] are grouped according to the principal [ways of dividing], namely into the perfect and imperfect. And note that when we speak principally of modus we do not speak of the perfect or imperfect divided tempus; but the divided tempus is grouped according to the perfect or imperfect modus [ways of dividing] because the principal modi [ways of dividing] are to be found in the tempora.

Having considered the modus, let us now consider the division of the tempora.

---

21 Hammond cites this as having originated in Boethius’s, De arithmetica institutione. For further discussion of the unitas, see Chapter 1.

22 Vetulus uses the verb ascendo -ere to describe the process of moving up his tree diagrams. In music-theoretical terms, this results in the division of longer timespans into shorter ones. However, the term also reflects the process of proceeding from the lesser to the greater, that is from nature to the divine, which he explains at the end of the first part of the treatise. I thus translate the term literally as “to ascend” in English in order to reflect the metaphysical significance of his use of the term, but a reader should bear in mind that this describes the division of longer timespans into shorter ones throughout. See: Chapter 3.
Sciendum est quod in modo cognoscitur tempus et ubi incipimus modum possimus incipere mensuram temporis dum tempus non sit divosum, sed si divisum est tempus, oportet sequi mensuram divisionis secundum figurationem per regulas ordinatam. Insuper habemus principaliter quadruplex tempus, scilicet perfectum et imperfectum, semiperfectum et semiimperfectum. Divisionis temporis perfecti reducitur secundum modum perfectum, et temporis imperfecti reducitur secundum modum imperfectum. Tempus [fol. 2r] semiperfectum et semiimperfectum reducitur aliquando secundum modum perfectum et modum imperfectum. Et tempus semiperfectum et semiimperfectum dicitur respectu istius temporis perfecti aut imperfecti et non secundum vocem.

Quot sunt species figurarum.

Dicendum est quod principales necessariae quoad divisiones et reductiones de quibus omnes aliae derivantur sunt quinque. Nomina [31] vero ipsarum sunt haec, scilicet larga, longa, brevis, semibrevis et minima, sicut alia istarum praedictarum principalium specierum maior, alia minor et alia minima. Et sicut alia perfecta, alia imperfecta, alia semiperfecta et alia semiimperfecta, et quaelibet carum de maiori enim, minori et minima prolacione inventur, particulariter inferius per ordinem declaratur.

Dicto de figuris, dicendum est de valore supradictarum.

It is necessary to know that musical time is discerned in the modus, and where we begin the modus we can begin the measure of musical time while the tempus is not divided. However, if the tempus is divided, it is proper to follow the measure of the division according to the figuration organized by the rules. Moreover, there are principally four kinds of tempus, namely perfect and imperfect, semi-perfect, and semi-imperfect. The division of the perfect tempus is grouped perfectly, and the imperfect tempus is grouped imperfectly. The semi-perfect and semi-imperfect tempus is sometimes grouped perfectly and [at others] imperfectly. And the semi-perfect and semi-imperfect tempus are named with respect to the perfect tempus, or the imperfect, and not according to their sound.

How many species of noteshapes are there?

It must be said that with respect to the divisions and groupings there are five necessary principal [noteshapes] from which all others are derived. These are their names: larga, longa, breve, semibreve, and minim, just as some of these aforesaid principal species are greater, others lesser, and another is least. And some are perfect, others imperfect, others semi-perfect, and others semi-imperfect, and each of these is of the greater, lesser, and least extension, as is shown particularly in succession below.

Having spoken of noteshapes, let us now speak of the value of the aforesaid.

---

23 Because semi-perfections and semi-imperfections are half as long as their perfect and imperfect equivalents two semi-perfect tempora may be grouped together to create an imperfection.
As is stated above, the first noteshape is the larga, and is called larga from [the word] “largiendo” [generously giving] because a generous giver of all good things\(^{24}\) gives everything generously and perfectly. And it is “larga” [large] in body and value. Of what sort [the larga is] in body; because it is a square note or point called the breve, which are the same, that receives the measure of the tempus. And if on this square note a tail or a line, which are the same, is placed on the right side, by this tail or line the value of the note or point is sometimes tripled and sometimes doubled. And without a tail it is a breve, and with a tail it is a longa. And if the body is doubled with a tail, the value of the longa is doubled by being grouped together and is called an imperfect larga or a duplex longa.

Still, these duplex longae that descend\(^{25}\) from the division of the lesser and least larga can be called imperfect largae in their genera. But a duplex imperfect longa that descends from a greater larga can ascend to a greater noteshape and its doubled value, and then it can be called a larga because it is imperfect.\(^{27}\) And any of these three imperfect largae can ascend to a perfection of their genera because a note [can be] perfect or imperfect, unless they are the same in value. And this is noted specifically and is discussed below in detail.

---

\(^{24}\) The phrase “largitor omnium bonorum” [a generous giver of all good things] is extracted from a postprandial monastic blessing that originates in Prudentius’s *Hymnus post cibum*, *The Daily Round*, IV.

\(^{25}\) Vetulus utilizes the term *descendo*-ere to describe the process of descending the trees of divisions and the metaphysical process of descending from the divine to the natural. Vetulus later explains that this is subordinate to the ascent in praise of God. I retain the literal term “to descend” in the English to reflect this process. From a music-theoretical perspective, this results in the derivation of shorter timespans or notes from longer ones.

\(^{26}\) Duplex longae can also be imperfect largae depending on their genera. One duration can take on different forms. This is because the form of a note is contingent upon its context.

\(^{27}\) That is, the duplex imperfect *longa* (worth 4 *tempora*) is derived from the greater perfect larga (worth 12 *tempora*). When this note is doubled, presumably due to alteration, its duration will be equal to the greater imperfect larga (worth 8 *tempora*). It can therefore become this kind of note.
Viso quid sit larga, videndum est quid sit imperfecta larga.

Imperfecta larga maior est illa quae non ascendit usque ad perfectionem largae et continet in se duas duplices longas, tamen quaelibet istarum duarum duplicium longarum quae descendunt ab isto corpore supradicto sunt imperfectae.

Quot modis habemus longam et unde dicatur longa.

Duplicem longam multipliciter habemus quia aliquando sunt de modo et de tempore perfecto, aliquando de modo et de tempore imperfecto, aliquando de modo perfecto et de tempore imperfecto, et aliquando de modo imperfecto et de tempore perfecto.

Et ita dicendum est de longis, brevibus et semibrevibus. Longa dicitur a longitudine temporis prolati respectu istarum brevium, semibrevium et minimarum, quamvis sit brevis respectu istarum largarum, semilargarum et duplicium longarum. Habemus etiam dupliciter longam scilicet perfectam et imperfectam per modos supradictos, sed figurationem longarum dictarum habemus decem speciebus ut ubi tractabitur de figuris ostendentur per ordinem.

Quid sit brevis et unde dicatur.

Having seen what a larga is, let us see what an imperfect larga is.

A greater imperfect larga does not ascend to a perfect larga and it contains two duplex longae. Each of these two duplex longae which descend from the aforesaid body are imperfect.

How many kinds of longa there are and the origins of the name “longa.”

There are various duplex longae because they are sometimes of perfect modus and tempus, sometimes of imperfect modus and tempus, sometimes of perfect modus and imperfect tempus, and sometimes of imperfect modus and perfect tempus.

And this must be said of longae, breves, and semibreves. The [name] longa comes from “longitudo” [longness]; [it is long] with respect to breves, semibreves, and minims, although it is short with respect to largae, semi-largae, and duplex longae. There are also two kinds of longae, namely perfect and imperfect, according to the kinds stated above, but there are ten species of form of the said longae, as will be shown in succession, as where the figures are discussed.

What is a breve and why is it called that?
Brevis dicitur quia minor quantitas prolationis temporum defluit proferendo. Et dicitur brevis illa quae valet unum tempus et, ut superius dictum est, principaliter est in corpore quadro. Et est aliquando in tempore perfecto, aliquando in tempore imperfecto, aliquando in semiperfecto et semiimperfecto, cuiuscumque prolationis aut divisionis sit. Ut dictum est superius quia duplex longae vadunt per modos antedictos, de longis, brevibus et semibrevibus idem est iudicium, et hoc superius notatur et in fine demonstratur.

Quid sit semibrevis.

Semibrevis est illa quae habet valorem dimidii temporis imperfecti, et tot sunt diversitates semibrevium quot sunt diversitates manerium seu prolationum. Semibrevis aliquando est perfecta, aliquando imperfecta et aliquando respectiva.

Semibrevis perfecta est illa quae est valoris trium minimarum, et vocatur maior. Semibrevis imperfecta est illa quae duarum minimarum est valoris.

Quid sit minima et unde dicatur.

It is called a breve because a lesser quantity of an extension of time flows down in an utterance. And that which is called a breve is worth one tempus and, as is stated above, it is principally square in shape. And it is sometimes in perfect tempus, sometimes in imperfect tempus, sometimes in semi-perfect tempus and in semi-imperfect tempus of whichever extension or division it is. As is stated above, because duplex longae proceed by the means stated above, the judgement concerning longae, breves, and semibreves is the same and this is noted above and they are shown at the end.

What is a semibreve?

A semibreve is that which is worth half of an imperfect tempus, and there are as many different types of semibreve as there are different mensural divisions or extensions. A semibreve is sometimes perfect, sometimes imperfect, and sometimes altered.

A perfect semibreve is that which is worth three minims, and it is called a greater [semibreve]. An imperfect semibreve is that which is worth two minims.

What is a minim and why is it called that?
Et minima est illa quae habet valorem unius particulae illius temporis in quo ipsa invenitur. Et dicitur minima a minuendo et est duplex: minima, ut dictum est supra, scilicet respectiva, et simplex. Enim respectiva dicitur respectu superiorum divisionum maiorum prolactionum, et reperitur minima in omnibus prolactionibus secundum genus suum. Simplex minima quoad vocem est sicut atomus quoad tempus. Et sicut per atomum recolitur tempus, sic per minimam simplicem mensurae vocum de gradu ad gradum reducuntur ad maiores. Haec et omnia supradicta seriosius subsequenter per ordinem in arbore, [fol. 2v] et in divisionibus tam in figuratione quam in valore ipsarum praedictarum specierum declarantur.

Dicto quae et quot sunt figurae seu species figurarum et valor praedictarum et qualiter per ista nomina nuncupantur, dicendum est de divisionibus ipsarum ut sequitur.

Divisio est alicuius generis in suas species quae fit per differentias constituentes illas species, sicut dicit dialecticus.28

A minim is worth one particle of the tempus in which it is found. And it is called a minim from “minuendo” [making lesser] and there are two kinds: namely, as is stated above, the altered minim and the simplex [minim]. [A minim] is called “respectiva” [altered] with respect to the above divisions of the greater extensions, and the minim is found in all of the extensions according to its genus. A simplex minim is to sound as an atom is to time. And just as time is cultivated by the atom, so are the measures of sounds grouped by the simple minim from degree to degree29 to larger ones. This and everything stated above is shown subsequently in greater detail in succession in the tree [diagrams] and in the divisions in both the form and value of the aforesaid species.

Having said what and how many the noteshapes or species of noteshape are, and the value of the aforesaid, and why they are called by these names, let us now speak of the divisions themselves as follows.

As a dialectician would say, a division of any genus into its species is made by the constituent differentiae of these species.

---

28 As Hammond observed, this definition of genus originates in Aristotle, Topica, II. A genus is differentiated into species by differentiae, or “differences”.

29 Vetulus utilizes the term gradus here, which is typically utilized in discussions pertaining to the latitude of forms. See: Chapter 1.

Nota quod in qualibet figura de principalibus ubi incipimus principales divisiones, videlicet in temporibus maiobus et prolationibus, reperiuntur tempora diversi valoris et modi, videlicet perfectum maius, minus et minimum, imperfectum maius, minus et minimum, semiperfectum maius, minus et minimum, et semiimperfectum maius, minus et minimum.

[34] De divisionibus temporum.

And between species there is a differentia because the species of the divisions are different with respect to measure and number. For some largae are greater, some lesser, and others least. Some imperfect largae are greater, others lesser, and others least. Some semi-largae are greater, some lesser, and others least. Some duplex longae are greater, some lesser, and others least. Some perfect longae are greater, lesser, and least. Some imperfect longae are greater, lesser, and least. A breve or perfect tempus [can be] greater, lesser, and least. An imperfect tempus [can be] greater, lesser, and least. A breve or semi-perfect tempus [can be] greater, lesser, and least. A breve or semi-imperfect tempus [can be] greater, lesser, and least. And they are called semi-perfect or semi-imperfect because the perfect or the imperfect tempus is divided in half, and not according to their sound. Note that each of these divisions are of the greater, lesser, and the least extension.

Having spoken of the differences above, we will now speak of the differences between the divisions and the extensions of the tempus.

Note that in each figure of the principal [notes] where we begin the principal divisions—namely in the greater tempora and extensions—tempora of diverse values and ways of dividing are found, namely the greater, lesser, and least perfect; the greater, lesser, and least imperfect; the greater, lesser, and least semi-perfect; and the greater, lesser, and least semi-imperfect.

On the divisions of the tempus.
Sciendum est quod habemus tempus divisionis duodenariae maioris, minoris et minimae prolacionis, 9 maioris, minoris et minimae prolacionis, octonariae maioris, minoris et minimae prolacionis, senariae maioris, minoris et minimae prolacionis. Quaternariae habemus quattuor modis, videlicet illud quo derivatur a divisione perfecta diminuta propria quae non dat respectum ad modum in reductione. Aliud quo derivatur etiam a divisione perfecta diminuta tamen impropria, et reductur ad modum imperfectum et dividitur secundum perfectum. Aliud quo reductur secundum modum perfectum quod descendit a divisione duodenaria maioris prolacionis. Et aliud quo descendit a divisione octonaria quo reducitur et dividitur per modum imperfectum.

Etiam divisionem perfectam diminutam habemus principaliter duobus modis quae est etiam senariae divisionis, scilicet propriam et impropriam. Propria est illa quae nascitur in se ipsa. Impropria est illa quae habet mediam partem temporis divisionis duodenariae maioris prolacionis. Et quaelibet istarum divisionum est de prolacione maior, minori et minima. Insuper habemus ternariam maioris, minoris et minimae prolacionis et binariam maioris, minoris et minimae prolacionis.

Dicto de divisionibus, dicendum est de larga maiori, minori et minima.

Larga maior dicitur respectu minoris quia habet maiorem partem temporis. Know that we have the \textit{tempus} of the \textit{duodenaria} division of the greater, lesser, and least extension; the \textit{novenaria} of the greater, lesser, and least extension; the \textit{octonaria} of the greater, lesser, and least extension; the \textit{senaria} of the greater, lesser, and least extension. There are four kinds of \textit{quaternaria}; one is derived from the proper perfect diminished division, which does not give respect to the \textit{modus} in its grouping.\textsuperscript{30} Another is also derived from the diminished perfect division, but the improper; and it is grouped imperfectly and divided perfectly. Another that is grouped perfectly descends from the \textit{duodenaria} division of the greater extension. And another that descends from the \textit{octonaria} division is grouped and divided imperfectly.

There are also two principal kinds of perfect, diminished division, which is also of the \textit{senaria} division, namely the proper and improper. The proper is born in itself. The improper is made of half of the \textit{tempus} of the greater extension of the \textit{duodenaria} division. And any of these divisions can be of the greater, lesser, and the least extension. Additionally we have the \textit{ternaria} of the greater, lesser, and least extension, and the \textit{binaria} of the greater, lesser, and least extension.

Having spoken of the divisions, let us now speak of the greater, lesser, and least larga.

A greater larga is so-named with respect to a lesser [larga] because it contains a larger part of time.

\textsuperscript{30} I parse this enigmatic passage in Chapter 2.
Minor dicitur quia tenet medium inter maiorem et minimam. Larga minima dicitur illa quae duarum largarum minima est et habet minimam partem temporis. Et inter largas tamen est minima, sed in aliquo loco est maxima respectu longarum, brevium, semibreves, et minimarum.

Dicto de proprietatibus divisionum temporum, nunc videndum est de modis et quid sint. Rubrica.

Modus prout spectat ad musicum est cognitio soni cum suis proprietatibus denotata. Nam ubi incipitur modus, potest inciperi divisio seu mensura temporis. Sed proprietates modorum principalium sunt duae, scilicet perfectam et imperfectam, per quas proprietates modorum omnes divisiones reducuntur. Modi vero plurimi sunt et [35] varias habent opiniones. Inter quos Magister Franco, qui fuit primus inventor mensurabilis musicae, assignat quinque modos, alii sex et alii septem, non sumantes tamen modum a largis videlicet maiori, minori et minima, quae quaelibet per se habet potestatem generandi modos varios et diversos quoad mensuram.

A lesser [larga] is so-named because it is between the greater and the least [larga]. That which is called a least larga is the smallest of the two largae and contains the smallest portion of time. And even though it is the least among the largae, in other places it is still greatest with respect to longae, breves, semibreves, and minimis.

Having spoken of the properties of the divisions of the tempus, let us now consider the [rhythmic] modes and what they are. Rubric.

For the musician, a mode is a cognition of sound, designated with its own properties. For where a mode begins, a division or a measure of the tempus can be begun. But there are two proprieties of the principal modes, namely the perfect and imperfect; through these proprieties all the divisions are grouped. There are many modes and there are various opinions [about them]. Among those [who studied the modes was] Magister Franco, who was the first inventor of measured music. He designated five modes, others six, and others seven. Without taking the mode from the largae of the greater, lesser, and least [extensions], any of these can have in themselves the power to produce the various different modes with respect to the measure.

---

31 He presumably meant to write about the lesser larga here, since he mentions the least again in the following sentence.

32 I have here translated the word modus as “mode,” since Vetulus is evidently referring to the rhythmic modes. However, he also uses the term modus to refer to the perfect and imperfect “proprieties” here and elsewhere. Vetulus is conflating the propriety of the rhythmic modes with perfection and imperfection.
Sed tamen principales principalium quoad considerationem constitutionis numeri sunt videlicet duo, perfectus et imperfectus, ut dictum est supra. Sed quoad considerationem divisionum mensurarum, mihi videtur quod, sumendo modum a largis, principales universalium tam perfectorum quam imperfectorum sunt 18. Videlicet perfectorum sunt 11, imperfectorum 7. Sed particulares dicere qualiter et quomodo vadunt, quae et quot sunt in divisionibus temporum per speciales regulas tacemus, quia esset multiplicatio verborum et confusio intellectus quae evitandae sunt, cum in arbore divisionum ipsos et derivationes eorum tam principales quam particulars et universales patebunt, et specialiter principales per ordinatas figuras et regulas demonstrantur, sub quibus particulares [fol. 3r] et quilibet istorum modorum seriatiim etiam demonstrabitur. Nota quod quando loquimur de modo, non loquimur nisi usque ad divisionem temporis, sed quando tempus est divisum, loquimur tamen de divisione quam videmus figuratum. Sed tamen omnes divisiones reducuntur secundum modum perfectum et imperfectum, ut superius dictum est et ut constat per figuram patebunt.

Dicto de modo et proprietatibus modorum, dicendum est sicut dixitit maneries.

Maneries est illa quae secundum modos ordinatos cantatur.

However, the first two of the principal [ways of dividing] with respect to the constitution of rhythm according to the system are the perfect and imperfect, as is stated above. But with respect to the divisions of the measures it seems to me that, having taken the mode from the largae, there are in total eighteen principal perfect and imperfect [modes]. There are eleven perfect and seven imperfect. Although some people in particular hasten to say of what sort and how, what and how many [modes] there are in the divisions of the tempora according to particular rules, we do not speak of this, because it would entail an increase of words and confusion of understanding, which have to be avoided. For in the tree[s] of the divisions these [modes] and their derivations, as much the principal [modes] as the particulars and universals will be shown, and the principal [modes] will be demonstrated specifically by means of the ordered noteshapes and rules, below which the particulars and each of these will also be demonstrated one by one. Note that when we speak of mode we are speaking [of it] only up to the division of the tempus, but when the tempus is divided, we speak of a division that we see formed. However, all the divisions are grouped perfectly and imperfectly, as is stated above and as will be shown in the figures.

Having spoken of mode and of the proprieties of the modes, let us describe how mensuration is defined.

Mensuration is that which is sung according to the ordered ways [of dividing].

---

33 Vetulus continues to conflate the rhythmic modes with “way of dividing.”
Et habemus ipsam multiplicem, ut superius demonstratur larga, et stricta ad libitum potestatis, quamvis insufficienter agatur cum habeamus tempus terminatum, limitatum, divisum et reductum per punctos, momenta, uncias et atomos ut superius dicitur, quod faciliter scire non omnium est. [36]

Quid sit divisio temporis.

Divisio temporis prout spectat ad musicum est cognitio numerorum divisionum, qui numeri cognoscuntur per figuras ordinatas ut inferius patebunt, per quas figuras mensura temporum potest haberi secundum atomos ordinatas.

Quid sit prolatio.

Prolatio est vocis iure mensurae modulatae enunciatio, et dividitur principaliter in duas partes quae superius, ubi tractatur de diversitatibus divisionum specierum tam perfectarum quam imperfectarum sufficienter declarantur. Particulariter vero dividitur in plures, videlicet naturalis et voluntaria. Naturalis prolatio est quam habet nota ex se. Voluntaria consistit in voluntate cantoris quod esse non debet, quia habent ipsas prolaciones reductas per punctos et atomos, conditiones vero praedictarum tam largarum, longarum, brevium, semibreves et minimarum, tam perfectarum, imperfectarum, semiperfectarum quam semiperfectarum.

There are many of these; the larga as is shown above, and it [can be] compressed as much as possible, however insufficiently it is delivered, since time is terminated, limited, divided, and grouped by means of points, impulses, ounces, and atoms as is said above, which of everything is not known easily.

What is a division of time?

For the musician, a division of time is a cognition of the divisions of rhythmic units; such rhythmic units are cognized by means of the ordered noteshapes as will be shown below. By means of these ordered noteshapes the measure of the {tempora} can be perceived with respect to the atoms.

What is an utterance?34

An utterance is an enunciation of a rhythmically measured sound in accordance with the law, and it is divided principally into the two parts that are described above sufficiently where the differences between the divisions of both the perfect and imperfect species are discussed. It is divided into many [parts], namely the natural and the voluntary. A natural utterance is noted from itself. A voluntary [utterance] consists in the will of the cantor, but it does not have to because the utterances themselves are grouped by points and atoms, made by the aforesaid perfect, imperfect, semi-perfect, and semi-imperfect largae, longae, breves, semibreves, and minimis.

34 This could also be translated as “extension,” as I translate the term prolatio in other locations, since the term is also used to describe the greater, lesser, and least extensions of notes. See: Commentary and Chapter 2.
Quia superius sufficienter tractatur et inferius declaratur, et quia de ipsis principalibus prolacionibus propriae et impropropiae causa etiam miscionis et sincopationis largae et strictae, quamvis insufficienter sit ut supra notatur ad libitum cantoris, et quia per figuram et arbores demonstratur causa evitandi superfluitates, nunc particulariter non tractatur.

His omnibus visis universaliter, videndum est de ipsis particulariter, ut plenius notitia habeatur cuiuslibet particulae.

Videndum est prius: notae principales sunt tres. Nomina vero ipsarum sunt tres. Nomina vero ipsarum sunt ista, scilicet larga maior, larga minor et larga minima. Et quaelibet per se est recta perfecta quoad modum dividendi. Cum igitur quaeque ipsarum possit dividii in tres partes aequales sicut nomina trinitatis, videlicet in patre et filio et spiritu sancto. Non quoad divisionem personarum, quia quales pater talis filius, talis spiritus sanctus, tam quoad considerationem different, quia pater in quantum pater different a filio eo quod maior sit, filius different a patre eo quod minor sit, testante Christo in evangelio, Pater maior me est. Spiritus sanctus different a patre et filio eo quod tenet medium inter patrem et filium. Et id quod tenet medium sapit naturam maioris et minoris extremitatis.

Because this is addressed sufficiently above and discussed below, and since the cause of the proper and improper, also the mixture and syncopation of the extended and compressed principal utterances, albeit insufficiently as is noted above, is at the leisure of the cantor, and because these are shown by means of the figures and trees, to avoid superfluities, this is now not addressed in particular.

Having considered all of these universally, let us consider them in the particular so that a more complete knowledge of each particular can be acquired.

First we must consider [that] there are three principal notes. They have three names. These are their names: the greater larga, the lesser larga, and the least larga. And by itself any perfect [larga] is recta with respect to the way of dividing. Any of these can be divided into three equal parts like the names of the Trinity, namely into the Father, the Son, and the Holy Spirit. Not with respect to the division of their persons, since “such as the Father is, the Son is, and the Holy Spirit is;” they are considered to be different because the Father, to the extent that he is the Father, differs from his Son because he is greater, the Son differs from his Father because he is lesser, which was testified to by Christ in the Gospel, “the Father is greater than I.” The Holy Spirit differs from the Father and his Son in that it is halfway between Father and Son. And that which is in the middle savors the nature of the greater and lesser extremity.


36 That is, it is not altered, or doubled in length to fill out a rhythmic grouping.

37 This is extracted from the Athanasian Creed.

38 Presumably a reference to Aristotle’s *Politics*, IV, VII, 41, “in eo […] [medio] utrumque extremorum apparet,” [each of the two extremities can be seen in the middle].
Unde spiritus sanctus qui est medius sapit naturam patris et filii quia in perfectione idem sunt. Ad similitudinem cuius spiritus sancti, larga minor tenet medium inter largam maiorem et minimam quoad mensuram temporis et continet in se valorem novem temporum, sicut novem sunt chori angelorum cantantes inter deum et homines unusquisque per se novies Kyrie eleison. Hoc est quod unusquisque chorus cantet, Parce domine populo tuo.

De larga minima.

Larga minima continet in se sex tempora ad similitudinem filii qui in sexta aetate appauaret in carne humana ad denotandum quod omnis homo debeat ipsum laudare corde et voce per omnes aetates quae sunt sex, scilicet infantia, pueritia, adolescencia, juventus, senectus et actas incipitam. Larga maior continet in se duodecim tempora ad similitudinem duodecim apostolorum qui per duodecim partes mundi discurrentes cantabant verbum dei sicut dicit psalmista, In omnem terram exivit sonus eorum et caetera. Et sicut in duodecim partibus mundi deus cognitus est, ita larga maior duodecim continet tempora. Et sicut novem chori angelorum qui per spiritum sanctum dicant laudem dei et minus dicam quam laudandus sit, eo quod ipse deus habeat sub se omnia tempora et in tempore non sit perfecta laus in homine versus deum, ita larga minor continet in se pauciora tempora et breviora quam 12 larga.

Quid sit spiritus sanctus circa novenariam.

This is why the Holy Spirit, which is the middle, savors the nature of the Father and Son, because they are the same in perfection. In the likeness of the Holy Spirit, the lesser larga is halfway between the greater and the least larga with respect to the measure of musical time and it contains nine tempora, like the nine choirs of angels singing nine Kyrie eleison each between God and the people. This is what each choir should sing: “Lord, spare your people.”

On the least larga.

The least larga contains six tempora in the likeness of the Son, who appeared in human flesh in the Sixth Age of the World to show that every person should praise him in heart and voice throughout all the ages, of which there are six, namely infancy, childhood, adolescence, youth, old age, and decrepitude. A greater larga contains twelve tempora in the likeness of the twelve Apostles who, wandering through the twelve parts of the world, were singing the word of God like it says in the psalms, “Their sound has gone forth into all the earth,” and so on. And just as God is known in the twelve parts of the world, so does the greater larga contain twelve tempora. And just as there are nine choirs of angels who praise God through the Holy Spirit—and less I will say than he should be praised because God has beneath him all times and in time there is no perfect praise in man facing God—so the lesser larga contains fewer tempora and breves than a larga [that is worth] twelve.

What is the Holy Spirit in relation to the novenaria?

---

39 Psalm XVIII:5. Hammond.

40 The nine choirs of angels are described by Pseudo-Dionysius in De coelesti hierarchia. See: Chapter 3.

41 Joel 2:17.

42 2 Esdras 14:11.
Dicendum est quod spiritus sanctus et bona voluntas in tribus personis consistit, videlicet in persona patris, in persona filii et in ipso spiritu sancto. Sic novenaria division [fol. 3v] et reductio etiam dividitur et reductur per ternarium numerum, quia in impari numero deus gaudet, videlicet in ternario quod numerus tertius quoad nos potest esse in binario et unario secundum dei laudem proferendam. Nam ipse Christus qui trinus est et unus de se loquitur erga nos, ubicumque fuerint duo vel tres congregati in nomine meo, hoc est ad mihi laudem quaer per musicales voces decantatur, ego ero in medio corum. Et quamvis de duabus dicit vel de tribus, unus tamen non excluditur, quia secundum constitutionem numeri et eius reductionem unum prius est duobus et tribus. Similiter in nobis, quia ad similitudinem trinitatis sancti sumus. Unusquisque per se habet in se tria, duo et unum, in quibus tribus, duobus et uno deus est in medio. Tria vero sunt corpus, anima et bona voluntas, duo vero corpus et anima, unum vero id quod procedit a corpore et ab anima ad dei laudem personandum. Ita quaelibet larga, longa quae descendit a dicta larga, brevis quae derivatur a longa descendente a larga praedicta, semibrevis descendens a praedicti brevi, et minima quae descendit a supradictis divisionibus, potest dividi usque ad atomum et reduci ad supradictam largam; quamvis dictum sit supra quod larga maior habeat in se plura tempora quam larga minor et minima, tamen tempora quaelibet mensurae divisionis seu prolationis possunt intrare in qualibet larga.

It must be said that the Holy Spirit and goodwill consist of three persons: the person of the Father, the person of the Son, and the Holy Spirit. Thus the novenaria division and grouping is also divided and grouped into a ternary rhythmic unit because God rejoices in an odd number, namely in the ternary, for a third rhythm from our perspective can be binary and unary in accordance with the praise offered to God. For Christ, who is threefold and one, says of himself with respect to us, “Wherever there are two or three gathered together in my name,” that is to praise me, this is sung over and again through musical sounds: “I will be in the midst of them.” And although he speaks of two or three, one is not excluded, because according to the order of number and its grouping one is prior to two and three. Similarly in us, since we are in the likeness of the Holy Trinity. Everyone has in themself three, two, and one; in these three, two, and one, God is in the middle. The three are the body, the soul, and goodwill; the two are the body and the soul; the one is that which goes forth from the body and soul for the resounding praise of God. Thus each larga, longa that descends from the said larga, breve that descends from the longa derived from the aforesaid larga, semibreve descending from the aforesaid breve, and minim, which descends from the divisions mentioned above, can be divided up to the [level of the] atom and grouped up to the larga mentioned above. Although it is stated above that the greater larga contains more tempora than the lesser and least larga, the tempora of any measure of division or extension can be contained within any larga.

---

De larga minima.

Minima larga, ut dictum est supra, continet in se sex tempora ad similitudinem filii. Nam sicut filius fuit minor angelis secundum mortalitatem et minor deo secundum humanitatem, ita larga minima est minima respectu largae maioris et minor dicitur respectu largae [39] minoris. Quod autem filius sit minor, ad cuius similitudinem dicitur minima, probatur dupliciter per sacram paginam. Nam de ipso loquitur David ubi dicit, Minuisti eum paulo minus ab angelis et caetera. Et angeli sunt 44 minores deo, ergo filius secundum carnem subiecit se duabus minoritatibus, scilicet minoritati dei et angelorum.

Dicto superius de continentia largarum, restat dicere de divisione ipsarum.

Dividitur enim larga maior in duas inaequales partes, videlicet in octavum numerum temporum et quartum, et habetur pro octo beatitudines quas ipse deus in monte suis discipulis praedicavit et aliis turbis. Etiam octavus numerus repraesentat illam bonam diem qua nos ipsi salutando vicissim octamus dicendo bona dies.

On the least larga.

The least larga, as is stated above, contains six tempora, in the likeness of the Son. For just as the Son was lesser than the angels according to his mortality, and lesser than God according to his humanity, so is the least larga least with respect to the greater larga and it is said to be lesser with respect to the lesser larga. That the Son is lesser (in whose likeness the least [larga] is said to be) is proven in two ways in the sacred scripture. For David speaks of it when he says, “You have made him a little lower45 than the angels,” and so on. And the angels are lesser than God, therefore the Son in the flesh casts himself two levels of lesserness below, namely to the lesserness of God and the angels.

Having spoken above of the contents of the largae, it remains to speak of their division.

The greater larga is divided into two unequal parts, namely into eight and four tempora, and it is considered to be among the eight beatitudes that God said on the mount before his disciples and the other crowds.46 The number eight also represents that good day in which we greet each other in turn saying “good day” eight times.47

---


45 Or “lesser.”

46 Matthew 5:7.

47 This is presumably referring to the eight monastic hours.
Sed quia vita nostra decurrit per septimum numerum temporum, videlicet per septem dies in quo non reperitur perfecta laus, scilicet in septimo numero dierum virorum, sed expectando octavus numerus in quo deum perfecte in ipso concedente poterimus laudare et hoc post mortem corporis. Nam tunc adimplebitur octavus numerus dierum virorum quando audiemus illam vocem dicentem, Venite benedicti patris mei et caetera. Et tunc illa dies adimplebit octavum numerum in qua etiam poterimus dicere, Dirupisti domine vincula mea et caetera. Et istud canticum erit perfectum. Et sub isto modo octavus numerus est perfectus in genere suo.

Quaternarius principalis largae maioris repraesentat quattuor testes trinitatis, videlicet quattuor evangelistas qui continentur in numero duodecim et principalium apostolorum et discipulorum, et ad ipsum numerum reducantur per mysterium trinitatis. Ita quartus numerus largae maioris continetur sub duodecimo et ad ipsum per ternarium numerum reducitur. Sic larga quae continet in se octo tempora dicitur larga imperfecta, quia ad beatitudinem percipiendam octavus numerus apostolorum est imperfectus, licet unusquisque per se perfectus sit. Et sic unumquodque tempus perfectum est. Sed nos loquimur de perfectione numeri apostolorum et temporum.

But because our life proceeds through the seven times, namely through the seven days, on which (namely on the seventh day of men) perfect praise is not found, by waiting for the eighth [day] we will be able to praise God perfectly when he grants it, and this after the death of the body. For then the eighth day men will be filled when we hear his voice saying, “Come, blessed of my Father,” and so on. And then this day will fill the eighth number, on which we will also be able to say, “Lord, you have broken my bonds.” And this canticle will be perfect. And beneath this mode is the number eight, perfect in its genus.

The quaternaria [division] of the first greater larga represents the four witnesses of the Trinity, namely the four evangelists, who are contained within the number twelve of both the principal apostles and the disciples, and they are grouped into this number by the mystery of the Trinity. Indeed, the number four of the greater larga is contained within the number twelve and is grouped into it by a ternary rhythmic unit. Thus, a larga that contains eight tempora is called an imperfect larga because, for the purpose of perceiving the beatitude, the eighth number of the apostles is imperfect, although each is perfect in itself. And thus each tempus is perfect. But we are speaking of the perfection of the number of the apostles and of the tempora.

---

48 Matthew XXV:34.

49 Presumably in reference to the eight church modes.
Et illa quae continet in se quattuor tempora duplex longa imperfecta vocatur, quia longa perfecta continet tria tempora quae duplicata continet in se sex, et sic esset duplex longa perfecta. Et si de qualibet longa perfecta subtrahitur unum tempus, remanet duplex longa imperfecta. Et sicut ista larga maior divisa est in duas partes, videlicet in octavum numerum et quartum, ita potest dividi in tres partes quattuor et quilibet numeros quartus vocatur duplex longa. Reducitur ad modum perfectum et dividitur secundum modum imperfectum.

Sed ut hoc opus non sit nimium laboriosum et difficile volentibus discere artem divisionum et prolationum mensurae pro eo quod facta est mentio superius de beatitudine et de numero apostolorum, sciem quod facta est, sicut duodecim apostoli praedicaverunt trinitatem et beatitudinem in universo orbe quorum [fol. 4r] doctrina erit usque ad extremitatem saeculi, sicut de ipsis psalmista dicit, In omnem terram exivit sonus eorum,\(^{50}\) ita valor largae maioris, minoris, et minimae quae repraesentant trinitatem, ut dictum est, sunt causa omnium quae continentur in arte musicae mensuratae, et ad ipsas omnes reducuntur.

Quaelibet istarum divisionum principalium subdividitur in duas partes aequales, et quaelibet pars vocatur longa tamen imperfecta de modo, sed perfecta est de tempore. Et quaelibet istarum longarum dividitur in duas partes aequales, et quaelibet pars vocatur brevis et valet unum tempus.

And that which contains four tempora is called a duplex imperfect longa, because a perfect longa contains three tempora, which doubled contains six [tempora], and thus this would be a duplex perfect longa. And if from any perfect longa one tempus is taken away, a duplex imperfect longa will remain. And thus this greater larga\(^{51}\) is divided into two parts, namely into eight and four. It can be divided into three parts [worth] four [tempora], and any number of four [tempora] is called a duplex longa.\(^{52}\) It is grouped into the perfect modus and is divided into imperfect modus.

But in order that this work is not too tiresome and difficult for those who wish to learn the art of measure of the divisions and extensions, \([and]\) because the beatitude and of the number of the apostles has been mentioned above, know that as the twelve apostles preached the Trinity and the beatitude in the whole world, their teaching will persist until the end of the age like it says in the psalms: “Their sound has gone forth into all the earth.” Indeed, the value of the greater, lesser, and least larga, which represent the Trinity are, as has been said, the cause of all things that are contained within the art of measured music, and all things are reduced to them.\(^{53}\)

Each of these principal divisions are subdivided into two equal parts, and each part is called a longa of the imperfect modus, but it is of the perfect tempus. And each of these longae is divided into two equal parts, and each part is called a breve and is worth one tempus.

---

50 Psalm XVIII:5. Hammond.

51 Greater perfect larga, worth twelve breves.

52 Duplex imperfect longa.

53 That is, all notes are grouped into these three largae because they are the longest notes in Vetulus’s system.
Insuper potest dividi larga maior per medium et quaelibet pars est valoris sex temporum, et principaliter semilarga appellatur et potest vocari duplex longa et triplex longa. Si duplex longa erit, dividitur recte et reducitur secundum modum imperfectum. Et longae descendentes a dicta duplici longa reducuntur ad modum imperfectum et dividuntur secundum modum perfectum. Et si erit triplex longa, reducitur ad modum imperfectum et dividitur secundum perfectum. Et longae descendentes a dicta tripli longa reducuntur ad modum perfectum et dividuntur secundum imperfectum.

Viso supra de larga maiori, videndum est sicut dividitur larga minor.

Larga minor in duas inaequales partes dividitur, videlicet in ternarium numerum temporum et senarium. Et minor pars valet tria tempora quae longa perfecta vocatur. Et maior pars erit duplex longa, quae longae descendentes a praedicta reducuntur ad modum imperfectum et dividuntur secundum modum perfectum. Dividi etiam potest praedicta larga minor per ternarium numerum, et quilibet numerus est valoris trium temporum qui reducit et dividitur per modum perfectum.

Dicto de larga minori, dicendum est de minima.

Larga minima dicitur respectu largae maioris et minoris ad similitudinem Christi qui se facit minorem respectu patris quoad dietatem et facit se minorem angelis quoad mortalitatem. Et praedicta larga minima in duas partes inaequales principaliter dividitur.

Moreover, the greater larga can be divided in half and each part is worth six tempora and called a semi-larga and can be called a duplex longa or a triplex longa. If it is a duplex longa, it is rightly divided and grouped imperfectly. And the longae descending from the said duplex longa are grouped imperfectly and divided perfectly. And if it is a triplex longa, it is grouped imperfectly and divided perfectly. And the longae descending from the said triplex longa are grouped perfectly and divided imperfectly.

Having considered the greater larga above, we will consider how the lesser larga is divided.

A lesser larga is divided into two unequal parts, namely into a ternary and a senary rhythmic unit. And the smaller part is worth three tempora, which is called a perfect longa. And the larger part will be a duplex longa, [and] these longae, descending from the aforesaid lesser larga, are grouped imperfectly and are divided perfectly. The aforesaid lesser larga can also be divided into a ternary rhythmic unit, and each part is worth three tempora, which is grouped and divided perfectly.

Having spoken of the lesser larga, let us speak of the least.

The least larga is so-called with respect to the greater and lesser larga in the likeness of Christ who made himself lesser with respect to the Father in terms of his divinity and made himself lesser than the angels in terms of his mortality. And the aforesaid least larga is divided principally into two unequal parts.
Et minor pars est valoris duorum temporum et dicitur longa imperfecta, et maior pars valet quattuor tempora et vocatur duplex longa imperfecta aut imperfecta larga minimae imperfectionis. Et ista imperfecta larga minima seu duplex longa imperfecta quae valet quattuor tempora etiam dividitur in duas partes aequales, et quaelibet pars est valoris duorum temporum. Et ista tempora descendentia ab ista duplici longa reducuntur ad modum imperfectum et dividuntur secundum modum perfectum. Adhuc larga minima supradicta potest dividiri in duas aequales partes, et quaelibet pars erit valoris trium temporum et reducitur ad modum imperfectum et dividitur secundum modum perfectum.

Dicto de divisionibus et subdivisionibus largarum, dicendum est de divisionibus et subdivisionibus temporum.

Ut dictum est superius, quia ubi incipimus modum possimus incipere divisionem seu mensuram temporis, hoc est verum. Tamen principales mensuras duodecim modis habemus, scilicet perfectam, maiorem, minorem et minimam, imperfectam maiorem, minorem et minimam, semiperfectam maiorem, minorem et minimam, et semiimperfectam maiorem, minorem et minimam.

Quomodo accipitur tempus.

Etiam dictum est supra quia musicus non accipit tempus sed id quod mensuratur per tempora, tamen in tempore quod tempus non maius neque minus sed medium quod est acceptum, divisum et reductum a musico a die naturali usque ad arithmeticam.

And the smaller part is worth two tempora and is called an imperfect longa, and the larger part is worth four tempora and is called a duplex imperfect longa or an imperfect larga of the least imperfection. And the least imperfect larga or imperfect duplex longa which is worth four tempora is also divided into two equal parts, and each part is worth two tempora. And the tempora descending from the duplex longa are grouped imperfectly and divided perfectly. The least larga mentioned above can still be divided into two equal parts, and each part will be worth three tempora and grouped imperfectly and divided perfectly.

Having spoken of the divisions and subdivisions of the largae, let us speak of the divisions and subdivisions of the tempora.

As is stated above, because where we begin the modus we can begin a division or measure of the tempus, this is true. We have twelve principal mensurations, namely the greater, lesser, and least perfect; the greater, lesser, and least imperfect; the greater, lesser, and least semi-perfect; and the greater, lesser, and least semi-imperfect.

How the tempus is perceived.

It is also stated above that a musician does not perceive time itself, but that which is measured by means of the tempora; it is neither the greater nor the lesser tempus, but the medium that is perceived, divided, and grouped by the musician from the natural to the arithmetic day.

---

54 This should presumably say “minimum,” or “least” rather than “lesser.”
Interest valor atomorum 54 et particularum vocis 27, quorum quaelibet est indivisibilis quoad vocem sicut atomus quoad tempus. Et ab isto tempore non incipiendum est dividere sed a tempore perfecto maiore quod continet in se valorem atomorum 72, particularum vocis 36 et minimarum 12 de prolatione tamen maiore. Et tempus perfectae maioris divisionis 12 maioris prolationis appellatur quod principaliter in duas partes inaequales dividitur, et tunc prima pars erit minor, secunda vero maior vel e converso.

De tempore quando dividitur in duas inaequales partes.

Quaeritur quare prima dictarum duarum partium est minor quam secunda. Respondetur et dicitur: [fol. 4v] Minor dicitur quoad alterationem, quia alterationem facere non debemus donec possimus ipsam evitare. Sed in ultima duarum notarum, quando tractatur de perfectis, causa implendi perfectionem dictam alterationem evitare non possimus. Unde de duabus, nisi per signum divisionis ultima alteretur, quae altera duorum temporum illius divisionis de qua tractatur. Tunc quando ipsa alteratione requaeritur, est valoris et mai or praedictarum partium tempus imperfectum maius octonariae divisionis maioris prolationis nominatur et 48 atomorum continet in se valorem. Et hoc tempus non restringitur ad modum. Within [this tempus] there are fifty-four atoms and twenty-seven particles of sound, of which each is indivisible with respect to sound just as the atom is with respect to time. And from this tempus it is not necessary to begin to divide, but rather from the greater perfect tempus, which contains seventy-two atoms, thirty-six particles of sound, and twelve minims of the greater extension. And the tempus of the greater perfect division is called the duodenary of the greater extension, which is divided principally into two unequal parts, and then the first part will be smaller, but the second larger, or the opposite.

On the tempus when it is divided into two unequal parts.

Why is the first of the two said parts smaller than the second? [This question can be] responded to and answered [as follows]: The smaller is so-called on account of alteration because we do not have to make an alteration if we can avoid it. But in the last of the two notes, when the perfect is considered, we cannot avoid the said alteration because we have to fill out the perfection. Out of these two, unless the last is changed by a sign of division, of the two tempora of this division it is this altered [note] that is spoken about. Then, when thinking again about alteration, it is worth and is the larger of the aforesaid parts, [and it is] named the greater imperfect tempus of the octonaria division of the greater extension, and it is worth forty-eight atoms. And the tempus is not bound to the modus.55

---

55 That is, because this breve is altered, it is not one of the three breves (each worth 24 atoms) that make up the modus of this particular division, as he will now explain.
Et minor pars intelligatur tempus breve quaternariae maioris prolationis de tempore semiimperfecto maiori, et 24 atomorum valorem in se continet; et non etiam restringitur ad modum, tamen maior et minor pars simul unitae modum faciunt perfectum.

[45] Potest enim tempus praefatum octonariae maioris prolationis prae ductae dividì per binarium numerum. Et quilibet numerus tempus breve semiimperfectum maius quaternariae maioris prolationis vocatur, quod dividitur et reducitur per modum imperfectum.

Etiam potest quodlibet istorum temporum semiimperfectorum maiorum quaternariae prolationis ascendere ad divisionem senariam. Et tempus semiimperfectum maius senariae minoris prolationis, quod reducitur ad modum imperfectum, nominatur.

Quaeritur qualiter praefatum tempus quaternariae divisionis ascendere potest ad divisionem senariam in cadem mensura temporis, cum illae sint quattuor aequales et illae sexies et aequales. Respondetur: Quia praedictum tempus semiimperfectum quattuor componitur et dividitur per duas minores semibreves; et est notandum quod unaquaeque dictarum semibrevis minorum, quae est valoris duarum minimarum de prlatione maiori, potest facere unam semibreves maiorem de prlatione minori, quae est valoris trium minimarum minoris prolationis.

And the smaller part is understood to be the breve tempus of the quaternaria of the greater extension of the greater semi-imperfect tempus, and it is worth twenty-four atoms; and it is not only bound to the modus, but the unified larger and smaller parts simultaneously make perfect modus.

The aforementioned tempus of the octonaria of the greater extension can be divided into a binary rhythmic unit. And each part is called a greater semi-imperfect breve tempus of the quaternaria of the greater extension, which is divided and grouped imperfectly.

Any of these greater semi-imperfect tempora of the quaternaria extension can also ascend to the senaria division. And it is called the greater semi-imperfect tempus of the senaria of the lesser extension, which is grouped imperfectly.

How can the aforementioned tempus of the quaternaria division ascend to the senaria division in the same measure of the tempus when the four [semibreves of the quaternaria] are equal and the six [semibreves of the senaria] are also equal? This is how: Because the aforesaid semi-imperfect tempus is composed of four [parts] and it is divided by two lesser semibreves; and note that each of the said lesser semibreves, which are worth two of the minims of the greater extension, can make one greater semibreve of the lesser extension, which is worth three of the minims of the lesser extension.

56 That is, the value in atoms of the breve remains the same, but will now be divided into six rather than four.

57 Of the greater extension.
Quaerendum est etiam qualiter praedicta minor, quae est valoris duarum minimarum de prolacione maiori et aequalium, potest facere semibrevem maiorem, cum sit valoris trium minimarum et aequalium de prolacione minori. Dicendum est quia praedicta minor de prolacione maiori 12 atomorum est valoris, quos in duas partes aequales dividere possimus, sicut minor praedicta duarum minimarum maioris prolacionis est valoris, videlicet in duas partes per bis sexies, aut in tres partes aequales ad similitudinem praedictae maioris de prolacione minori quae in tres minimas aequales dividit potest in tres partes, scilicet per sex quattuor. Et ita antedictum tempus semiimperfectum maius quaternariae maioris prolacionis potest ascendere ad senarium divisionem minoris prolacionis, sicut 24 atomi qui sunt praedicti temporis valoris possunt in sex partes aequales, videlicet per sex quattuor.


Let us also consider how the aforesaid lesser [semibreve], which is worth two equal minims of the greater extension, can make a greater semibreve when it is worth three equal minims of the lesser extension. It must be said that the aforesaid lesser [semibreve] of the greater extension is worth twelve atoms, which we can divide into two equal parts, as the aforesaid lesser [semibreve] is worth two minims of the greater extension. Namely [it can be divided] into two parts by six twice, or into three equal parts in the likeness of the aforesaid greater [semibreve] of the lesser extension, which can be divided into three equal minims into three parts, namely by four three times. The aforesaid greater semi-imperfect tempus of the quaternaria of the greater extension can ascend to the senaria division of the lesser extension, just as the twenty-four atoms which are spoken of above are worth one tempus [and] can be divided into six equal parts, namely by four times six.

The aforesaid tempus of the duodenaria division of the greater extension is also divided into three equal parts, and each part is called the greater semi-imperfect breve tempus of the quaternaria division of the greater extension, which is grouped perfectly and is divided imperfectly. And it is worth twenty-four atoms.
Potest etiam quodlibet istorum temporum semiimperfectionum maiorum quaternariae divisionis dividi in duas partes aequales, et quaelibet pars de prolacione maiori duarum minimarum est valoris. Et minor semibrevis appellatur quae 12 atomorum est valoris. Etiam quaelibet istorum dictarum duarum semibrevium minorum de prolacione maiori, quae duarum minimarum est valoris, potest in tres minimas dividi minoris prolacionis. Et hoc quare: Quia 12 atomi qui habent valorem praedictae minoris maioris prolacionis seu maioris prolacionis minoris possunt dividi in duas partes aut in tres, videlicet in duas per bis sex et in tres per ter quattuor, ut superius particulariter tractatur. Et omnes istae tres minimae descendentes a praedicta semibrevi minori simul unitae semibreven componunt maiorem, tamen minoris prolacionis ut supra dicitur. Et sicut per duas minores semibreves componitur tempus quaternarium, ita per duas maiores componitur tempus senarium quod tempus antedictum est de modo perfecto et de tempore imperfecto. Et tempus senariae divisionis minoris prolacionis vocatur.

Potest etiam unaquaeque dictarum minorum de prolacione maiori aut maiorum de prolacione minori ascendere ad quaternarium divisionem minimae prolacionis, quae quaternaria reductur et dividitur secundum modum imperfectum. Et tempus semiimperfectum minimum 4 minimae prolacionis vocatur.

Super codem.

Any of these greater semi-imperfect tempora of the quaternaria division can also be divided into two equal parts, and each part will be worth two of the minims of the greater extension. And [each part] is called a lesser semibreve, which is worth twelve atoms. Also, each of these two said lesser semibreves of the greater extension, which are [both] worth two of the minims, can be divided into three of the lesser extension. And this is why: Because the twelve atoms that are worth [the same as] the aforesaid lesser [semibreve] of the greater extension or the greater [semibreve] of the lesser extension can be divided into two parts or into three, namely into two by six twice and into three by four thrice, as is discussed above in detail. And all of these three minims, descending from the aforesaid lesser semibreve, united simultaneously, make up the greater semibreve, still of the lesser extension as is stated above. And just as the quaternaria tempus is composed of two lesser semibreves, so is the senaria tempus composed of two greater [semibreves] because the aforesaid tempus is of perfect modus and is of imperfect tempus. And it is called the tempus of the senaria division of the lesser extension.

Any of the said lesser [semibreves] of the greater extension or the greater [semibreves] of the lesser extension can also ascend to the quaternaria division of the least extension because the quaternaria is grouped and divided imperfectly. And the least semi-imperfect tempus is called the quaternaria of the least extension.

About the same.
Qualiter semibrevis quae componitur ex duabus minimis prolationis maioris seu maior minoris prolationis quae componitur ex tribus potest dividit in 4 et aequales?

Respondetur: Quia tam maior de prolacione minori quam minor de prolacione maiori 12 atomorum est valoris ut supra patet, qui 12 aequales, in tres aequales et in quattuor aequales. In duas aequales videlicet per bis sex. In tres aequales videlicet per ter quattuor. Et in quattuor aequales videlicet per quater tres.

Etiam quodlibet praedictorum temporum semiimperfectorum quaternariae etiam divisionis et minimeae prolotionis [fol. 5r] ascendere potest ad divisionem senariam minimeae etiam prolotionis. Quare? Quia est compositum ex duabus semibrevisibus minoribus, et unaquaque praedictarum minorum, cum sit valoris 6 atomorum, potest ascendere ad divisionem ternariam. Nam sicut per duas minores componitur tempus quaternariae divisionis, ita per duas maiorres componitur tempus divisionis senariae, ut supra patet. Et ad modum perfectum reducitur et dividitur.

How can a semibreve that is composed of two minims of the greater extension, or a greater [semibreve] of the lesser extension that is composed of three, be divided into four equal [parts]? This is how: Because both a greater [semibreve] of the lesser extension and a lesser [semibreve] of the greater extension are worth twelve atoms, as is shown above. These twelve atoms can be divided into two equal parts, into three equal and four equal [parts]. Into two equal parts by six twice; into three equal [parts] namely by three four times; and into four equal parts by three four times.

Any of the aforesaid semi-imperfect tempora of the quaternaria, of both the least division and extension, can ascend to the senaria division of the least extension as well. Why? Because [the quaternaria of the least extension] is composed of two lesser semibreves, and each of the aforesaid lesser [semibreves] can be divided into three because they are worth six atoms. For just as the tempus of the quaternaria division is composed of two lesser [semibreves], so is the tempus of the senaria division composed of two greater [semibreves], as is shown above. And it is grouped and divided perfectly.

58 Improper.

59 Of the least extension.

60 Three improper minims of the least extension (2 atoms).

61 Improper greater semibreves of the least extension.

62 This should presumably say “imperfectly,” since the senaria division described here is grouped into imperfect modus and divided into imperfect tempus. The diagram shows how the improper senaria of the least extension (12 atoms, i.e. half of the greater quaternaria division mentioned above) is grouped into imperfect modus. Each new senaria breve is divided into two improper greater semibreves of the least extension (6 atoms) and six improper minims of the least extension (2 atoms).
Super eodem.

Qualiter semibrevis minor de divisione quaternaria minima prolactionis, quae est valoris duarum minimarum, potest dividi in tres etiam minimas, cum illae minimae dictae minoris sint de prolatione minima 4 divisionis? Respondetur: Quia quaelibet dictarum minorum continet in se valorem atomorum 6, quorum atomorum facere possimus duas aut tres partes, videlicet duas per bis 3 et tres, scilicet per ter bis.

Insuper dictum tempus semiimperfectum maius divisionis quaternariae aut senariae, quod descendit a divisione duodenaria maioris prolactionis, potest ascendere ad divisionem octonariam minima prolactionis, quod reductur ad modum perfectum et dividitur secundum imperfectum. Etiam tempus semiimperfectum maius, quod descendit a divisione octonariae maioris prolactionis, potest generare divisionem etiam octonariam minima prolactionis, quod reductur et dividitur secundum modum imperfectum. Quare? Quia praefatum tempus semiimperfectum maius quaternariae aut senariae divisionis continet in se valorem, ut dictum est supra, 24 atomorum de quibus facere possimus quattuor partes aequales, sex aequales et octo aequales, videlicet in quattuor partes aequales dividuntur per quater 6, in 6 per sex quattuor, et in octo per octies tres.

About the same.

How can the lesser semibreve of the quaternaria division of the least extension, which is worth two minims, also be divided into three minims, when these minims of the said lesser [semibreve] are of the least extension of the quaternaria division? This is how: Because each of the said lesser [semibreves] contains six atoms; out of these atoms we can make two or three parts, two by three twice and three by two three times.

Moreover, the said greater semi-imperfect tempus of the quaternaria division, which descends from the duodenaria division of the greater extension, can ascend to the octonaria division of the least extension, which is grouped perfectly and divided imperfectly. The greater semi-imperfect tempus, which descends from the octonaria division of the greater extension, can also generate the octonaria division of the least extension, which is grouped and divided imperfectly. Why? Because the aforementioned greater semi-imperfect tempus of the quaternaria or senaria division contains the value, as is stated above, of twenty-four atoms out of which we can make four equal parts, six equal [parts], and eight equal [parts]. Namely they are divided into four equal parts by six four times, into six by four six times, and into eight by three eight times.

---

63 Of the least extension.

64 That is: how can a lesser semibreve of the least extension (6 atoms) be divided into three parts, despite the fact that it can also be divided into two minims of the least extension? The answer, as he will explain, is that there are two different kinds of minims of the least extension. One is worth three atoms, the other two. He is here describing the distinction between the so-called “proper” and “improper” divisions. See: Chapter 2.

65 Of the greater extension.

66 Of the lesser extension.
Notandum est quod quando tempus imperfectum aut semiimperfectum \[49\] dividitur per medium, aliquando per duo binariae, aliquando per duo ternariae et aliquando per duo quaternariae. Et omnes istas divisiones possumus miscere simul, tamen imperfectum tempus cum imperfecto et semiimperfectum cum semiimperfecto tempore, videlicet primam medium partem per modum binariae et secundum per modum ternariae, vel e contrario. Aut primam medium partem per modum binariae et secundam per modum quaternariae, vel e contrario. Aut primam per modum ternariae et secundam per modum quaternariae, vel e contrario.

Etiam praedictum tempus semiimperfectum maius aliquando dividitur per modum quaternariae, aliquando per modum senariae et aliquando per modum octonariae; et omnes istae possunt misceri simul sub eadem mensura, videlicet prima pars per modum quaternariae et secunda per modum senariae, vel e contrario. Aut prima pars per modum senariae et secunda per modum octonariae, vel e contrario. Aut prima pars per modum quaternariae et secunda per modum octonariae, vel e contrario. Quare? Quia omnes istae, ut dictum est supra, sunt sub eadem mensura temporis.

Etiam praedictum tempus senariae divisionis, quod est compositum ex duabus maioribus semibrevisbus, potest dividi in tres minores. Quare?

Note that when the imperfect or semi-imperfect tempus is divided in half, [it is] sometimes [divided] into two binariae, sometimes into two ternariae and sometimes into two quaternariae. And we can mix all of these divisions simultaneously, imperfect tempus with imperfect and semi-imperfect with semi-imperfect tempus, namely the first half by the binaria division and the second by the ternaria division, or the opposite; or the first half by the binaria division and the second by quaternaria division, or the opposite; or the first by the ternaria division and the second by the quaternaria division, or the opposite.

The aforesaid greater semi-imperfect tempus is also divided sometimes by the quaternaria division, sometimes by the senaria division and sometimes by the octonaria division; and all of these can be mixed simultaneously under the same measure, namely the first part by the quaternaria division and the second by the senaria division, or the opposite; or the first part by the senaria division and the second by the octonaria division, or the opposite; or the first part by the quaternaria division and the second by the octonaria division, or the opposite. Why?

Because all these, as is said above, are under the same measure of the tempus.

The aforesaid tempus of the senaria division, which is composed of two greater semibreves, \[67\] can also be divided into three lesser [semibreves]. \[68\] Why?

---

\[67\] Of the lesser extension.

\[68\] Of the lesser extension.
Quia praefatum tempus, ut dictum est, continet in se valorem 24 atomorum quod possimus dividere in duas partes, videlicet per bis 12; sicut dicta divisio sexta potest dividī et reduci per 2 maiores, et in tres etiam partes, videlicet per ter 8, sicut antedicta divisio senaria in 3 semibreves minores potest dividī et reduci.

Adhuc supradictum tempus divisionis duodenariae maioris prolationis, quod est compositum ex 3 temporibus divisionis quaternariae maioris etiam prolationis, et quodlibet tempus ex duabus minoribus semibrevisibus, potest dividī et reduci per medium. Nunc dicendum quare. Quia praefatum tempus componitur per tria tempora quaternariae, ut dictum est supra, et quodlibet tempus divisio quaternariae potest dividī in duas minores semibreves, ita quod summarie omnia ista tria tempora faciunt sexies minores semibreves quae possunt dividī per medium, videlicet per bis tres. Et tempus semiperfectum maius, aut perfectum improprium diminutum, quod reducitur ad modum imperfectum et dividitur secundum modum perfectum, vocatur et 36 atomorum est valoris.

Dividi etiam potest praedictum tempus in duas inaequales partes. Et tunc prima pars erit minor, secunda vero maior, vel e contrario.

Because the aforementioned tempus, as has been stated, contains twenty-four atoms, which we can divide into two parts by twelve twice, just as the said sixth division can be divided and grouped into two greater [semibreves]; and into three parts, namely by eight three times, just as the aforesaid senaria division can be divided and grouped into three lesser semibreves.

Still, the aforesaid tempus of the duodenaria division of the greater extension, which is also composed of three tempora of the quaternaria division, also of the greater extension (and any other tempus [that is composed] of two lesser semibreves) can be divided in half. Let us now say why. Because the aforementioned tempus is composed of three quaternaria tempora, as is stated above, and any tempus in the quaternaria division can be divided into two lesser semibreves, because in sum these three tempora contain six lesser semibreves, which can be divided in half, namely into three twice. And this is called the greater semi-perfect, or the improper diminished perfect tempus, which is grouped imperfectly and is divided perfectly, and is worth thirty-six atoms.

The aforesaid tempus can also be divided into two unequal parts. And then the first part will be smaller, but the second larger, or the opposite.

---

69 In Hammond this is transcribed as “divisionibus.” de Anagnia, Liber de musica, ed. Hammond, 49.

70 I changed this from “semiimperfectum” to “semiperfectum” to reflect Vat307.

71 Senaria.

72 Of the lesser extension.

73 Three lesser semibreves of the lesser extension.
Et maior pars pro tempore brevi minime imperfectionis impropriae quaternariae maioris prolationis computatur, quod non dat respectum ad modum et 24 atomorum est valoris, et minor pars erit semibrevis minor de prolatione maiori quae 12 atomorum est valoris. Et sicut minor semibrevis maioris prolationis ascendit ad divisionem ternarium et quaternarium, et tempus divisionis quaternariae maioris prolationis ascendit ad divisionem senarium et octonarium per punctos atomorum particulariter divisiones aut reductiones praedictarum divisionum temporum per ordinem superius demonstratur.

Nota quod divisio senaria potest dividi et reduci per binarium numerum et ternarium. Etiam praedictum tempus improprium perfectum diminutum, aut semiperfectum\textsuperscript{74} maius quia in mensura sunt idem, potest in tres aequales partes dividit. Et quaelibet pars semibrevis minor appellatur, et duarum minimarum maioris prolationis et atomorum 12 est valoris. Potest etiam quodlibet istorum temporum praedictae perfectae diminutae ascendere ad novenarium divisionem minoris prolationis. Quare? Quia praefatum tempus senarium componitur ex tribus \textsuperscript{[fol. 5v]} minoribus semibrevisibus prolationis maioris.

And the larger part adds up to the time of a breve of the least improper imperfection of the \textit{quaternaria} of the greater extension,\textsuperscript{75} which does not give respect to the \textit{modus} and is worth twenty-four atoms; and the smaller part will be the lesser semibreve of the greater extension which is worth twelve atoms. And just as the lesser semibreve of the greater extension ascends to the \textit{ternaria} and the \textit{quaternaria}, so does the \textit{tempus} of the \textit{quaternaria} division of the greater extension ascend to the \textit{senaria} division and the \textit{octonaria} through the points of atoms; the divisions or groupings of the aforesaid divisions of the \textit{tempora} are shown particularly in succession above.

Note that the \textit{senaria} division can be divided and grouped into binary and ternary rhythmic units. Also, the aforesaid improper diminished perfect or the greater semi-perfect \textit{tempus}, since they are the same in measure,\textsuperscript{76} can be divided into three equal parts. And each part is called a lesser semibreve, and is worth two of the minims of the greater extension and twelve atoms. Any of these \textit{tempora} of the aforesaid diminished perfect [division] can also ascend to the \textit{novenaria} division of the lesser extension. Why? Because the aforementioned \textit{senaria tempus} is composed of three lesser semibreves of the greater extension.

\textsuperscript{74} I changed this from “semiimperfectum” to “semiperfectum” to reflect Vat307.

\textsuperscript{75} Here, Vetulus appears to be using the term improper in a different sense from the divisions built up from the improper minim of the least extension, worth two atoms. Presumably, he is referring to the fact that this \textit{quaternaria} breve (24 atoms) is derived from the division of the \textit{senaria} breve (36 atoms) into three parts (12 atoms), and following this the grouping of two of these parts together.

\textsuperscript{76} By “improper diminished perfect” it is possible that Vetulus is referring to the span of the improper lesser perfect breve (but not its division into parts).
Et ut dictum est supra, quaelibet dictarum minorum semibrevium de prolacione maiori, quae est valoris duarum minimarum, potest facere unam semibreven maiorem de prolacione minori. Et sicut tempus senarium componitur ex tribus minoribus, ita tempus divisionis novenariae componitur ex tribus maioribus semibrevisibus. Et istud tempus praedictae divisionis novenariae reducitur ad modum imperfectum et dividitur secundum modum perfectum.

Super eodem.

[51] Qualiter istae sex minimae de prolacione maiori temporis perfecti diminuti possunt facere novem de prolacione minori ut praedictum est? Respondetur: Quia praefatum tempus, ut dictum est supra, 36 atomorum in se continet valorem, quos possimus dividere per senarium numerum et novenarium, videlicet per senarium per 6 sex, et per novenarium per novies 4. Etiam sicut minor de prolacione enim maiori facit semibreven maiorem de prolacione minori, hoc est superius tractatum.

Potest etiam praefatum tempus divisionis novenariae ascendere ad divisionem duodenarium minimae prolotionis. Quare?

And as is stated above, any of the aforesaid lesser semibreves of the greater extension, which are worth two minims, can make one greater semibreve of the lesser extension. And just as the *senaria tempus* is composed of three lesser [semibreves], so is the *tempus* of the *novenaria* division composed of three greater semibreves. And the *tempus* of the aforesaid *novenaria* division is grouped imperfectly and divided perfectly.

About the same.

How can these six minims of the greater extension of the perfect diminished *tempus* make nine minims of the lesser extension as has already been stated? This is how: Because the aforementioned *tempus*, as is stated above, contains thirty-six atoms, which we can divide into a senary and a novenary rhythmic unit, namely into the *senaria* by six times, and the *novenaria* by four nine times. Also, since the lesser [semibreve] of the greater extension makes a greater semibreve of the lesser extension, this is addressed above.

The aforementioned *tempus* of the *novenaria* division can also ascend to the *duodenaria* division of the least extension. Why?

---

77 Of the greater extension.
Quia praedictum tempus divisionis novenariae supradictae, ut dictum est supra, componitur ex tribus semibrevibus maioriibus, et unaquaque dictarum semibrevium praedicti temporis novenariae minoris prolationis potest ascendere ad divisionem quaternariae minimae prolationis.

Quae est ratio quod tempus praedictum divisionis novenariae potest ascendere ad divisionem duodenariae minimae prolationis in eadem mensura temporis?

Respondetur: Quia, cum dictum est supra, continet in se valorem 36 atomorum quos possimus dividere per duodenarium numerum et per novenarium, per duodenarium per duodecies 3, et per novenarium per novies 4. Patet et supra quod hoc tempus divisionis duodenariae componitur ex 3 temporibus 4, et ex tribus temporibus 4 potest dividi, et tempus semiimperfectum minimum divisionis quaternariae minimae prolationis appellatur, quod dividitur ad modum imperfectum et reductur secundum modum perfectum, quod 12 atomorum est valoris.

Notandum est quod quodlibet praedictorum temporum divisionis quaternariae minimae prolationis praedictae ascenderet potest ad senariam divisionem et minimae prolationis etiam, et erit de modo perfecto et de tempore imperfecto.

Because the aforesaid tempus of the novenaria division mentioned above, as is said above, is composed of three greater semibreves, and each of the said semibreves of the aforesaid novenaria tempus of the lesser extension can ascend to the division of the quaternaria of the least extension.

How can the aforesaid tempus of the novenaria division ascend to the division of the duodenaria of the least extension in the same measure of the tempus?

This is how: Because, as is stated above, [this tempus] contains thirty-six atoms which we can divide into a duodenary and a novenary rhythmic unit, by a duodenary by three twelve times, and by a novenary by four nine times. And it is shown above that this tempus of the duodenaria division is composed of three quaternaria tempora, and from the three tempora the quaternaria can be divided, and this is called the least semi-imperfect tempus of the quaternaria division of the least extension, which is divided imperfectly and grouped perfectly, [and] which is worth twelve atoms.

Note that any of the aforesaid tempora of the quaternaria division of the aforesaid least extension can ascend to the senaria division of the least extension, and it will be of perfect modus and imperfect tempus.

---

78 Of the lesser extension.

79 Improper.
Quaerendum est qualiter praedictum tempus quaternariae minimae prolationis ascendere potest ad senariam divisionem et minimae prolationis, cum illae sint quattuor aequales et illae sex et aequales.

Respondetur: Quia praefatum tempus 12 atomorum est valoris de quibus facere possumus quaternarium divisionem et senarium, videlicet quaternarium per quater 3, et senarium per sexies 2.

Insuper praefatum tempus semiperfectum\(^{80}\) maius, quod est \(^{52}\) valoris 6 minimarum de prolatione maiori, in duas aequales partes potest dividii, videlicet in duas maiores semibreves. Et unaquaeque illarum maiorum semibrevim, ut supra patet, valoris est trium minimarum tamen maioris prolationis, et atomorum 18 pro tempore semiperfecto minimo impropro nominatur. Etiam quaelibet praedictarum semibrevim maiorum in duas minores semibreves dividii potest, et hoc quia praedicti 18 atomi qui habent valorem unius praedictarum semibrevim maiorum, dividere possimus in duas aequales partes, videlicet per bis 9.

How is it that the aforesaid tempus of the quaternaria of the least extension can also ascend to the senaria division of the least extension, when these four [parts] are equal and these six [parts are] equal?

This is how: Because the aforementioned tempus is worth twelve atoms, of which we can make the quaternaria division and the senaria, namely the quaternaria by three four times, and the senaria by two six times.

Moreover, the aforementioned greater semi-perfect tempus, which is worth six of the minims of the greater extension, can be divided into two equal parts, namely into two greater semibreves.\(^{81}\) And each of these greater semibreves, as is shown above, is worth three minims of the greater extension, and eighteen atoms, named the least, improper, semi-perfect tempus. Also, any of the aforesaid greater semibreves can be divided into two smaller semibreves, and this [is the case] because we can divide the aforesaid eighteen atoms which are worth one of the aforesaid greater semibreves into two equal parts, namely by nine twice.

---

\(^{80}\) I changed this from “semiimperfectum” to “semiperfectum” to reflect Vat307.

\(^{81}\) Of the greater extension.
Potest etiam quaelibet dictarum maiorum maioris prolationis ascendere ad senariam divisionem per duplicem modum, videlicet per duas maiores aut per tres minores, quia ut supra dicitur maior praefata prolationis maioris 18 atomorum est valoris, qui possunt per binarium numerum sicut praedicta semibrevis potest dividī, videlicet per bis novem. Et tempus semiimperfectum minus quod reductur et dividitur secundum modum imperfectum computatur. Et per ternarium, sicut dicitur supra, quia praefata maius semibrevis per ternarium numerum potest dividi, videlicet per ter 6. Et tunc tempus semiimperfectum minus quod reductur ad modum imperfectum et dividitur secundum perfectum appellatur.

Praefatum tempus semiimperfectum minus divisum per ternarium numerum, videlicet in tres minores, ascendere potest ad novenariam divisionem, quia unaquaeque minor minoris prolationis quae componunt hoc tempus divisionis senariae potest facere unam semibreven maiorem de prolatione minima, ut supra patet.

Any of the aforesaid greater [semibreves] of the greater extension can also ascend to the senaria division by dividing [them] in two, namely into two greater [semibreves], or three lesser [semibreves], because, as has been stated above, the aforementioned greater [semibreve] of the greater extension is worth eighteen atoms, which can be divided into a binary rhythmic unit, just as the aforesaid semibreve can be divided by nine twice. And the lesser semi-imperfect tempus, which is grouped and divided imperfectly sums up to this. And [it can also be divided] into a ternary [rhythmic unit], as is stated above, because the aforementioned greater semibreve can be divided into a ternary rhythmic unit, namely by six three times. And then it will be called the lesser semi-imperfect tempus, which is grouped imperfectly and divided perfectly.

The aforementioned lesser semi-imperfect tempus is divided into a ternary rhythmic unit, namely into three lesser [semibreves]. It can ascend to the novenaria division, because each lesser [semibreve] of the lesser extension, which makes up this tempus of the senaria division, can make one greater semibreve of the least extension, as is shown above.

---

82 Both of the least extension.

83 Of the least extension.

84 The improper novenaria of the least extension.

85 Improper.
Quaelibet minor quae est valoris duarum minimarum minoris prolationis potest facere unam maiorem semibrevene minimae prolationis, quia tam minor minoris prolationis quam maior minima sex atomorum est valoris qui possunt dividi per binarium, sicut minor semibrevis praedicta in duas partes dividitur, videlicet per bis 3, aut per ternarium sicut maior praefata in tres etiam partes dividit, et sic dividi per tern 2. Et ut dicitur supra, sic divisio 6 potest componi per tres minores semibreves, ita divisio novenaria componitur ex tribus maioriibus, ut patet. Et tunc tempus divisionis novenariae minimae prolationis vocatur.

[f. 6r] Adhuc tractandum est de tempore imperfecto maiori octonariae, [53] maioris prolationis, quod ut dicitur supra continet in se valorem 48 atomorum, quod componitur et dividitur ex duobus temporiis quaternariae divisionis quia potest ascendere ad divisionem duodenariam, quia per ordinem antedictum tempus divisionis quaternariae maioris prolationis praedictae ascendere potest ad senarium divisionem minoris prolationis.

Any lesser [semibreve] that is worth two minims of the lesser extension can make one greater semibreve of the least extension, because both a lesser [semibreve] of the lesser extension and a greater [semibreve] of the least [extension] are worth six atoms, which can be divided into a binary [rhythmic unit], just as the aforesaid lesser semibreve can be divided into two parts, namely into three twice, or into a ternary rhythmic unit, just as the aforementioned greater [semibreve] can also be divided into three parts, namely into two three times. And, as is stated above, the senaria division can be composed of three lesser semibreves, so the novenaria division is composed of three greater [semibreves], as is shown. And this is called the tempus of the novenaria division of the least extension.

It is still necessary to discuss the greater imperfect tempus of the octonaria of the greater extension which, as is stated above, contains forty-eight atoms, which is composed of and divided into two tempora of the quaternaria division because it can ascend to the duodenaria division, since the aforesaid tempus of the quaternaria division of the aforesaid greater extension can ascend in succession into the senaria division of the lesser extension.

---

86 The improper lesser semibreve of the lesser extension (6 atoms) worth two improper minims of the lesser extension (3 atoms) can make an improper greater semibreve of the least extension (6 atoms).

87 Improper greater semibreve of the least extension.

88 Improper.

89 Of the lesser extension.
Et sicut per duo tempora quaternaria compositionem minoris prolacionis. Et sicut per duo tempora quaternaria componitur tempus divisionis octonariae, ita per duo tempora senaria componitur tempus divisionis duodenariae. Quod tempus dicitur duodenariae impropriae divisionis et potest dividi per ternarium numerum, et quilibet numeros tempus impropriae imperfectionis quaternariae divisionis appellatur quod dividitur per modum imperfectum et reductur secundum modum perfectum, et 16 atomorum est valoris. Etiam duo istorum temporum quaternariae possunt facere unum tempus divisionis octonariae; minoris impropriae imperfectionis notatur, et est valoris 32 atomorum. Potest etiam quodlibet istorum temporum praedictorum divisione quaternariae ascendere ad improprium octonarium divisionem minimae prolactionis, quae reductur et dividitur per modum imperfectum.

And thus by means of two quaternaria tempora [we form] the composition of the lesser extension. And just as the tempus of the octonaria division is composed of two quaternaria tempora, so too can the tempus of the duodenaria division be composed of two senaria tempora. This is said to be the tempus of the improper duodenaria division, and it can be divided into a ternary rhythmic unit, and each unit is called the tempus of the improper imperfection of the quaternaria division, which is divided imperfectly and grouped perfectly and is worth sixteen atoms. Also, two of these tempora of the quaternaria [division] can make one tempus of the octonaria division; note of the lesser improper imperfection, and it is worth thirty-two atoms. Any of these aforesaid tempora in the quaternaria division can also ascend to the improper octonaria division of the least extension, which is grouped and divided imperfectly.

Dicto de divisionibus et subdivisionibus temporis perfecti maioris duodenariae divisionis et maioris prolacionis:

Having spoken of the divisions and subdivisions of the greater perfect tempus of the duodenaria division and of the greater extension:

Dicendum est de divisionibus et subdivisionibus temporis perfecti maioris seu medi, ubi primo per musicum incepta fuit mensura temporis, quod tempus universaliter continet in se valorem atomorum 54, particularum vocis 27 et minimarum 9 de prolacione maiori.

It is now necessary to speak of the divisions and subdivisions of the lesser perfect or medium tempus, where the measure of the tempus was first begun by a musician; altogether this tempus contains fifty-four atoms, twenty-seven particles of sound, and nine minims of the greater extension.

90 The improper duodenaria (greater breve) of the greater extension.

91 Of the greater extension.

92 Because he uses both the terms “improper” and “lesser” here, it is unclear whether he is referring to the proper greater imperfect breve of the lesser extension or the improper greater imperfect breve of the greater extension.

93 That is, both the least improper octonaria division and the lesser improper quaternaria division are worth sixteen atoms.
Et tempus divisionis novenariae maioris prolacionis vocatur, quod tempus dividitur per modum infrascriptum, videlicet principaliter in duas inaequales partes. Et tunc prima pars erit minor, secunda vero maior vel e contrario, quae maior pars tempus breve minoris imperfectionis senariae divisionis maioris prolacionis appellatur. Et atomorum 36 continet in se valorem et non restringitur ad modum. Et minor pars semibrevis maior, quae est valoris trium minimarum de praedicta prolacione maiori, nominatur.

Notandum est quod praefatum tempus divisionis senariae maioris prolacionis et minoris imperfectionis componitur ex duabus semibrevisibus [54] maioribus de prolacione maiori, et ex duabus maioribus semibrevisibus potest dividi. Et hoc tempus praedictae senariae potest dividi per tres minores semibreves. Quia antedictum tempus senariae maioris prolacionis, ut dictum est supra, atomorum 36 continet in se valorem, ita quod valorem 36 atomorum in 4 aut in 6 partes dividere possimus, ut inferius per ordinem demonstratur, videlicet in 4 per quater 9, aut in 6 per sexies 6. Etiam quaelibet dictarum maiorum de prolacione maiori divid potest in duas aequales partes, videlicet in duas minores semibreves.

And it is called the tempus of the novenaria division of the greater extension; this tempus is divided by the means written below, principally into two unequal parts. And then the first part will be smaller, but the second larger, or the opposite. The larger part is called the breve tempus of the imperfect senaria division of the greater extension. And it contains thirty-six atoms and is not bound to the modus. And the smaller part, which is worth three minims of the aforesaid greater extension, is called a greater semibreve.94

Note that the aforementioned tempus of the senaria division of the greater extension and of lesser imperfection is composed of two greater semibreves of the greater extension and it can be divided into two greater semibreves. And this tempus of the aforesaid senaria [division] can be divided into three lesser semibreves.95 Since the aforesaid tempus of the senaria of the greater extension, as is stated above, contains thirty-six atoms, we can divide the value of these thirty-six atoms into four or six parts, as is demonstrated below in the diagram, namely into four by nine four times, or into six by six six times. Also each of the aforesaid greater [semibreves] of the greater extension can be divided into two equal parts, namely into two smaller semibreves.

94 Of the greater extension.

95 Of the greater extension.
Quaeritur quare praedita maior maioris prolationis quae est valoris trium minimarum et aequalium potest in duas aequales partes dividii, ut dicitur supra, quia unaquaque dictarum maiorum de prolatione maiori est valoris 18 atomorum quos possimus per binarium et ternarium numerum dividere, scilicet per binarium per bis 9, et per ternarium scilicet per ter 6. Potest etiam quaelibet istarum maiorum maioris prolationis ascendere ad 6 divisionem, videlicet per duas maiores minoris prolationis aut per tres minores de minori etiam prolatione, quia 18 atomi qui sunt valoris, ut dictum est supra. Praedictae maioris de prolatione maiori possunt dividii per binarium, ternarium et senarium numerum, videlicet per binarium per bis 9, per ternarium per ter 6, et per senarium per sexies 3. Et si componitur hoc tempus 6 divisionis per duas maiores tempus semiimperfectum minus 6 divisionis imperfectae appellatur, quod reductur et dividitur per modum imperfectum. Et si componitur per tres minores tempus semiimperfectum minus 6 divisionis perfectae impropiae diminutae appellantur, et reductur ad modum imperfectum et dividitur secundum modum perfectum.

Quodlibet etiam praedictorum temporum semiimperfectorum minorum 6 divisionis potest ascendere ad novenariam divisionem minimae prolationis.

How is it that the aforesaid greater [semibreve] of the greater extension is worth three equal minims\(^{96}\) and can be divided into two equal parts, as is stated above? Because each of the said greater [semibreves] of the greater extension is worth eighteen atoms, which can be divided into a binary or ternary rhythmic unit, namely into a binary by nine twice, and a ternary by six three times. Any of these greater [semibreves] of the greater extension can also ascend to the \textit{senaria} division, namely into two greater [semibreves] of the lesser extension or into three lesser [semibreves] also of the lesser extension,\(^{97}\) because they are worth eighteen atoms, as is stated above. The aforesaid greater [semibreves] of the greater extension can be divided into a binary, ternary, and senary rhythmic unit, namely into a binary by nine twice, into a ternary by six three times, and into a senary by three six times. And if this \textit{tempus} of the \textit{senaria} division is composed of two greater [semibreves] it is called the lesser semi-imperfect \textit{tempus} of the imperfect \textit{senaria} division, which is grouped and divided imperfectly. And if it is composed of three lesser [semibreves] they are called the lesser semi-imperfect \textit{tempus} of the perfect improper diminished \textit{senaria} division, and is grouped imperfectly and divided perfectly.

Any of the aforesaid lesser semi-imperfect \textit{tempora} of the \textit{senaria} division can also ascend to the \textit{novenaria} division of the least extension.\(^{98}\)

\(^{96}\) Of the greater extension.

\(^{97}\) Improper semibreves.

\(^{98}\) Improper \textit{novenaria} of the least extension.
Et hoc quia potest componi et dividī
ex tribus minoribus semibrevibus, ut dicitur
supra. Unaquaeque dictarum minorum
minoris prolationis potest facere unam
maiorrum minimae prolationis et per
ordinem inrascriptum demonstratur,
videlicet quaelibet minor [56] minoris
prolationis est valoris sex atomorum, quos
possimus dividere per binarium numerum
sicūt minor semibrevis per binarium
numero dividitur, et per ternarium sicūt
maior semibrevis per ternarium etiam
numero dividitur numero, videlicet per
bis 3, et per ternarium per ter 2. Et sicūt
tempus 6 divisionis componitur ex tribus
minoribus, ita tempus divisionis 9 ex tribus
maioribus semibrevibus componitur, et
tempus semiimperfectum [f. 6v] minorem
novenariae minimae prolationis appellatur,
quod reductūr ad modum imperfectum et
dividitur secundum modum perfectum.
Potest etiam praefatum tempus 9 maioris
prolationis dividī per 3 numerum, et tunc
quaelibet numerus semibrevis maior maioris
prolationis vocatur, et quaelibet
praedictarum maiorum, ut dictum est supra,
potest dividī per binarium numerum et per
ternarium, prout per punctos atomorum
divisiones aut reductiones eorum
ostendemus.

And this [is the case] because it can be
composed of and divided into three lesser
semibreves, as is stated above. Each of the
said lesser [semibreves] of the lesser
extension can make one greater [semibreve]
of the least extension and in the diagram
written below, each lesser [semibreve] of the
lesser extension is worth six atoms, which we
can divide into a binary rhythmic unit, just
as a lesser semibreve is divided into a binary
rhythmic unit, and into a ternary, just as a
greater semibreve unit is also divided into a
ternary rhythmic unit, namely by three
twice, and into a ternary by two three times.
And just as the tempus of the senaria division
is composed of three lesser [semibreves], so
is the tempus of the novenaria division
composed of three greater semibreves, and
is called the lesser semi-imperfect tempus of
the least novenaria extension, which is
grouped imperfectly and divided perfectly.
The aforementioned tempus of the novenaria
of the greater extension can also be
divided into a ternary rhythmic unit, and
then each part is called a greater semibreve
of the greater extension, and each of the
aforesaid greater [semibreves], as is stated
above, can be divided into a binary and into
a ternary rhythmic unit, just as we will show
by means of the divisions of the points of
atoms or their groupings.

---

99 Both improper.

100 54 atoms.
Etiam quaelibet istarum maiorum praedictorum prolationis maioris praedictae potest dividi in duas maiores minoris prolationis, et per duas maiores componitur tempus divisionis senariae, quae senaria dividitur per modum imperfectum et reducitur ad modum perfectum. Et tempus semiimperfectum minus 6 divisionis computatur. Praefata maior semibrevis maioris prolationis potest ascendere ad 6 divisionem, ut supra dicitur, per modum antedictum per tres minores semibreves. Et tunc erit divisio senaria quae reductur et dividitur per modum perfectum.

Quodlibet istorum temporum divisionis supradictae senariae ascendere potest ad novenariam divisionem minimae prolationis, et tunc hoc tempus divisionis senariae praedictae reductur et dividiatur ad perfectum modum. Ratio quare praedicta semibrevis maiori maioris prolationis dividiti potest per binarium, ternarium, senarium numerum et novenarium, per punctos atomorum reductiones et divisiones praedictarum divisionum particulariter declaratur.

Each of these aforesaid greater [semibreves] of the aforesaid greater extension can also be divided into two greater [semibreves] of the lesser extension, and the tempus of the senaria division is composed of two greater [semibreves]; this senaria is divided imperfectly and grouped perfectly. And it sums up to a lesser semi-imperfect tempus of the senaria division. The aforementioned greater semibreve of the greater extension can ascend to the senaria division, as is stated above, by the aforesaid means, by three lesser semibreves. And then it will be the senaria division that is grouped and divided perfectly.

Each of the tempora of the aforesaid senaria division can ascend to the novenaria division of the least extension, and then the tempus of the aforesaid novenaria division is grouped and divided perfectly. The reason why the aforesaid greater semibreve of the greater extension can be divided into a binary, ternary, senary, and nonary rhythmic unit, by points of atoms, groupings, and divisions of the aforesaid divisions will be discussed in detail.

101 Improper.

102 Improper.
Iterum tractare debemus de supradicto tempore novenariae maioris prolationis quod est, ut supra dicitur, compositum ex tribus semibrevibus maioribus; et unaquaque dictarum maiorum est valoris trium minimarum de prolacione maiori, quia potest dividii in duas aequales partes. Et quaelibet pars tempus semiimperfectum minus, quod reductur ad modum imperfectum et dividitur secundum modum perfectum, appellatur.

Quaeritur qualiter praedictum tempus novenariae divisionis quod est compositum ex impari numero, videlicet ex tribus maioribus et numerus novem, potest per medium dividii. Respondetur: Quia ut pluries dicitur supra, quaelibet maior de prolacione maiori dividii potest per binarium numerum. Itaque istae tres maiores praedictae per hunc modum dividendi ad senarium numerum ascendunt, qui numerus 6 breviter per medium dividii potest, videlicet per bis 3. Ad removendum dubium de illa minima quae est ex impari numero qualiter potest per medium dividii, dicendum est quia minima praedicta est minima respectu superiorum, non respectu inferiorum seu minorum.

Again, we must discuss the aforesaid tempus of the greater novenaria extension, which is, as is stated above, composed of three greater semibreves; and each of the aforesaid greater [semibreves] is worth three minims of the greater extension because it can be divided into two equal parts. And each part is called the lesser semi-imperfect tempus, which is grouped imperfectly and divided perfectly.

How can the aforesaid tempus of the novenaria division, which is composed of an odd number, namely of three greater [semibreves], and the number nine, be divided in half? This is how: Because, as is stated above many times, any greater [semibreve] of the greater extension can be divided into a binary rhythmic unit. Therefore, the three aforesaid greater [semibreves] ascend into a senary rhythmic unit by means of this way of dividing; this senary unit can be divided in half, namely by three twice. In order to allay any doubts about how this minim, which comes from an odd number, can be divided in half, it must be said that this is because the aforesaid minim is a minim with respect to the above, and not with respect to the below, or lesser [minim].

---

103 Of the greater extension.
104 This section is not particularly clear. Given the following paragraph, it appears that Vetulus means that the greater semibreve of the greater extension (18 atoms) can be divided in half.
105 In the following paragraph, he explains that the minim mentioned here is the minim of the greater extension, worth six atoms.
106 It is here derived from the novenaria.
107 Into an improper minim of the lesser extension.
108 That is, there are minims shorter than the minim of the greater extension (6 atoms).
Et pluries etiam dictum est, quia hoc tempus praedictum universaliter continet in se valorem 54 atomorum quos possumus breviter dividere per 9 numerum ad similitudinem 9 minimarum de dicta prolacione maiori, videlicet per novies 6. Et unaquaeque dictarum minimarum, ut visum est supra, 6 atomorum in se continet valorem. Unde sicut sex atomi dividi possunt per medium, videlicet per bis 3, ita minima semibrevis tamen prolacionis minoris per medium dividi potest.

Quodlibet etiam istorum semiimperfectorum minorum antedictorum temporum ad alias divisiones et subdivisiones ascendere potest, tamen per punctos atomorum per modum antedictum omnes reducuntur ad maiorem. Qualiter et quomodo in inscripta arbore ordinate ostendentur.

Visis omnibus divisionibus et subdivisionibus substantialibus temporis perfecti maiori et minoris, videndum est de divisionibus et subdivisionibus temporis perfecti minimi seu perfecti diminuti et proprii, qui in mensura seu valore sunt idem, quod tempus 36 atomorum est valoris, particularum vocis 18 et de prolacione maiori minimarum 6.

And this has been stated several times, because this aforesaid tempus contains altogether fifty-four atoms which, in brief, we can divide by nine in the likeness of the nine minims of the aforesaid greater extension, namely by six nine times. And each of the aforesaid minims, as can be seen above, contains six atoms. For this reason these six atoms can be divided in half, namely by three twice, just as the minim of the lesser extension can be divided in half.

Also, any of these aforesaid lesser semi-imperfecta tempora can ascend to other divisions and subdivisions; all are still grouped into the greater [novenaria extension] by the points of atoms by the aforesaid means. Of what kind and how [they are grouped] will be shown in the tree diagram.

Having considered all the substantial divisions and subdivisions of the greater and lesser perfect tempus, let us consider the divisions and subdivisions of the least perfect or the diminished perfect and proper tempus, which are the same in measure or value. This tempus is worth thirty-six atoms, eighteen particles of sound, and six minims of the greater extension.

109 Into improper minims of the least extension.
Dividitur enim praedictum tempus in duas inaequales partes, videlicet in uno tempore quaternariae, quod est pars maior quae pars tempus breve imperfectum minimum 4 maioris prolationis nominatur, et non restringitur ad aliquem modum in reductione. Et minor pars minor semibrevis prolationis maioris computatur. Quaternarium habet praefatum tempus ingrediendi potestatem ad divisionem 6 minoris prolationis et non restringitur ad modum. Quaeritur qualiter praedictum tempus quaternariae ascendere potest ad 6 divisionem minoris prolationis, ut dicitur supra, cum illae sint quattuor aequales, et illae sex et aequales. Respondetur: Quia praefatum tempus, ut supra dicitur, 24 atomorum est valoris quos tam per 4 numerum quam per 6 dividere possimus, videlicet per 4 per quater 6, et per 6 videlicet per sexies 4.

Etiam praefatum tempus 6 divisionis dividit aut in duas maiores aut in tres minores potest. Et si dividitur in duas maiores, tempus imperfectum minimum 6 minoris prolationis appellatur. Quaeritur etiam quae est causa quod tempus imperfectae minimae praefatun dividit per binarium, ternarium, quaternarium et senarium potest numerum. Respondetur: Quia, ut supradictum est, praefatum tempus 24 atomorum est valoris vel continet in se valorem qui dividis possunt per binarium numerum, videlicet per bis 12, etiam per ternarium, videlicet per ter 8, per quaternarium per quater 6, et per 6m per sexies 4.

The aforesaid tempus is also divided into two unequal parts, namely into one quaternaria tempus, which is the larger part called the least imperfect breve tempus of the quaternaria of the greater extension, and is not bound to any modus in its grouping. And the smaller part sums up to a lesser semibreve of the greater extension. The aforementioned quaternaria tempus has the power to enter the senaria division of the lesser extension and is not bound to the modus. How can the aforesaid tempus of the quaternaria ascend to the senaria division of the lesser extension when, as is stated above, these four [semibreves] are equal, and these six are also equal? This is how: Because the aforementioned tempus, as is stated above, is worth twenty-four atoms which we can divide as much into a quaternary as into a senary rhythmic unit, namely by four by six four times, and by six by four six times.

The aforementioned tempus of the senaria division can also be divided into two greater or into three lesser [semibreves]. And if it is divided into two greater [semibreves], it is called the least imperfect tempus of the senaria of the lesser extension. Let us ask as well: why is the aforementioned tempus of the least imperfect [division] divided into a binary, ternary, quaternary, and senary rhythmic unit? This is why: Because, as is stated above, the aforementioned tempus is worth twenty-four atoms; or it contains a value that can be divided into a binary rhythmic unit, namely by twelve twice, also into a ternary, namely by eight three times, into a quaternary by six four times, and into a senary by four six times.

---

110 Greater semibreves of the lesser extension or lesser semibreves of the greater extension.
Potest etiam praefatum [fol. 7r] tempus 6 divisionis in eadem mensura temporis ad octonariam divisionem minimeae prolationis ascendere, quae octonaria divisio dicitur minimeae prolationis de tempore imperfecto minimo maioris prolationis.

Quare praedictum tempus imperfectum minimum maioris prolationis, quod nunc profertur seu dividitur per 6 divisionem minoris prolationis, potest ascendere ad divisionem 8am minimeae prolationis in eadem tamen mensura temporis? Respondetur: Quia, ut pluries dicitur supra, tempus 6 divisionis ex duabus maioribus semibrevisibus [60] componitur, et unaquaeque dictarum maiorum istius divisionis senariae minoris praedictae ascendere potest ad 4 minimeae prolationis. Et divisio quaternaria de tempore semiimperfecto minimo vocatur quae reducitur et dividitur secundum imperfectum modum. Et sicut duae semibreves maiores componunt unum tempus divisionis 6, ita, ut dictum est, per duo tempora quaternariae componitur tempus divisionis octonariae.

Et est notandum quod quodlibet praedictorum temporum quaternariae divisionis, videlicet de tempore semiimperfecto minimo, ad divisionem 6 ascendere potest, quia quodlibet tempus semiimperfectum minimum 12 atomorum est valoris quos atomos possimus dividere tam per 4 numerum quam per 6, videlicet per 4 per quater 3, et per 6 per sexies 2.

The aforementioned tempus of the senaria division\textsuperscript{111} can also ascend to the octonaria division of the least extension in the same measure of the tempus. The octonaria division of the least extension is said to be from the least imperfect tempus of the greater extension.

Why does the aforesaid least imperfect tempus of the greater extension, which is now brought forth or divided by the senaria division of the lesser extension, ascend to the octonaria division of the least extension in the same measure of the tempus? This is why:

Because, as is stated above many times, the tempus of the senaria division is composed of two greater semibreves,\textsuperscript{112} and each of the said greater [semibreves] of the aforesaid lesser senaria division can ascend to the quaternaria of the least extension. And this is called the quaternaria division of the least semi-imperfect tempus, which is grouped and divided imperfectly. And just as two greater semibreves make up one tempus of the senaria division, so is, as has been stated, the tempus of the octonaria division composed of two tempora of the quaternaria.

And note that each of the aforesaid tempora of the quaternaria division, namely of the least semi-imperfect tempus, can ascend to the senaria division, because each least semi-imperfect tempus is worth twelve atoms, which we can divide as much into a quaternary rhythmic unit as into a senary, namely into a quaternary by three four times, and into a senary by two six times.

\textsuperscript{111} Of the lesser extension.

\textsuperscript{112} Of the lesser extension.
Et ista tempora reducuntur ad modum imperfectum, et dividuntur aliquando secundum modum perfectum, et aliquando secundum modum imperfectum dividi possunt.

Adhuc potest praedictum tempus perfectum diminutum seu perfectum minimum, quod idem est, 6 maioris prolationis dividi in tres minores semibreves de prolatione maior. Quia, ut superius dicitur, 36 atomorum est valoris qui possunt dividi in tres partes per ordinem praedictum sicut hoc tempus in tres partes dividi potest.

Etiam quaelibet istarum minorum de prolatione maior per modum antedictum facere potest unam semibrevisem maiorem minoris prolationis, et per hunc modum hoc praedictum tempus perfectum diminutum, quod nunc per 6 numerum dividitur, ascendere potest ad novenariam divisionem minoris prolationis. Et tempus divisionis novenariae minoris prolationis appellatur, quod in reductione non curat de modo; et divisionem facit secundum perfectum modum.

Iterum quaeritur qualiter praedictum tempus divisionis 6 potest ad novenariam divisionem ascendere, cum illae sint sex aequales et illae novem et aequales in eodem tempore. Respondetur:

And these tempora are grouped imperfectly, and are sometimes divided perfectly, and they can sometimes be divided imperfectly.

The aforesaid diminished perfect tempus or least perfect tempus of the senaria of the greater extension, which are the same, can still be divided into three lesser semibreves of the greater extension. Because, as is stated above, it is worth thirty-six atoms, which can be divided into three parts in the aforesaid order, just as the tempus can be divided into three parts.

Also, each of these lesser [semibreves] of the greater extension can make one greater semibreve of the lesser extension by the aforesaid means, and by this means the aforesaid perfect diminished tempus, which is now divided into a senary rhythmic value, can ascend to the novenaria division of the lesser extension. And it is called the tempus of the novenaria division of the lesser extension, which in its grouping does not concern itself with the modus; and it is divided perfectly.

Let us ask again how is it that the aforesaid tempus of the senaria division can ascend to the novenaria division when these six are equal and these nine are also equal in the same tempus? This is how:
Quia praefatum tempus perfectum diminutum 36 atomorum est valoris quos dividere possimus per 6 numerum et novenarium, sicut antedictum tempus proprium diminutum [61] perfectum per senarium et novenarium numerum dividitur, ut patet per regulas antedictas, videlicet per 6 per sexies 6, et per novenarium per novies 4. Et tunc divisio temporis perfecti diminuti novenariae minoris prolactionis appellatur. Ut dicitur supra, maior semibrevis minoris prolactionis ascendere potest ad 4 minimae prolactionis divisionem quia, ut visum est supra, 12 atomorum est valoris qui per 3 et quaternarium numerum dividi possunt, videlicet per 3 per ter 4, et per 4 per quater 3. Et tempus semiimperfectum minimum 4 minimae prolactionis appellatur quod reducitur ad modum perfectum et dividitur secundum modum imperfectum.

Etiam, ut dictum est superius, quia sicut per tres maiores semibreves componitur tempus divisionis novenariae, ita per tria tempora quaternariae componitur tempus divisionis duodenariae. Et per hunc modum hoc tempus novenarium ascendit ad divisionem 12, quae in reductione non curat de modo nisi in divisione. Et tunc tempus divisionis duodenariae minimae prolactionis vocatur. Quodlibet etiam istorum semiimperfectionis minimorum temporum 4 divisionis, quorum tempus praedictum duodenariae minimae prolactionis componitur, potest ad 6 minimae prolactionis etiam ascendere divisionem, quae reducitur ad modum perfectum et dividitur secundum modum imperfectum.

Because the aforesaid perfect diminished tempus is worth thirty-six atoms, which we can [divide] into a senary and novenary rhythmic unit, just as the aforesaid proper perfect diminished tempus is divided into a senary and nonary rhythmic unit, as is shown above in the aforesaid rules, namely by the senary by six six times, and by the nonary by four nine times. And then it is called the division of the perfect diminished novenaria tempus of the lesser extension. As is stated above, the greater semibreve of the lesser extension can ascend to the quaternaria division of the least extension because, as can be seen above, it is worth twelve atoms which can be divided into a ternary and quaternary rhythmic unit, namely into a ternary by four three times, and into a quaternary by three four times. And it is called the least semi-imperfect tempus of the quaternaria of the least extension because it is grouped perfectly and divided imperfectly.

Also, as is stated above, since the tempus of the novenaria division is composed of three greater semibreves, so is the tempus of the duodenaria division composed of three tempora of the quaternaria. And by this means the novenaria tempus ascends to the duodenaria division, which in its grouping does not concern itself with the modus if it is not in a division. And then this is called the tempus of the duodenaria of the least extension. Also, each of these least semi-imperfect tempora of the quaternaria division, out of which the aforesaid tempus of the duodenaria of the least extension is composed, can also ascend to the senaria division of the least extension,113 which is grouped perfectly and divided imperfectly.

---

113 Improper.
Quaeriter qualiter tempus perfectum diminutum novenariae divisionis potest ascendere ad 12 divisionem. Respondendum est: Quia praefatum tempus, ut pluries dictum est, continet in se valorem 36 atomorum qui tam per novenarium quam per 12 numerum divid possunt, videlicet per novenarium per novies 4, et per 12 per duodecies 3.

Quaeritur etiam qualiter quodlibet praedictorum temporum unde componitur tempus duodenariae divisionis minimae prolationis praedictae aut quod descendit ab ipsa divisione 12 aut semiimperfectorum minorum, quod in mensura sunt idem, potest, ut dicitur supra, ad 6 minima prolationis ascendere. Respondetur: Quod praedictum tempus quaternariae minimae prolationis aut semiimperfectum minimum, ut dictum est supra, 12 atomorum est valoris quos 12 atomos tam per 4 quam per 6 numerum dividere possunt, videlicet per 4 per quater 3, et per 6 per sexies 2.

Iterum dicendum est quia praefatum diminutum tempus minima perfectionis et maioris prolationis praedictae potest per modum infrascriptum per medium dividit, quia ut dicitur supra valoris est 6 minimarum prolationis maioris, quae sex minimae breviter per medium dividit possunt, videlicet per 3 et 3. Et tempus semiimperfectum minimum notatur, quod reductur ad modum imperfectum et dividitur secundum modum perfectum.

How can the diminished perfect tempus of the novenaria division ascend to the duodenaria division? This is how: Because the aforementioned tempus, as has been said many times, contains thirty-six atoms, which can be divided as much into a nonary as into a duodenary rhythmic unit, namely into a nonary by four nine times, and into a duodenary by three twelve times.

Also, how can each of the aforesaid tempora, from which the tempus of the duodenaria division of the aforesaid least extension is composed, or that which descends from this duododenaria division, or the lesser semi-imperfect [tempus], which are the same in measure as is stated above, ascend to the senaria of the least extension? This is how: Because the aforesaid tempus of the quaternaria of the least extension or least semi-imperfect tempus, as is stated above, is worth twelve atoms, which we can divide as much into a quaternary as into a senary rhythmic unit, namely into a quaternary by three four times, and into a senary by two six times.

It is necessary to say again that the aforesaid diminished tempus of the least perfection and of the aforesaid greater extension can be divided in half by the means written above, because as is stated above it is worth six minim of the greater extension, which in brief can be divided in half, namely by three and three. And note that the least semi-imperfect tempus is grouped imperfectly and divided perfectly.

---

114 Both improper.
Notandum est quod quodlibet praedictorum temporum semiimperfectorum minorum [fol. 7v] potest binarium numerum divid, quia 18 atomorum continet in se valorem quorum facere possimus duas aequales. Potest, videlicet per bis novem. Potest etiam quodlibet istorum praedictorum temporum semiimperfectorum minorum ascendere ad 6 divisionem, quia ut dictum est supra est de valore 18 atomorum, quorum facere possimus sex partes ad similitudinem praedicti temporis, videlicet sexies 3. Et divisio 6 de tempore semiimperfecto minimo appellatur, quae reducitur ad modum imperfectum et dividitur secundum modum perfectum. Potest etiam quodlibet istorum praedictorum temporum semiimperfectorum minorum senariae divisionis ad novenariam divisionem minimae prolationis ascendere, quae reducitur ad modum imperfectum et dividitur secundum modum perfectum. 

Quaeritur quare praefatum tempus semiimperfectum minimum 6 divisionis ascendere potest ad novenariam divisionem minimae prolationis, cum illae sint sex aequales et illae novem et aequales in eadem mensura temporis. Respondetur: Quia ut pluries dictum est, continet in se [63] valorem praefatum tempus semiimperfectum 18 atomorum qui possunt dividī tam per 6 quam per 9 numerum, videlicet per 6 per sexies 3, et per 9 per novies 2. 

Note that any of the aforesaid lesser semi-imperfect tempora can be divided into a binary rhythmic unit because they contain eighteen atoms, out of which we can make two equal [parts]. Namely, it can [be divided] twice by nine. Each of the aforesaid lesser semi-imperfect tempora can also ascend to the senaria division because, as is stated above, it is worth eighteen atoms, out of which we can make six parts in the likeness of the aforesaid tempus, namely three six times. And it is called the senaria division from the least semi-imperfect tempus,115 which is grouped imperfectly and divided perfectly. Each of the aforesaid lesser, semi-imperfect tempora of the senaria division can also ascend to the novenaria division of the least extension,116 which is grouped imperfectly and divided perfectly.

How can the aforementioned least semi-imperfect tempus of the senaria division ascend to the novenaria division of the least extension when these six [notes] are equal and these nine are equal in the same measure of the tempus? This is how: Because, as is stated above many times, the aforementioned semi-imperfect tempus contains eighteen atoms, which can be divided as much into a senary as into a nonary rhythmic unit, namely into a senary by three six times and into a nonary by two nine times.

---

115 To be consistent, this would have to say lesser semi-imperfect tempus, as Vetulus did earlier in the paragraph, or else least semi-perfect tempus.

116 Improper.
Visis omnibus supradictis ut patet aperte, sequitur aliquid dicere potius et ostendere figuras arborum quarum superius fecimus mentionem.

De omnibus quae dicta sunt de divisionibus musicae mensuratae, constituenta sunt arbores ad exemplum per quas fit ascensus ad musicam planam et de plana ad mensuratam. Et per arbores praedictas fit ascensus per totam musicam tam planam quam mensuratam usque ad atomum, similiter et reductio. Sed quaeritur quare per has arbores prius ascenditur quam descendatur, quod totum contrarium facit philosophus quando ostendit dialectico ordinationem et constitutionem naturae. Respondetur: Quia natura multum distat ab hac scientia. Nam in natura omne superius constituit suum inferius et maius est co. Sed in hac scientia quae ad dei laudem inventa est, ut pluries dictum, nullus laudans est maior deo immo minor, et non constituit deum immo ascendit ad dei laudem ut constituatuer ab eo. Sic omnes laudantes deum laudant eum ascendendo de virtute ad virtutem. Ita per musicam laudatur deus de motione mensurae vocis ad vocem, videlicet de musica plana ad mensuratam. Quae, videlicet mensurata, mollificat corda cantantium, mentes audientium ad laudes dei et amorem hominum praeferentium.

Having considered all of the above, as has been shown openly, it follows to speak of something more preferable, and to show the tree diagrams which we mentioned above.

Trees have been constructed for everything that has been said about the divisions of measured music, through which the ascent to plainsong and from plainsong to measured music is carried out. And by means of the aforesaid trees the ascent through all music, both plain and measured, is made, all the way to the atom, like reduction. But why do they first ascend before descending through these trees, since the complete opposite is done by the Philosopher when he shows the division and construction of nature by means of logical [reasoning]? This is why: Because nature is far distant from this knowledge. For in all nature everything superior makes its inferior and is greater than it. But in this knowledge, which was invented for the praise of God, as has been said many times, nothing that praises is greater than God; on the contrary it is lesser, and it does not make God; on the contrary it ascends in praise of God and is made by Him. Thus, all things that praise God praise him by ascending from virtue to virtue. Indeed, God is praised by music by the motion of the measure of sound to sound, namely from plainsong to measured [music]. Measured [music] softens the hearts of singers, the minds of listeners, and the love of people rejoicing in the praise of God.

117 That is, the descent through the Porphyrian tree (see Chapter 3).
Sed quaeritur utrum arbor musicae planae et mensuratae sit idem in utraque scientia vel differat. Dicendum est, quod arbor musicae planae et arbores musicae mensuratae secundum substantiam sunt idem, sed secundum diversas considerationes ipsarum sunt diversae. Nam ad dei laudem possimus ascendere ad indoctos docendos per musicam positivam, deininde per mensuratam. Descendere vero possimus ad ipsam positivam per mensuratam, et ne videatur contrarium eius quod diximus quando diximus fidem habemus, incipere figuram seu arbores figuraram a musica plana seu a mensurata nam utrumque facere possumus. Quia a larga incipere [64] possimus in ascendendo usque ad minimam, sicut a largitione omnium bonorum accipimus laudem quam sibi damus tanquam primae causae; sic possimus incipere musicam mensuratam in qua larga multa corpora copulantur, sic in corpore Christi multa corpora coniunguntur ad dei laudem, videolet multi laudantes. Quae larga figuratur cum filo deorsum tracto in parte dextra quia deus volens genus humanum salvare dextrum et non sinistrum, et ab ipso dextro gente laudari.

Ideo qui deum vult laudare perfecte debet organum suae vocis trahere ad manum dextram, hoc est non per vanam gloriam. Et sic de larga dicimus ad manum dextram sic de nota caudata etiam ad manum dextram, quae dicitur longa a longitudine; quia longa est laus in dextra dei laudantium.

But let us ask whether the tree of plainsong and measured [music] is the same for both [kinds of] knowledge [or whether] it differs? It must be said that the tree of plainsong and the trees of measured [music] are the same with respect to their substance, but are different with respect to various considerations. For we can ascend in praise of God by teaching the uninstructed using unmeasured music, then using measured. We can descend to unmeasured music through measured [music], and lest it should be seen to be the contrary of that which we said when we said we have faith, we [can] begin the noteshapes or tree diagrams from plain or from measured music, for we can make both. For we can begin from the larga in ascending up to the minim, like we accept praise from the “largitio” [generosity] of all good people, which we give to him as the first cause; in this way we can begin measured music. In this larga many bodies are joined together, just as many bodies are joined together in the body of Christ in the praise of God, namely many praising people. This larga is formed with a descending thread on the right side because God wishes to save people to the right and not the left and to be praised by people on his own right side.

This is why he who wants to praise God perfectly must draw up his musical instrument to the right-hand side, that is not by vainglory. And thus we also speak of the larga on the right-hand side, namely of the note tailed on the right-hand side, which is called a longa from “longitudo” [longness]; because the praise of praising [people] on the right-hand side of God is long.
Ad cuius differentiam notae caudatur in manu sinistra quae significat sinistram partem, quae non perfecte dat laudem deo, quia corpus humanum in quo tenemur deo reddere laudem breve est sinistrum quia nemo laudans perfecte laudat. Caudata vero cum cauda seu filo sursum ducito diminuit valorem notae in quolibet corpore, sicut caudata in parte dextra crescit. Unlike this, the note tailed on the left-hand side, which means the left part, does not praise God perfectly because the human body in which we are held by God to bestow praise is short and perverse, since nobody praising praises perfectly. But a caudated note with a tail or thread that leads above diminishes the value of a note in any body, just as the tail on the right side augments its value.

I altered the punctuation here to reflect that “sinistrum” describes the “corpus.”

This is a pun on the word “breve,” which can mean “short” in the general sense, or the musical note the breve. The pun is that a stem on the left side of a ligated note can turn a longa into a breve. According to Vetulus this reflects the shortness of humanity’s time on earth and with it the insufficiency of human praise of God, which also occurs when one sits on the left hand side of the creator.
Figurae arborum per quas divisiones et valor divisionum cognoscuntur, videlicet per figuras algorismi, etiam principalis maioris largae quam primo debemus ostendere; et ista sequens [fol. 8r] depicta prima per quam primam arbreom cognoscuntur divisiones et valor divisionum, ut hic patet. [Here are] the tree diagrams by means of which the divisions and the value of the divisions come to be known (namely through the figures of the algorism), also of the principal greater larga that we must show first; and the first image follows. By means of the first tree the divisions and the value of the divisions come to be known, as is shown here.

120 The term “algorismi” [algorism] here presumably refers to the system of arithmetic calculation using Arabic numerals that rose to prominence in medieval Europe in the twelfth and thirteenth centuries through the work of Boethius (and with him Nichomachus) and the Persian mathematician al-Khwarizmi (ninth century), whose work was translated into Latin in the twelfth century. As Gillian R. Evans observes, this went in tandem with the rise in the use of astronomical fractions, similar to Vetulus’s division of the day into atoms. Gillian R. Evans, “Abacus to Algorism: Theory and Practice in Medieval Arithmetic,” *The British Journal for the History of Science* 10, no. 2 (1977), 114–24.
Per secundum arborem divisiones minoris largae cognoscuntur. The divisions of the lesser larga come to be known by means of the second tree.
Per tertiam arborem divisiones minimae largae demonstrantur. The divisions of the least larga are demonstrated by the third tree.
[fol. 8v] Divisiones et subdivisiones temporis perfecti maioris per quartam arborem ostenduntur.

The divisions and subdivisions of the greater perfect tempus are shown by means of the fourth tree.\textsuperscript{121}

\textsuperscript{121} There is a small error on this tree. Proceeding upwards from the leftmost branch of the “re” root, one sees a numeral 4, then a numeral 6. The numeral 4 leading from the right hand side of the numeral 6 is misdrawn and should be a numeral 3.
Per quintam arborem divisiones et subdivisiones perfecti minoris temporis demonstrantur.

The divisions and subdivisions of the lesser perfect tempus are demonstrated by the fifth tree.\textsuperscript{122}

\textsuperscript{122} For a discussion of the errors on this tree, see: Chapter 2.
[fol. 9r] Per sextam arborem cognoscuntur omnes divisiones et subdivisiones temporis minima perfectionis.

All the divisions and subdivisions of the least perfect tempus come to be known by means of the sixth tree.
De figuris.

Obmissis omnibus divisionibus mensurarum quae dicta sunt et his quae ostenduntur in arboribus, videndum est quomodo figurantur notae dictarum divisionum mensurarum seu subdivisionum. Primo incipiendum est a nota brevi quae primo prolata fuit ad mensuram temporis perfecti, non maioris neque minimi sed minoris seu medii reducti et divisi per punctos, momenta, uncias et atomos, quod tempus potest dividi usque ad atomum et reduci usque ad largam. Et potest ipsum tempus cognosci per plures figuras, tamen principaliter in forma quadrangulari consistit ad similitudinem quattuor partium mundi in quibus trinitas in sexta aetate apparuit in carne humana, ut superius dictum est. Et per virtutem istius temporis superaddita et ad evitandum figuras superflueus quodlibet tempus maius, minus vel minimum cuiuscumque divisionis seu subdivisionis sit, potest per modum praedicti temporis figurari, quamvis dictum sit supra quia brevis nota quae est valoris unius temporis habeat plures figuras. Hoc est verum. Tamen ut dicitur supra, principaliter figuratur in forma quadrangulari, ut inferius ostendetur. Et sicut per musicum figuratur tempus prolatum, ita per eum figuratur tempus obmissum seu pausatum, quae pausa unius temporis brevis per modum infrascriptum per ordinem demonstrat. Videlicet, pausa unius temporis est quoddam filum quod truncat vel continet in se unum spatium, videlicet ab una linea usque ad aliam ut in exempla infra monstrabitur, ita quod si ligatur pausa seu filum cum dicta nota, valor illius pausae copulatur cum praefata nota.

On noteshapes.

Having presented all the divisions of the measures that have been mentioned and those that are shown in the trees, let us see how the notes of the said divisions or subdivisions of the measures are drawn. Let us first begin with the breve that was mentioned first to measure the perfect tempus, neither the greater nor the least, but the lesser or medium, grouped and divided by points, impulses, ounces, and atoms. This tempus can be divided up to the atom and grouped into the larga. And this tempus can be determined by means of many noteshapes, yet it consists principally of a square form in the likeness of the four parts of the world in which the Trinity appeared in the Sixth Age in human flesh, as is stated above. And by virtue of the aforesaid tempus, and in order to avoid superfluous noteshapes, each greater, lesser, or least tempus of whichever division or subdivision it is can be drawn in the same way as the aforesaid tempus, however much it is stated above that the short note that is worth one tempus has many shapes. This is true. Nevertheless, as is stated above, it is formed principally in a quadrangular shape, as will be shown below. And just as the sounded tempus is formed by a musician, so is the omitted or paused tempus formed by him. A rest of the time of one breve is shown by the means written above in succession. A rest of one tempus is a certain thread that cuts off or contains one space, namely from one line to the other, as will be shown in the example below, so that if the rest or thread is joined with the said note, the value of this rest will be combined with the [value of] the aforementioned note.

---

123 He is referring to the fact that the breve can be formed multiple different ways when it is ligated.
And by virtue of the said breve and rest or thread [this thread signs its length] the aforementioned note, caudated by the thread or rest, is called a longa; it is sometimes perfect and sometimes imperfect according to its genus. How can a perfect and imperfect longa be the same in shape? This is how: Because wherever there are two notes, as much largae as longae, breves, semibreves, or minims, unless the second is divided for the purpose of finding the perfection of the measure again, this sometimes will not ascend to the perfection of a ternary rhythm unless by means of the alteration of some note. It can be altered where modus is perfect, unless it is otherwise distinguished by a dot of division.

It is appropriate to speak somewhat of the altered [note]. Rubric.

It is necessary to say how and in what manner [a note] is said to be altered. An altered [note] is said to differ from a recta [note]. A recta note is said to be a breve of one tempus. And an altered [note] is said to be that which is worth two tempora, according to their genus. The second of the aforesaid parts out of which the said longa is composed can never be altered because it is the thread that is said to be a rest. And regarding this it is to be noted specifically that a rest can never be altered. And this is why: Because necessity binds us neither to the perfect nor the imperfect.
Et est notandum, quod quando praedicta pausa seu filus vult componere longam, semper vult se ligari cum nota ex parte dextra quia, ut superius dictum est, deus vult genus humanum salvare dextrum et non sinstrum. Etiam musicus prius incept mensuram super notam prolatam quam pausam, ita primo licet ostendere figuram notae quam pausae tenemur; et ambae simul, ut supra dicitur, componunt longam, ut inferius per figuras demonstrabitur. Et si duplicatur corpus dictae longae, potest duplicari et triuplicari valor. Et quando valor praedictae longae duplicatur, praedicta duplicata vocatur imperfecta larga vel duplex longa, et potest sub cadem figura ascendere ad perfectionem perfectae largae secundum genus suum. Ratio quare praedicta nota duplicata potest esse de modo perfecto et de tempore imperfecto et de modo imperfecto et de tempore perfecto, ut superius sufficienter declaratur, quia ad evitandum superfluas figuras notarum nota perfecta et imperfecta, quamvis in valore differant, tamen in figura, ut supra notatur, sunt idem. Potest ergo praefata nota per modum praedictum duplicata esse larga perfecta et imperfecta aut duplex longa, quae idem est, quod imperfecta larga cum omnibus conditionibus praedictis ad libitum compositoris cantus in quo praedicta nota invenitur.

De speciebus figurarum.

[67] Notandum est quod quot sunt species figurarum largarum, tot sunt species longarum.

And note that when the aforesaid rest or thread wants to compose a longa, it always wants to join itself with a note from the right side because, as is stated above, God wants to save humankind to the right and not the left. The musician also first begins the measure above the uttered note rather than the rest. Indeed, it is first appropriate to show the shape of a note rather than that we comprehend a rest. And, both together, as is stated above, make up the longa, as will be demonstrated below by means of the noteshapes. And if the body of the said longa is doubled its value can be doubled or tripled. And when the value of the aforesaid longa is doubled the aforesaid doubled [longa] is called an imperfect larga or a duplex longa, and using the same shape we can ascend to the perfection of the perfect larga according to its genus. The reason why the aforesaid doubled note can be of perfect modus and imperfect tempus and of imperfect modus and perfect tempus, as has been shown above sufficiently, is because, to avoid superfluous noteshapes, perfect and imperfect notes, even if they differ in value as is noted above, are nevertheless drawn the same. Therefore, the aforementioned note, doubled by the aforesaid means, can be a perfect or an imperfect larga or a duplex longa, which are the same; the imperfect larga with all the aforesaid conditions is at the leisure of the composer of the song in which the aforesaid note is found.

On the species of noteshapes.

Note that there are as many species of larga as there are of longa.
Sed quia magis utimur cantare super mensuram longarum quam largarum, et quia per figuras longarum possunt cognosci figucae praedictarum largarum, principaliter tractandum est de speciebus antedictarum longarum quae universaliter sunt 10. Videlicet, 5 sunt simplices et 5 compositae, quae compositae demonstrantur ubi tractabitur de proprietatibus. Sed quia primo invenimus notam simplicem quam compositam seu ligatam, primo de simplicibus est tractandum, et ideo principaliter de principali longa quae figuratur sic: aut sic: 

Longa plicata ascendens et descendens longiorem tractum habet a parte dextra quam a sinistra ut hic: aut in corpore obliquo ut hic: . Tamen praefata ultima plicata numquam fieri debet nisi ubi praecedat pausam seu hoquetum.

Brevis vero unicum habens tempus nullum habet tractum, et proprium dicturn est quia ad reinveniendum mensuram perfecti modi aliquando ipsi brevis potest alterari, ut infra dicetur, tamen formatur sic: 

Brevis plicata ascendens et descendens tractum habet longiorem sinistrum quam dextrum ut hic: 

Semibrevis autem formatur tripliciter; nam aliquando disiuncta ad modum losengae ut patet hic: aut coniuncta seu ligata cum ligatura ascendente cum corpore quadro cum filo sursum ducto aut oppositae proprietatis ut hic: aut in corpore obliquo tam in ascendendo quam in descendendo ut hic: 

But because we are more accustomed to singing above the measure of longae than largae, and because the noteshapes of the aforesaid largae can be recognized by the shapes of longae, it is necessary principally to discuss the species of the aforesaid longae, of which there are ten in total. Namely five are simple and five composite. The composite will be shown where proprieties are discussed. But because we first find simple notes rather than composite or ligated, it is first necessary to discuss the simple notes, and for this reason principally the first longa, which is shaped like this: or like this: 

An ascending and descending plicated longa has a longer stem from the right side rather than the left like this: or is oblique in body like this: . The last aforementioned plicated longa can never be made unless it precedes a rest or a hocket.

A breve that is worth one tempus never has a stem, and it is so-called literally because it can be altered to find the measure of the perfect modus or sometimes the breve again. As it will be said below, it is still formed thus: 

An ascending and descending plicated breve has a stem that is longer on the left than the right, like this: 

A semibreve is formed three ways; for sometimes it is disconnected in the shape of a lozenge, as is shown here: or it is connected or ligated with an ascending ligature with a square body with a thread leading above, or it is of opposite propriety like this: . Or it is oblique both ascending and descending like this: 

372
Dicto de speciebus simplicium longarum et brevium et aliqualiter de semibrevibus ligatis, modo dicere oportet de ligaturis.

Nota quod semibrevis simplex numquam plicari debet. Scienendum est quod de valore praedicatum specierum semibrevium, de ligatis et non ligatis idem est iudicium.

Cum igitur dictum sit supra, quia universaliter sunt 10 species [68] figurarum notarum longarum, videlicet quinque simplices et quinque ligatae, ut dictum etiam sit quia ipsae ligatae inveniuntur ubi tractabitur de proprietatis aut ascendentibus et descendentibus, de ipsis ascendentibus et descendentibus ultra quaedam sunt primae notae in principio ligaturae forte et quaedam sunt ultimae in fine ipsius ligaturae notatae.


Having spoken of the species of the simplex longae and breves and a little of ligated semibreves, I will now speak of ligatures.

Note that a simplex semibreve must never be plicated. Know that the judgement is the same concerning the value of the aforesaid species of semibreves, both ligated and non-ligated.

This is stated above, since in general there are ten species of noteshapes of longae, namely five simple and five ligated, [and] as has also been said, since these ligated [notes] are found where propriety is discussed, this is true. Therefore, you must first know that each of these notes is ligated, either ascending or descending. Out of these ascending and descending [notes] themselves, on one side some are perhaps the first notes at the beginning of a ligature and some are the last at the end of the notated ligature.

All others existing in the middle between these first and last are called breves, that is, among the ascending [notes] that you will notate like this. Every ascending ligature is either drawn above the first note without a stem, or with a stem. A [note] without a stem like this is shown here: \[\text{Diagram}\]. The first note is said to be with propriety and is called a breve. Or it is formed above the first with a stem from the right part as is shown here: \[\text{Diagram}\] The first note is said to be without propriety and is called a longa of the first said species. Every ligature either descends from the first note and has a stem from the left part like this: \[\text{Diagram}\] Then the first note is said to be with propriety and is calculated to be a breve. Or it descends from the first note without a stem as is shown here: \[\text{Diagram}\].
quae prima sine proprietate et longa secundi modi dictarum specierum ligaturarum appellatur. Unde per regulam dicitur, omnis ligatura cum proprietate brevis existit et sine proprietate longa demonstratur, ut in praedictis quattuor exemplis proximis plenissimè est declaratum. Ideo prius dictum est de nota prima omnis ligaturae sive ascendentis vel descendentis, quia ut sit ius, a capite est redenda ratio. Nunc autem de nota omnis ligaturae ultima videamus.

Scias igitur quando ultima nota superior recto remanet ut hic patet: aut ut hic: longa tertii modi ligaturarum appellatur.

[69] In ligatura autem ascendente quicumque in fine ligaturae nota quadrata sub penultima invenitur ut hic: longa quarti modi praedictarum ligaturarum dicitur.

Et si plicaretur praedicta nota a parte superiori ut hic: adhuc ipsa ultima nota in ligatura descendente longa quarti modi vocatur dictarum ligaturarum, quamvis praedicta plicatura, quia habemus propriorem modum figurandi, possit evitari, etiam si inveniuretur nota in corpore obliquo non caudata ex parte sinistra ut hic: Tunc prima, ut supra dicitur, quinti modi praedictarum specierum ligaturarum appellatur longa.

Omnes mediae inter praedictas sunt breves.

Then the first [note] is without propriety and is called a longa of the second type of the said species of ligatures. Whence it is said by the rule: [the first note of] each ligature with propriety is a breve, and without propriety it is shown to be a longa, as has been shown very clearly in the four previous examples. For this reason this has already been said of the first note of every ligature either ascending or descending, because, as is just, it is necessary to calculate its value from the head. Now let us consider the last note of every ligature.

Therefore, you should know [that] when the last note remains straight above like this: or like this: it is called a longa of the third type of ligature.

In an ascending ligature at the end of any ligature a square note found under the penultimate [note] like this: is called a longa of the fourth type of the aforementioned ligatures.

And if the aforesaid note is plicated from above, like this: the last note in the descending ligature is still called a longa of the fourth type of the said ligatures, although the aforesaid plicated [note], since we have a proper way of drawing [noteshapes], can be avoided, even if a note oblique in shape without a stem from the left part should be found, like this: Then the first [note] of the fifth type of the aforesaid species of ligatures is called a longa, as is stated above.

All of the middle [notes] between the aforesaid are breves.
Si autem duae notae in uno corpo obliquo inveniuntur sive in fine plicatae ascendentem ut hic: \[\text{\textcopyright} \] vel etiam descendente ut patet hic: \[\text{\textcopyright} \] brevis ultima vocatur.

Dicto de prima et ultima nota tam cum proprietate quam sine, et sicut longae ligatae tam primae quam ultimae per quinque species cognoscuntur, et quod omnes mediae tam ascendentes tam descendentes sunt breves, dicendum est de opposita proprietate quae cognoscitur per modum infrascriptum, videlicet et quid sit ut hic exponitur.

Opposta proprietas est ubicumque in prima duarum notarum ligaturarum ascendentium tractus ascendens invenitur a parte sinistra ut hic: \[\text{\textcopyright} \] aut descendentium ut patet hic: \[\text{\textcopyright} \]

Tunc primae duae notae sunt semibreves; et notae ligatae cum cauda oppositae proprietatis ambae pro uno tempore ponuntur, sed specialiter pro tempore imperfecto. Et plures semibreves quam duae [70] pro uno tempore non computentur ligatae. Et semibreves cum corpore quadro in fine ligaturae descendentes ut hic: \[\text{\textcopyright} \] manere non debent. Ut dictum est superius et inferius patebit, modus perfectus [fol. 10v] reductur per ternarium numerum et imperfectus modus per binarium, in quo modo binario numquam nota debet alterari nec ad perfectionem ascendere, nisi per signum perfectionis et ubi tractabitur de sincopis.

De pausis.

If two notes in one oblique body are found either at the end of a plicated [note] ascending, like this: \[\text{\textcopyright} \] or also descending as is shown here: \[\text{\textcopyright} \] the last is called a breve.

Having spoken of the first and last note both with and without propriety and how both the first and last ligated longae are identified through the five species [of ligatures], and that all middle [notes] both ascending and descending are breves, let us speak of opposite propriety, which is perceived by the means described above; namely, what this is, as is set out here.

Opposite propriety occurs whenever an stem is found ascending from the left part in the first of two ascending ligated notes, like this: \[\text{\textcopyright} \] or descending as is shown here: \[\text{\textcopyright} \]

Then, the first two notes will be semibreves; and ligated notes with a tail of opposite propriety both take the place of one tempus, but specifically of one imperfect tempus. And more semibreves than two for one tempus ligated do not sum up. And square semibreves should not remain descending at the end of a ligature like this: \[\text{\textcopyright} \]. As is stated above and will be shown below, the perfect way [of dividing] is grouped into a ternary rhythmic unit and the imperfect way [of dividing] into a binary; in this binary way [of dividing] a note can never be altered, nor [can it] ascend to a perfection except by means of a symbol of perfection, and where [this occurs] will be discussed [in the section] on syncopations.

On rests.
Nota quod superius et inferius in notis per ternarium et binarium numerum debita mensura temporis demonstratur, ita et in pausis sequentibus observatur idem numerus et mensura. Propterea pausae inaequaliter figurantur. Pausa igitur vel eius mensura figurata per tria spatia longae perfectae in se continent valorem. Pausa duo spatia comprehendens mensuram brevis alterius vel imperfectae longae demonstrat. Pausa vero spatium solum tenens rectam brevem insinuat. Pausa semibrevis quae pausa dicitur hoquetus ponitur sub linea. Pausa seu hoquetus minimae notae ponitur super lineam et hoc quare, quia hoquetus positus super lineam est minor quam hoquetus positus sub lineam; quia sicut filus tractus deorsum addit, ita filus tractus sursum diminuit, ut superius dictum est in figuratione oppositae proprietatis. Pausa quae omnia spatia comprehendit ibi finirí debeat finis punctorum merito appellatur. Quarum exemplum infra patet, ut nunc in praesenti videtis:

De temporibus largarum et longarum, et de earum perfectionibus et imperfectionibus.

Nota quod duo sunt principales modi ad quos omnes modi reducuntur, videlicet perfectus et imperfectus, sed principaliter tractandum est de modo perfecto. Dicendum est ergo quod longa ante longam valet tria tempora ut hic: \[\text{\footnotesize Duplex longa aut }\text{ imperfecta larga figuratur sic: }\] et tunc vocantur longae de modo perfecto. Ipsa autem longa imperfectur aliquando quia, ut patet per regulam antedictam, nota fit tamen duorum temporum.

Note that above and below in the notes the given measure of time is shown by means of ternary and binary rhythms, and in the following rests the same number and measure is observed. For this reason, the rests are drawn unequally. A rest therefore, or its measure formed in three spaces is worth a perfect longa. A rest comprising two spaces designates the measure of an altered breve or an imperfect longa. A rest occupying a single space insinuates a recta breve. A semibreve rest, which is a rest called a hocket, is placed below the line. A minim rest or hocket is placed above the line, and this is why, because a hocket placed above the line is smaller than a hocket placed below the line; because just as a descending thread stem adds, so does an ascending thread stem diminish and it is, as is stated above, in the shape of opposite propriety. A rest that includes all spaces must be finished there; for good reason it is called “the end of points.” An example of these is shown below, as you will now see in the present [image]:

On the tempora of the largae and longae and of their perfections and imperfections.

Note that there are two principal types of division into which all divisions are grouped, namely the perfect and imperfect, but the perfect modus should first be considered. Therefore, it must be said that a longa before a longa is worth three tempora like this: \[\text{\footnotesize A duplex longa or imperfect larga is shaped like this: }\] and then these are called longae of perfect modus. This longa is sometimes imperfected because, as is shown by the aforesaid rule, the note can still be made of two tempora.

Et hoc est quando sola brevis vel valor sequitur ipsam ut patet hic: nisi per divisionem modi aliter distinguatur ut hic: quia tunc causa illius signi divisionis sequens brevis non potest imperfecte praecedentem longam, immo debet reduci ad longam sequentem et ipsam imperfecte. Et hoc quare brevis vel valor debet imperfecte longam, quia ab ipsa perfecta longa descendit et ad ipsam debet reduci et simul facere perfectionem, vel si brevis vel valor praecedit longam, imperfectit ipsum ut hic patet: **Quantum tunc causa illius signi divisionis sequens breve non potest imperficire praecedentem brevem, immo debet reduci ad longam sequentem et ipsam imperfecte. Et hoc quare breve vel valor debet imperfecte longam, quia ab ipsa perfecta longa descendit et ad ipsam debet reduci et simul facere perfectionem, vel si breve vel valor praecedit longam, imperfectit ipsum ut hic patet:**

And this [occurs] when a single breve or the value [of a breve] follows, as is shown here: unless it is otherwise distinguished using the sign of division like this: Because then as a result of this sign of division the breve that follows cannot imperfect the preceding longa; on the contrary, it must be grouped with and imperfect the longa that follows. And this is why the breve or its value must imperfect the longa: because it is derived from the perfect longa and must be grouped together to make a perfection with this [longa]; or if the breve or its value precedes the longa it imperfections it, as is shown here: unless it is otherwise distinguished by the sign of division, as is also shown here: and then by virtue of the sign of perfection the breve preceding cannot imperfect the following longa, and this longa, which contains three tempora, will be perfect. And the aforementioned breve preceding or its value is grouped with some other note or value with which it can make a perfection because it must not remain alone, but still not with the dotted longa. And if a perfection were not to be found, unless through error, it would have to be grouped into imperfect modus. Note that the judgement is the same concerning the value of ligated semibreves and semibreves that are not ligated.

Note that the judgement is the same concerning largae, longae, breves, and semibreves. And just as a longa is perfected by the dot of perfection, so is the larga perfected by it, as well as the breve and the semibreve, because it has the power of addition and division, as will be shown below. And just as the breve imperfects the longa, so does the longa imperfect the larga, the semibreve the breve, and the minim the semibreve.
Dicto de temporibus largarum et longarum, et de carum perfectionibus et imperfectionibus, nunc videndum est de temporibus brevium et carum aequalitibus et inaequalitibus.

Est enim notandum quod omnes breves notae sunt aequales, nisi septem modis quod secunda brevis debet alterari. Videcet primus modus est quando duae notae breves sunt inter duas longas ut hic: Tunc prima brevis vel valor valet unum tempus, secunda vero brevis, quia sine alteratione aliqua perfectio ternarii numeri ad quam tenemur dare respectum non reinveniretur, per regulas antedictas debet alterari. Et ambae pro una perfectione computantur ita quod ambae longae sunt perfectae, nisi per divisionem modi aliter distinguatur ut hic: Tunc ambae [fol. 11r] breves sunt aequales, et prima brevis imperfect primam longam, et secunda brevis imperfect secundam longam.

Iste punctus qui est inter praedictas notas aliquando habet potestatem addendi et aliquando dividendi. Potestatem dividendi habet principaliter ubi reductur secundum modum perfectum. Et merito, quia aliquando longa imperficeretur a breve vel a valore brevis, et brevis imperficeretur a semibrevis vel a valore semibrevis, et semibrevis a minima vel a valore minimae imperficeretur, nisi per illud signum salvaretur. Potestatem habet addendi principaliter ubi reductur secundum modum imperfectum. Et hoc quare: Quia modus imperfectus non ascenderet ad ternarium numerum nisi per illud signum perfectionis; et fit causa sincopationis.

Having spoken of the tempora of the largae and longae, and of their perfections and imperfections, let us now consider the tempora of breves and their equalities and inequalities.

Note that all breves are equal, unless the second breve must be altered as a result of [one of] the seven types [of alteration]. The first type occurs when two notated breves are between two longae, like this: Tunc ambae [fol. 11r] breves sunt aequales, et prima brevis imperfect primam longam, and the second breve will imperfect the first longa, and the second breve will imperfect the second longa.

The dot that is between the aforesaid notes sometimes has the power of adding or sometimes division. It has the power of division principally where grouping is perfect. And for good reason, because sometimes a longa is imperfected by a breve or by the value of a breve, and a breve is imperfected by a semibreve or the value of a semibreve, and a semibreve is imperfected by a minim or the value of a minim, unless it is saved by this sign. It has the power of addition principally where grouping is imperfect. And this is why: Because the imperfect way [of dividing] will only contain ternary rhythms by means of this sign of perfection; and it results in syncopation.
Secundus modus per quem secunda breve debet alterari est quando duae breves longam praecedunt ut hic: \( \text{\textperiodcentered\textperiodcentered} \).

Tertius modus est quando de duabus brevibus una ponatur ante et alia post longam ut hic: \( \text{\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered} \). Tamen quod non sequatur ei alia brevis.

Quartus modus est quando divisae sunt ab aliis per signum divisionis tamen rare inventur.

Quintus modus est quando remanet in fine post reductionem factam perfectionis cantus ut hic:

Sextus modus est quando praecedunt pausam perfectam ut hic: \[73\] \( \text{\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered} \).

Septimus modus est quando praecedunt pausam imperfectam, tamen si brevis vel valor sequatur post pausam ut hic:

Si autem tres breves inter duas longas inveniantur vel valor earum tamen quod ultima sit in forma brevi, ipsae tres breves erunt aequales, et ambae longae erunt perfectae ut hic:

Sunt quamplures opiniones cantorum inter quos aliqui sunt qui bene credunt opinari quando eligunt quod nota debet alterari per punctum. Ad quod, quia alteratio permittitur causa necessitatis, et hoc quando perfectio ternarii numeri nisi per alterationem secundae duarum ut in pluribus locis possunt inveniri, et quia per illum punctum sequendo ipsum punctum tamen brevis vel ipsius valor nos necessitas non astringit, et quod praedictus punctus habeat aliquando dividere et aliquando perficere.

The second way by which the second breve must be altered occurs when two breves precede a longa like this: \( \text{\textperiodcentered\textperiodcentered\textperiodcentered} \).

The third way occurs when out of two breves, one is placed before and the other after the longa, like this: \( \text{\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered} \) that is still not followed by another breve.

The fourth way occurs when [the breves] are divided by the others through the sign of division, which is found but rarely.

The fifth way occurs when [a breve] remains at the end after the grouping of the perfection of the melody, like this: \[\text{\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered}\].

The sixth way occurs when [the breves] precede a perfect rest like this: \[\text{\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered} \].

The seventh way occurs when they precede an imperfect rest, even if the breve or its value follows the rest, like this: \[\text{\textperiodcentered\textperiodcentered\textperiodcentered}\].

If three breves are found between two longae, or their value (the last should still be in the form of a breve) these three breves will be equal, and both the longae will be perfect, like this: \[\text{\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered\textperiodcentered}\].

Many are the opinions of singers, among whom there are indeed some who believe that they choose when a note must be altered by a dot. To this: since alteration is permitted out of necessity (and this [occurs] when the perfection of a ternary rhythmic unit [can only occur] by means of the alteration of the second of two [notes], as can be found in many places), and since necessity (still the breve or its value following this dot) does not bind us by means of this dot, indeed the aforesaid dot sometimes divides and sometimes perfects.
Cum doctrinam volumus non latere, aperte dicimus ipsam alterationem esse per punctum evitandum, videlicet ut patet hic: Tamen per quemcumque modum duo erunt manentes tam mediante longa ut supra quam sine, secunda illarum debet alterari. Et ambae ipsae breves debent simul facere perfectionem quia per regulas antedictas ultima duarum debet alterari, et praefata longa signata erit sincopa de valore trium temporum. Si quattuor praedictarum brevium inter duas longas inveniantur, videlicet ut hic: vel quocumque modo tunc prima brevis imperfect primam longam, nisi post ipsam signum ponatur perfectionis ut hic: Et tunc prima longa erit perfecta, tres vero sequentes erunt aequales et ultima brevis imperfect ultimam longam, nisi sequatur ipsam signum perfectionis ut hic: quod tunc ultima longa erit sincopa et quarta [notes] brevis refertur ad ultimam, et simul faciunt perfectionem, quae ultima ratione duarum quia est secunda alteratur.

Si erunt quinque breves vel valor ipsarum ut patet hic: tunc tres primae breves erunt aequales et ponuntur pro una perfectione, quarta etiam recta erit brevis, quinta quia est secunda duarum in fine manentium debet alterari. Quadruncumque praedictarum brevium sex inveniantur vel valor ut patet hic: tunc per ternarium numerum debet computari, et quilibet ternarius numerus pro perfectione computetur, et omnes erunt aequales.

Since we do not want to hide our doctrine, we say openly that the alteration is avoided by the dot, as is shown here: Still, by whatever means two [notes] remain, as much with a divided longa like above as without, the second of these must be altered. And both of the breves must simultaneously make a perfection because, by means of the aforesaid rules, the last of the two has to be altered, and the aforementioned dotted longa will be a syncopation worth three tempora. If four of the aforesaid breves are found between two longae, like this: or in any manner, then the first breve will imperfect the first longa, unless a sign of perfection is placed after it, like this: And then the first longa will be perfect, the three following will be equal [breves] and the last breve will imperfect the last longa, unless it is followed by a sign of perfection, like this: Then the last longa will be a syncopation and the fourth breve will be grouped with the last, and they will together make a perfection because of the two the last, since it is second, is altered.

If there are five breves or their value, as is shown here: then the first three breves will be equal and take the place of one perfection; the fourth will also be a recta breve; because it is the second of the two remaining at the end the fifth must be altered. Whenever six of the aforesaid breves or their value are found, as is shown here: then they must be grouped into ternary rhythmic units, and each ternary rhythmic unit will sum up to a perfection, and all will be equal.

125 Even in the absence of a dot alteration would not take place here in standard practice (see previous example). However, Vetuslus’s use of the dot here and in other locations in the treatise suggests that he deems it possible for a dot to sign the conclusion of a perfection such that it can override the rule similis ante similem that decrees that like notes before like are perfect.
Si erunt septem breves vel valor earundem ut sic patet: tunc prima dictarum brevium debet primam longam imperfecte, et aliae sex sequentes debent per ternarium numerum computari, videlicet tres et tres. Et quilibet ternarius numerus unius perfectionis seu longae perfectae est valoris. Et ipsae longae perfectae per ternarium numerum dividi debent et reduci. Et ista de causa breves reducantur per ternarium numerum tamen in modo perfecto, quia ab ipsa longa tres descendunt breves, ut dictum est supra. Si vero octo breves vel valor ipsarum erunt inter praedictas longas vel absque, ut etiam patet hic: [fol. 11v] debemus ipsas reducerem per ternarium numerum videlicet tres et tres. Et tunc istae sex sunt valoris duarum perfectionum, et secunda illarum duarum brevium in fine manentium debet alterari ita quod de octo ultima alteretur, tamen si praedicta manet in corpore brevi. Si erunt novem vel valor ipsarum brevium, omnes erunt aequales quia, computando in ternario numero, omnes istae novem sunt valoris trium perfectionum. Si plures aut minus quam novem erunt, computandum est per ternarium numerum, et si sola brevis in fine remaneat, praedicta brevis debet imperfecte primam longam. Et si in fine duae remanerant, secunda duarum, ut per regulam superius notatur, debet alterari.

Ordinandae sunt principales divisiones, postquam visum est de temporibus brevium et earum aequalitatis et inaequalitatis, cum proprietatibus et sine cuiusmodi ligatae et non ligatae dicuntur, et de divisionibus, figurationibus et de aliis quae ostenduntur in arbores tam perfectis quam imperfectis.

If there are seven breves or their value, as is shown here: then the first of the said breves must imperfect the first longa, and the other six must sum up to ternary rhythmic units, namely [into] three and three. And each ternary rhythmic unit is worth one perfection or a perfect longa. And the perfect longae themselves must be divided and grouped into ternary rhythmic units. And for this reason the breves are still grouped into ternary rhythmic units in perfect modus, since three breves descend from the longa, as it says above. If eight breves or their value lie between the aforesaid longae or from them, as is shown here: we must group them into ternary rhythmic units, namely three and three. And then these six will be worth two perfections, and the second of the two breves remaining at the end must be altered so that the last of the eight is altered, even though the aforesaid continues to be a breve in body. If there are nine of these breves or their value, all will be equal because, having summed up into ternary rhythmic units, all nine will be worth three perfections. If there are more or less than nine, they should be summed up into ternary rhythmic units, and if a single breve remains at the end, the aforesaid breve must imperfect the first longa. And if two remain at the end, the second of the two, as is noted in the rules above, must be altered.

Having considered the tempora of the breves and their equalities and inequalities, let us order the principal divisions. Each type of ligated and non-ligated [noteshape] with and without propriety is described, as well as the divisions, figurations, and others, both perfect and imperfect, which are shown in the trees.
Ordinandae sunt principales divisiones quoad figurationem, per quas figurarum omnes divisiones tam de perfectis quam de imperfectis cognoscere, figurare et cantare poterimus, videlicet novem, sex de tempore perfecto diminuto et de tempore imperfecto, et quattuor. Et per istas quattuor divisiones omnes modi et divisiones cognoscendi, figurandi et practicare possunt, ut per exemplum patet inferior. Quaeritur quare divisio duodenaria et octonaria non figurantur. Respondetur; Quia cum tempus 12 sit compositum ex tribus temporibus 4 divisionis et tempus divisionis 8 ex duobus. Et imperfectis divisionibus, videlicet in duodenariam et octonariam, requiruntur multae figurae variæ et diversae et specialiter semibreves caudatae variis et diversis modis. Et ipsae et aliae divisiones possunt figurari et cognoscendi per tres solas notas, videlicet per semibrevem maiorem, minorem et minimam. Et istas tres possimus figurare et cognoscere per duas solas figurarum, videlicet per semibrevem et minimam, quae minima per quam cognoscuntur omnes divisiones cognoscitur per solum parvulum filectum positum in semibrevi sursum ductum. Et ideo ad evitandum superfluitates figurarum et ad sequendam brevitatem, debent per modum divisionis quartae figurari. Nam dicit philosophus, Frustra fit per plura quod fieri potest per pauciora sive per unum.126

De ipsis quattuor divisionibus figurationum per quas omnes divisiones cognoscere possimus.

The principal divisions must be ordered with respect to their noteshapes. By means of these noteshapes all the divisions can be notated and sung, as much perfect as imperfect, namely nine [in total], six of the perfect diminished tempus and four of imperfect tempus. And by means of these four divisions all the ways [of dividing] and divisions can be recognized, notated, and practiced, as is shown below by means of the example. Why aren’t the duodenaria and octonaria divisions depicted? This is why: Because the duodenaria tempus is made up of three tempora of the quaternaria and the division of the octonaria out of two. And in the imperfect divisions, namely in the duodenaria and octonaria many different and varied noteshapes and semibreves in particular are found, caudated by various and diverse means. And these and the other divisions can be notated and recognized by means of three notes alone, namely by means of the greater and lesser semibreve, and the minim. And these three can be formed and recognized through two notes alone, namely by means of the semibreve and the minim. The minim, by means of which all divisions come to be known, is recognized by just a tiny little thread placed leading above the semibreve. And for this reason, to avoid superfluous noteshapes and to follow the breve, they must be notated in the form of the fourth division. For the Philosopher says, “It is pointless to do with more what can be done with less.”

On these four divisions of noteshapes by means of which we can come to know all the divisions.

---

126 As Hammond states, this is the principle of parsimony referred to as Ockham’s razor.

127 He appears to be alluding here to the novel noteshapes that can be found in later-medieval repertory, and that are often associated with the so-called ars subtiiior. However, he does not condone them explicitly. For the sake of parsimony he favors the simple noteshapes.

128 Presumably this refers to the four divisions of noteshapes that he will now describe.
Primo a tempore divisionis novenariae incipiendum est dividere, quod tempus non divisum principaliter figuratur sic: [image]


It is first necessary to begin to divide from the tempus of the novenaria division; this tempus [when it is] not divided is formed principally like this: [image]. This tempus can also be divided into two semibreves, like this: [image] or like this: [image] or like this: [image] or like this: [image]. And then the second of these semibreves must be altered so that the perfection of the measure can be found again according to the aforesaid rules. The said tempus can also be divided into two parts and make the first larger and the second smaller, like this: [image]. And this is why: Because it is easy to imperfect the breve with the semibreve or with the value of the semibreve, just as [it is easy] to imperfect the longa with the breve, as is stated above; it is derived from this and must be grouped into this. And by this means the first greater part is said to be an imperfect breve because it continues to be shaped like a breve. Note that whenever a semibreve or its value is followed or preceded by a breve, it imperfects [the breve] unless a sign of division follows it [the breve], like this: [image]. Then the semibreve will imperfect the breve that follows [it]. Or the sign of perfection will follow, as is shown here: [image]. And by means of this sign of perfection the aforesaid semibreve, following or preceding, cannot imperfect the aforesaid breve because, by virtue of the sign, the aforementioned breve is a syncopation and perfect; and the second of the said semibreves must be altered according to the aforesaid rules. And the last [breve], because it is not imperfected by anything, is perfect. The aforesaid tempus of the novenaria division can also be divided into three equal parts, like this: [image] or like this: [image] or like this: [image] and as it is shown here: [image].
Et unaquaeque istarum partium vocatur maior semibrevis et hoc quare, quia trium
minimarum est valoris, ut superius dictum est; adhuc praefatum [fol. 12r] tempus
dividi potest in tres inaequales partes per plures modos ut hic: ▪ ▪ ▪ Et tunc prima
pars intelligatur tempus seu brevis
imperfecta, secunda pars vocatur minima,
quae minima sic manente semper refertur
ad primam imperfectam brevem quae 5
minimarum est valoris, nisi per divisiones
modi aliter distinguat ut hic: ▪ ▪ ▪ Tunc
prima pars maior semibrevis vocatur,
secunda vero minima, quae ad sequentem
brevem refertur, valoris quinque
minimarum. Aut ut hic: ▪ ▪ ▪ et tunc prima
pars erit minor, secunda vero minima, et
tertia altera semibrevis vocatur. Aut sic: [77]
 ▪ ▪ ▪ Tunc omnes erunt aequales maiiores.
Nota quod semper minima refertur ad
praecedentem notam nisi per signum
divisionis seu perfectionis, quia ab ipsa
descendit et ad ipsam debet reduci. Et sicut
prae ductus punctus habet potestatem
<addendi> super longam, ita habet
potestatem addendi super breve et
semibreven. Et sicut alteratur secunda
duorum longarum inter duas largas,
secunda duorum brevium inter duas longas,
et secunda duorum semibrevim inter duas
breves, ita secunda duorum minimarum
alterari potest inter praedictas aut inter
sembreves maiiores. Etiam causa
sincopationis praefatum tempus pluribus
modis dividit potest in tres inaequales partes
ut hic: ▪ ▪ ▪ And each of these parts is called a greater
semibreve, and this is why: Because [each] is
worth three minims, as is stated above; yet
the aforementioned tempus can be divided
into three unequal parts by many means,
such as this: ▪ ▪ ▪ And then the first part is
understood to be the tempus or an imperfect
breve; the second part is called a minim.
The minim by remaining like this is always
grouped with the first imperfect breve,
which is worth five minims, unless it is
otherwise distinguished by a dot, like this:
 ▪ ▪ ▪ Then the first part is called a greater
semibreve, the second a minim, which is
grouped with the following breve worth five
minims. Or like this: ▪ ▪ ▪ And then the first
part will be a lesser [semibreve], the second
a minim, and the third will be called an
altered semibreve. Or this: ▪ ▪ ▪ Then all
will be equal greater [semibreves]. Note that
a minim is always grouped with the
preceding note unless there is a sign of
division or perfection because it is derived
from it and must be grouped with it. And
just as the aforesaid dot has the power <of
adding> to the longa, indeed it has the
power of adding to the breve and the
semibreve. And just as the second of the two
longae between two largae, the second of
the two breves between two longae, and the
second of the two semibreves between two
breves, are altered, so can the second of two
minims between the aforesaid or between
greater semibreves be altered. Also, as a
result of syncopation the aforementioned
tempus can be divided many different ways
into three unequal parts, like this: ▪ ▪ ▪
Then the first part will be an imperfect breve worth five minims, the second will be a syncopation worth three minims, and the third part will be a minim that is grouped with the imperfect breve because it cannot remain alone. Or the opposite like this: and then the first will be a minim, the second a syncopation worth three minims, and the third an imperfect breve or an altered semibreve worth five minims, and the first minim is grouped with the last imperfect breve or with the altered semibreve. The aforementioned tempus is still divided into four parts like this: or like this: or thus: or even thus: And then the first part will be a minim, the second an altered minim, which is worth two minims, and the other two following will be greater [semibreves]. Or the opposite, like this: or like this: or even thus: Then the first two will be greater [semibreves], the third a minim, and the last minim will be altered. Or thus: Then the first part will be a lesser [semibreve], the second part a minim, and the other two following greater [semibreves]. Or the opposite like this: The first two will be greater [semibreves], the third a lesser [semibreve], and the last a minim. Or also as is shown here: or thus: and then the first part will be a greater [semibreve], the second a minim, the third an altered minim, and the last a greater [semibreve].

129 This example does not correspond to Vetulus’s description.
Aut ut sic: \( \frac{3}{8} \) quod prima pars erit maior, secunda minor, tertia minima, et ultima maior. Adhuc praefatum tempus potest dividii in quattuor partes per plures modos ratione sincoparum, videlicet sic: \( \frac{3}{8} \). Tunc prima pars erit minima, secunda vero maior, tertia minima alteratur, et ultima erit maior.

Quaeritur qua de causa tertia pars, quae est in forma minimae, non nunc imperficit ultiam semibreven sed alteratur, cum dictum sit supra quia brevis praecedens imperficit longam sequentem, et de longis, brevibus et semibrevisibus fit idem iudicium. Respondetur: Quia tam de duabus brevibus quam semibrevis aut minimis secunda debet alterari, ita quod nunc secunda illarum duarum minimarum, quia alio modo non inveniretur mensura, alterari de necessitate debet, et ultima non potest imperfici. Et hoc quare, quia praedicta minima sola non debet manere. Vel ut patet hic: \( \frac{3}{8} \). Quod est tunc prima minima, secunda vero maior, tertia minor, et quarta maior erit. Quaerendum est qualiter imperfici potest ista tertia semibrevis, cum ipsam sequatur semibrevis et non minima nec valor minimae, et etiam dictum est quia de longis, brevibus et semibrevisibus sit idem iudicium. Ergo sicut longa ante longam valet tria tempora, et brevis ante brevem valet tres semibreves, ita semibrevis ante semibreven debet valere tres minimas.

Or like this: \( \frac{3}{8} \). The first part will be a greater [semibreve], the second a lesser [semibreve], the third a minim, and the last a greater [semibreve]. The aforementioned tempus can still be divided into four parts many different ways by reason of syncopations, namely thus: \( \frac{3}{8} \). Then the first part will be a minim, the second a greater [semibreve]; the third, a minim, will be altered, and the last will be a greater [semibreve].

Why is it that the third part, which is in the form of a minim, now does not imperfect the last semibreve but is altered, since it is stated above that the breve that precedes imperfects the longa that follows, and the same judgement is made of longae, breves, and semibreves? This is why: Because just as the second of two breves, semibreves or minimis must be altered, so now the second of these two minimis must be altered out of necessity because the measure will not otherwise be found, and the last cannot be imperfected. And this is why: because the aforesaid minim cannot remain alone. Or as is shown here: \( \frac{3}{8} \). Then the first is a minim, the second a greater [semibreve], the third a lesser [semibreve], and the fourth will be a greater [semibreve]. It is necessary to ask how the third semibreve can be imperfected when a semibreve follows it and neither a minim nor the value of a minim, and this is also stated because the judgement is the same regarding longae, breves, and semibreves. Therefore, just as a longa before a longa is worth three tempora, and a breve before a breve is worth three semibreves, so must a semibreve before a semibreve be worth three minimas.

---

\[130 \text{He here contradicts himself by defying similis ante similem in the example before decreeing that like notes before like are always perfect. He does so again several times in the passage that follows.}\]
Respondetur: Quia hoc est verum, tamen sicut brevis praecedens imperfect longam sequentem, et semibrevis brevem, ita minima potest imperficiere semibreves. Tamen nec causa illius signi perfectionis imperficeris non potest praecedens minima primam semibreves sequentem, ita quod debet imperficiere semibreves secundam nisi per aliquod impedimentum alieius signi ut hic: [fol. 12v] Tunc ultima quae est minima refertur ad primam semibreven. Et hoc quare: Quia ratione illius signi perfectionis una quaeque punctatarum semibrevelium sincopa secundum genus suum est, et perfecta. Vel ut sic: Tunc secunda pars quae est minima ad ultimam refertur semibreven, et simul reducuntur ad perfectionem. Et hoc quare: Quia quaelibet per se punctata, sincopa est in suo esse et perfecta. Aut ut hic: Tunc ambae illae quae sunt punctatae aut signatae, perfectae sunt et sincopae; illarum duarum minimarum secundum per regulas antedictas alteratur. Vel ut sic: Tunc prima erit maior secunda vero quia imperfectur a minima sequenti remanet minor, et utima erit maior. Vel e contrario ut sic: Tunc prima per virtutem illius signi sequentis primae praedictae semibrevis non imperfectur a sequenti minima, sed est perfecta. Secunda vero minima imperfect semibreves sequentem, maior erit, et ultima vel trium minimarum valoris. Aut ut sic: Tunc prima minima ad sequentem semibreven refertur et ipsam imperfectit, et aliae duae sequentes erunt maiores. Vel sic: 

This is why: Because this is true, yet just as the breve that precedes imperfects the longa that follows, and the semibreve the breve, so can the minim imperfect the semibreve. The minim that precedes cannot imperfect the first semibreve that follows as a result of the sign of perfection, so it must imperfect the second semibreve unless there is some impediment of another sign, like this: Then the last, which is a minim, is grouped with the first semibreve. And this is why: Because, by reason of the sign of perfection each of the dotted semibreves is a syncopation according to its genus and is perfect. Or like this: Then the second part, which is a minim, is grouped with the last semibreve, and it is grouped together into a perfection. And this is why: Because each that is dotted is a syncopation and in its being is perfect. Or like this: Then both of these that are dotted or signed are perfect and are syncopations; of the two minims the second is altered according to the aforesaid rules. Or like this: Then the first will be a greater [semibreve], the second a lesser because it is imperfected by the minim that follows, and the last will be a greater [semibreve]. Or the opposite, like this: Then the first [note], by virtue of the sign following the first aforesaid semibreve, is not imperfected by the minim following, but is perfect. The second minim imperfects the semibreve following, and the last will be a greater [semibreve] or the value of three minims. Or like this: Then the first minim is grouped with the semibreve following and imperfects it, and the other two following will be greater [semibreves]. Or thus:
Tunc duae primae erunt maiores; duarum minimarum in fine manentium secunda alteratur. Vel e contrario ut hic: et tunc prima quia imperficitur a sequenti minima erit minor, et duae sequentes vocantur maiores. Aut ut patet hic: vel sic: et tunc prima erit maior, secunda vero quia imperficitur ab ultima, quae est minima, vocatur minor. Et hoc quare: Quia praedicta minima ratione illius signi perfectionis non potest imperficere ipsum praecedentem semibreven, ergo ad aliam primam praecedentem debet referri et ipsam imperficere et simul facere reductionem ad mensuram seu ad perfectionem. Aut ut hic: Tunc tres primae erunt minimeae quae reducuntur simul pro uno tempore semibrevisi, et quarta erit imperfecta brevis et sex minimarum valoris. Aut ut hic: Tunc prima erit imperfecta brevis, et tres sequentes erunt minimeae. Vel sic: aut ut sic: quod tunc prima erit minima, secunda vero altera ratione illius signi aut minor semibrevis, quod idem est in valore, et tertia erit minima quae ad quartam quae est imperfecta brevis, videbunt quinque minimarum valoris, refertur. Then the first two will be greater [semibreves]; of the two minims remaining at the end the second will be altered. Or the opposite like this: And then the first, because it is imperfected by the minim that follows, will be a lesser [semibreve], and the two following will be called greater [semibreves]. Or as is shown here: vel sic: Or like this: And then the first will be a greater [semibreve], the second is called a lesser [semibreve] because it is imperfected by the last [note], which is a minim. And this is why: Because the aforesaid minim, by reason of the sign of perfection, cannot imperf ect the semibreve preceding. Therefore, it must be referred back to the other first [semibreve] preceding and group together in a measure or perfection. Or like this: Then the first three will be minims which are grouped together in the time of one semibreve, and the fourth will be an imperfect breve worth six minims. Or like this: Then the first will be an imperfect breve, and the three following will be minims. Or thus: or like this: Then the first will be a minim, the second an altered [minim] by reason of the sign, or [it will be a] lesser semibreve, which is the same in value, and the third will be a minim, which is grouped with the fourth [note], which is an imperfect breve worth five minims.
Vel e contrario sic: aut ut hic: et tunc prima erit imperfecta brevis, tamen quinque minimarum valoris, secunda vero minima erit quae ad primam imperfectam praedictam refertur, et secunda illarum duarum manentium erit altera minima aut minor semibrevis, quod dicitur supra idem est in valore. Tamen pro clariori loco ipsius minimae alterae dicimus esse ponendam simplicem semibreven, videlicet quando sequitur ipsam alia minima. Aut ut hic: vel sic: Tunc prima erit minima, secunda vero minor aut altera minima quae idem est, tertia erit imperfecta brevis quinque minimarum valoris, ad quam ultimam, quae est minima, refertur; et simul reducuntur ad perfectionem. Vel e contrario ut hic: aut sic: et tunc prima, quae est minima, ad secundam imperfectam brevem, quae est quinque minimarum valoris, refertur et aut secunda duarum sequentium erit altera minima aut minor, quod idem est in valore; et simul faciunt unitatem. Vel ut sic: et tunc prima erit minor, secunda vero minima quae ad primam minorem debet referri, tertia imperfecta brevis verumtamen quinque minimarum valoris ad quam ultima minima refertur, cum ambae sint valoris duarum perfectionum semibreven. Aut ut hic: 

Or the opposite thus: or like this: and then the first will be an imperfect breve worth five minims, the second will be a minim, which is grouped with the first aforesaid imperfect [breve], and the second of these two remaining [notes] will be an altered minim or a lesser semibreve, which as is stated above are the same in value. For clarification, in place of the altered minivm we say that it is necessary to place the simple semibreve, namely when another minivm follows it. Or like this: or thus: And then the first will be a minivm, the second a lesser [semibreve] or an altered minivm, which is the same, the third will be an imperfect breve worth five minims, with which the last [note], which is a minivm, is grouped, and they are grouped together into a perfection. Or the opposite, like this: or thus: And then the first [note], which is a minivm, is grouped with the second imperfect breve, which is worth five minims, and otherwise the second of the two following [notes], will be an altered minivm or a lesser [semibreve], which are the same in value, and together make a unit. Or like this: And then the first will be a lesser [semibreve], the second a minivm which must be grouped with the first lesser [semibreve], [and] the third an imperfect breve worth five minims with which the last minivm is grouped, since together they are worth two perfections of semibreves. Or like this:
Tunc prima imperficitur a minima sequenti, ad quam praedicta minima refertur, erit minor; tertia minima ad quartam imperfectam brevem, quae remanet in valore quinque minimarum, ut pluries dictum [61] est, debet reduci. Aut e contrario ut hic: et tunc prima imperfecta brevis quinque etiam minimarum valoris, ad quam secunda minima refertur, appellatur; tertia etiam minima ad quartam, quae est minor semibrevis, quia simul faciunt perfectionem et reductionem.

De nota punctata.

Est enim notandum quod punctata nota a latere dextro numquam imperfici potest a sequenti vel praecedenti nota neque a valore notae. Et si ad praedictam notam, videlicet per praedictum modum punctatam, sequitur aut praecedit nota aut valor notae, debet reduci ad primam sequentem aut praecedentem notam verumtamen non punctatam.

[fol. 13r] Est etiam notandum quia aliqua nota secundum genus suum aliquando debereet esse imperfecta, aut minor aut minima. Et ex vigore illius puncti seu signi copulat praefata punctata aut signata in se valorem aliarum notarum, quae ista de causa remanent imperfectae; et ipsae punctatae per praedictum modum ad perfectionem ascendunt, et recte sincopae vocantur.

Then the first [note], imperfected by the following minim, with which the aforesaid minim is grouped, will be a lesser [semibreve]; the third minim must be grouped with the fourth imperfect breve, which continues to be worth five minims, as has been stated many times. Or the opposite, like this: . And then the first [note] is called an imperfect breve also worth five minims, with which the second, a minim is grouped. The third is also a minim [and is grouped] with the fourth [note], which is a lesser semibreve, because they simultaneously make a perfection and grouping.

On dotted notes.

It must be noted that a note dotted on the right side can never be imperfected by the note following or preceding, nor by the value of the note. And if a note of the value of a note follows or precedes the aforesaid note, dotted by aforesaid means, it must be grouped with the first note following or preceding that is not dotted.

Note also that sometimes another note, either a lesser [semibreve] or a minim, must be imperfected according to its genus. And by force 131 of the dot or sign the aforementioned dotted or signed [note] joins in itself the value of other notes, which continue to be imperfect for this reason; and these dotted [notes] ascend to a perfection through the aforesaid means, and they are rightly called syncopations.


The aforementioned tempus of the novenaria [division] can also be divided into five parts thus: or thus: or thus: And the first three [notes] will be minims, and the following two will be greater [semibreves]. Or the opposite, as is shown here: or like this: or thus: or thus: Then the first two will be greater [semibreves], and the following three will be called minims. Or thus: or as is shown here: and then the first [note] will be a minim, and it will be grouped with the second, which is called a lesser semibreve. The third and fourth [notes] proceed like the first and the second, namely the third is a minim, and the fourth is an altered minim or lesser [semibreve], which are the same, and the last is a greater [semibreve]. Or the opposite as is shown here: And then the first will be a greater [semibreve], the second a lesser [semibreve] with which the third, which is a minim, is grouped; the fourth [is] also a lesser [semibreve], and the last is grouped with the fourth aforesaid lesser [semibreve] that precedes it, and together they are grouped into a perfection. Or thus: or thus: then the first will be a minim, which is grouped into a perfection with the second [note], which is an altered [minim] or a lesser [semibreve]; the third will be a greater [semibreve]. Of the two [remaining] the second is altered or will be a lesser [semibreve], which are the same in value.

---

132 Again, he flouts similis ante similem.
Aut ut patet hic: \[\text{\textsuperscript{1}1\textsuperscript{1}}\] Tunc prima erit pars minor, secunda vero minima quae ad primam referetur, tertia maior, quarta minor, et ultima minima quae ad quartam referetur ad perfectionem. Vel sic: \[\text{\textsuperscript{1}1\textsuperscript{1}}\] aut sic: \[\text{\textsuperscript{1}1\textsuperscript{1}}\] quod tunc secunda illarum minimarum debet alterari minima per regulas antedictas, nisi per signum divisionis aut perfectionis ad praecedentem notam referetur; tertia vero erit maior. Aut sic: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\] Tunc prima et ultima sunt maiores quia illae tres mediae quae sunt minimae vadunt per se, videlicet pro uno tempore semibreve. Vel ut sic: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\]

Tunc tres primae minimae pro uno tempore semibreve ponuntur; quarta referetur ad quintam imperfectam brevem quae quinque minimarum est valoris. Vel e contrario ut sic: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\] et tunc prima imperfecta brevis quinque minimarum valoris appellatur ad quam sequens minima reductur, et tres etiam sequentes erunt minimae quae simul reducuntur ad perfectionem. Vel sicut hic: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\].

Tunc tres primae erunt minimae quae simul faciunt perfectionem, quarta vero quinque minimarum est valoris imperfecta brevis, ut pluries dictum est, quinta vero erit minima quae ad praecedentem imperfectam brevem debet referri et unam simul facere perfectionem seu reductionem.

Or as is shown here: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\]. Then the first part will be a lesser [semibreve], the second a minim, which is grouped with the first [note], the third a greater [semibreve], the fourth a lesser [semibreve], and the last a minim which is grouped with the fourth [note] in a perfection. Or thus: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\] or thus: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\]. Then the second of these minims must be altered according to the aforesaid rules, unless it is grouped with the preceding note by the sign of division or perfection; the third [note] will be a greater [semibreve]. Or thus: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\] Then the first and last will be greater [semibrees] because these three minims in the middle proceed by themselves in the time of a semibreve. Or like this: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\]. Then the first three minims are placed in the time of a semibreve; the fourth is grouped with the fifth imperfect breve, which is worth five minims. Or the opposite like this: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\] and then the first [note] is called an imperfect breve worth five minims, with which the minim following is grouped, and the three following [notes] will also be minims, which are grouped together into a perfection. Or like this: \[\frac{\text{\textsuperscript{1}1\textsuperscript{1}}}{\text{\textsuperscript{1}1\textsuperscript{1}}}\]. Then the first three [notes] will be minims which together make a perfection, the fourth is an imperfect breve worth five minims, as is stated many times above; the fifth will be a minim, which must be grouped with the preceding imperfect breve and together make one perfection or reduction.
Postquam visae sunt diversitates quinque notarum pro praedicto tempore novenariae divisionis usque ad sincopas, videndae sunt diversitates earum mediantibus sincopis.

Sunt itaque sincopae illae quae inferius ostenduntur punctatae a latere dextro in diversas divisiones quinque praedictarum notarum pro uno tempore supradicto. Quae quandoque possunt sincopari, videlicet [sic] \[\text{\textsuperscript{183}}\] sic: \[\text{\textsuperscript{183}}\]\[\text{\textsuperscript{183}}\] tunc prima erit minimae, secunda vero ratione puncti aut signi perfectionis erit valoris trium minimarum, quae sincopa secundum genus suum perfecta appellatur; tertia causa illius sincopae ad quam primam minimam non potest referri dicitur minor et facit perfectionem cum prima minima. Illarum duarum sequentium secunda per regulas antedictas debet etiam alterari. Vel sic: \[\text{\textsuperscript{183}}\]\[\text{\textsuperscript{183}}\] et tunc prima minima, ut dicitur supra, ratione illius signi perfectionis non potest imperficere neque facere unitatem cum semibreve ipsam praecedentem, immo ad primam aliam sequentem notam tamen non punctatam refertur, et simul reducuntur ad perfectionem; et quarta minima unitatem seu reductionem facit ad perfectionem cum ultima quae minor semibrevis appellatur. Aut e contrario ut patet hic: \[\text{\textsuperscript{183}}\]\[\text{\textsuperscript{183}}\] et tunc prima pars, quia imperfectur a sequenti minima et simul reducuntur ad perfectionem, erit minor.

Having seen the differences between the five notes in the aforesaid tempus of the novenaria division up to the syncopations, the differences between the syncopations in the middle will be considered.

Therefore, the syncopations that are shown below are dotted on the right side in the various divisions of the five aforesaid notes in [the time of] one aforesaid tempus. Whenever these can be syncopated, namely thus: \[\text{\textsuperscript{183}}\]\[\text{\textsuperscript{183}}\] then the first will be a minim, the second, by reason of the dot or the sign of perfection, will be worth three minims, which is called a perfect syncopation according to its genus; the third, as a result of the syncopation with which the first minim cannot be grouped, is called a lesser [semibreve] and makes a perfection with the first minim. Of these two following [notes] the second must also be altered according to the aforesaid rules. Or thus: \[\text{\textsuperscript{183}}\]\[\text{\textsuperscript{183}}\] And then the first minim, as is stated above, can neither imperfect nor make a unit with the semibreve following it because of the sign of perfection. On the contrary, it is grouped with the first other note following that is not dotted, and together they are grouped into a perfection; and the fourth minim makes a unit or a grouping into a perfection with the last [note], which is called a lesser semibreve. Or the opposite as is shown here: \[\text{\textsuperscript{183}}\]\[\text{\textsuperscript{183}}\] and then the first part, because it is imperfected by the following minim will be a lesser [semibreve], and together they are grouped into a perfection.
tertia etiam erit minima quae per regulas pluries notatur, quia sola minima post reductionem factam non debet manere sed debet evitari; ad ultimam, quae tunc quia est secunda duarum oportet alterari, refertur et simul ascendunt ad perfectionem. Quarta quia non imperficitur ab aliquo et semper sic manente, aut punctata aut non, erit sincopa secundum genus suum et perfecta. Vel sic: Tunc duae primae erunt minimae, duae vero sequentes ratione illius signi sunt maiores et ultima minima, ita quod tunc aliquarum illarum semibrevisum punctatarum seu sincopatarum non imperficitur ab aliqua praedictarum minimarum, sed omnes tres minimae ad perfectionem simul reducuntur.

Quaeritur quare secunda illarum duarum minimarum nunc non alteratur, cum dictum sit supra quia, tam de longis, brevibus, semibrevisibus, quam de minimis in modo perfecto, secunda nisi mediante signo divisionis aut perfectionis debet alterari. Respondetur: Quia nunc praedicta minima alterari non debet cum ultima quae est etiam minima remaneret sola, quod esse supra notatur non debet, et unitatem neque perfectionem facere non potest cum aliqua illarum punctatarum semibrevisum quia, ut supra dicitur, ratione illius signi praefatae signatae sunt sincopae secundum genus earum et perfectione.

The third [note] will also be a minim which is notated according to many rules, because a minim cannot remain alone after a grouping has been made, but must be avoided. [This minim] is grouped with the last [note], which then, because it is the second of two [notes], should be altered and grouped together into a perfection. The fourth, because it is not imperfected by anything and always remains thus, either dotted or without a dot, will be a syncopation and perfect according to its genus. Or thus: Then the first two will be minimis, the two following are greater [semibreves] by reason of the sign, and the last is a minim, so that then of the other dotted or syncopated semibreves none are imperfected by any of the aforesaid minimis, but all three minimis are grouped together into a perfection.

Why is the second of these two minimis now not altered, since, as is stated above as much about longae, breves, and semibreves as minimis in the perfect way [of dividing], the second [note in a group], must be altered, unless there is a sign of division or perfection in the middle? This is why: Because the aforesaid minim must now not be altered, since the last [note], which is also a minim, remains alone. This, as is noted above, must not happen, and it can make neither a perfection nor a unit with another of the dotted semibreves because, as is stated above, by reason of this sign, the aforementioned signed [notes] are syncopations according to their genus and perfection.
Ita quod ista de causa, praefata ultima minima ad praedictas duas minimas debet referri et simul facere unitatem seu perfectionem. Adhuc figurantur sic: \( \hat{\text{I} \text{I}} \) et erit tunc prima minima, et duae sequentes per regulas praedictas erunt maiores, et aliae duae sequentes minimeae. Et tunc illarum duarum secunda, quia prima minima remaneret sola, non debet alterari, quae prima ad praedictas ultimas refertur, et simul reducuntur ad perfectionem. Aut ut sic: \( \hat{\text{I} \text{I}} \) et tunc prima pars erit minima quae ad praecedentem imperfectam brevem, videlicet quinque minimarum valoris, refertur; et tres erunt minimeae sequentes aequales quae ad perfectionem simul reducuntur.

Visis diversitatibus divisionum, manerierum et figurationum ut supra patet, videndum est quia per plures modos potest dividii in 6 supradictum tempus novenariae etiam divisionis.

Quando tempus praedictum novenariae divisionis in 6 partes dividitur, principaliter patet sic: \( \hat{\text{I} \text{I} \text{I}} \) licet per plures modos videbitis. Tunc prima est minima et ad secundam semibreve refertur, et per praedictum modum tertia ad quartam et quinta ad sextam refertur. Aut e contrario ut sic patet: \( \hat{\text{I} \text{I} \text{I}} \) quod tunc vadunt per hunc ordinem, videlicet minor et minima usque ad ultiam. Aut sic ut patet: \( \hat{\text{I} \text{I} \text{I}} \).

For this reason, the aforementioned last minim must be grouped with the two aforesaid minims and together make a unit or perfection. It is still notated thus: \( \hat{\text{I} \text{I}} \) And the first will then be a minim, and the two following will be greater [semibreves] according to the aforesaid rules, and the two following minims. And then of these two the second must not be altered because the first minim continues to be alone. The first [minim] is grouped with the aforesaid last [minims], and together they are grouped into a perfection. Or like this: \( \hat{\text{I} \text{I} \text{I}} \) and then the first part will be a minim which is grouped with the aforementioned imperfect breve worth five minims; and the three following [notes] will be equal minims, which are grouped together into a perfection.

Having considered the various divisions, mensurations, and figurations as is shown above, let us consider that the aforesaid tempus of the novenaria division can be divided into six by various means.

When the aforesaid tempus of the novenaria division is divided into six parts, it manifests itself principally like this: \( \hat{\text{I} \text{I} \text{I}} \) although you will see it arranged in many different ways. The first [note] is a minim and is grouped with the second semibreve, and by the aforesaid means the third is grouped with the fourth and the fifth with the sixth. Or the opposite, as is shown here: \( \hat{\text{I} \text{I} \text{I}} \) which then proceeds rapidly through the succession, namely the lesser [semibreve] and the minim up to the last [note]. Or as is shown thus: \( \hat{\text{I} \text{I} \text{I}} \).
Tunc tres primae erunt minima, quarta vero maior, quinta minima, et sexta quia secunda alteratur. Vel e contrario ut hic: \[ \frac{\text{\textcopyright}}{} \] vel ut etiam sic: \[ \frac{\text{\textcopyright}}{} \] Quod tunc prima pars erit minima, secunda vero altera vel minor, quod idem est quod valorem, tertiae major, et tres sequentes erunt minima. Aut sic: \[ \frac{\text{\textcopyright}}{} \] Quod tunc et quandocumque inter quinque minimas in tali divisione \[^{[85]}\] ponatur nota quadrata in forma brevis, vel in principio vel in fine, non aliqua illarum minimarum quae per hunc modum pro novenario tempore positae erunt cum breve tenetur alterari; immo sunt omnes aequales et brevis praefata vero nisi quattuor minimarum remanet in valore. Aut hic: \[ \frac{\text{\textcopyright}}{} \] Quod tunc prima erit minima quae ad secundum minorem referatur, tertia ad quartam quae debet alterari, quinta erit minor ad quam ultima minima referatur. Vel ut sic: \[ \frac{\text{\textcopyright}}{} \] Quod erit tunc prima minor, secunda minima, tertia minor, quarta minima. Ilae durarum minimarum sequentium per praedictas regulas secunda alteratur. Vel sic: \[ \frac{\text{\textcopyright}}{} \] et tunc prima erit maior, secunda minor, tertia minima, et facit perfectionem cum praecedente nota ipsam minimam tertia praefata nisi per signum dividatur, et tres sequentes erunt minima, simul faciunt perfectionem. Aut sic: \[ \frac{\text{\textcopyright}}{} \]

[fol. 14v] vel sic: \[ \frac{\text{\textcopyright}}{} \]

Then the first three [notes] will be minims, the fourth a greater [semibreve], the fifth a minim, and the sixth because it is second is altered. Or the opposite, like this: \[ \frac{\text{\textcopyright}}{} \] or also thus: \[ \frac{\text{\textcopyright}}{} \] Then the first part will be a minim, the second an altered [minim] or a lesser [semibreve], \[^{133}\] which are the same in value, the third a greater [semibreve], and the three following will be minims. Or thus: \[ \frac{\text{\textcopyright}}{} \] Then whenever a square note in the form of a breve is placed between five minims in such a division either at the beginning or end, none of these minims that by this means are placed with the breve for the novenaria tempus will be altered. On the contrary, all are equal and the aforementioned breve unless four minims remain in value. Or like this: \[ \frac{\text{\textcopyright}}{} \] Then the first will be a minim which is grouped with the second lesser [semibreve], the third with the fourth [note], which must be altered, the fifth will be a lesser [semibreve] with which the last minim is grouped. Or like this: \[ \frac{\text{\textcopyright}}{} \] Because then the first will be a lesser [semibreve], the second a minim, the third a lesser [semibreve], the fourth a minim. Of the two following minims the second is altered by the aforesaid rules. Or thus: \[ \frac{\text{\textcopyright}}{} \] and then the first will be a greater [semibreve], the second a lesser [semibreve], the third a minim, and the aforementioned third [note] itself a minim makes a perfection with the preceding note, unless it is divided using the sign, and the three following [notes] will be minims together making a perfection. Or thus: \[ \frac{\text{\textcopyright}}{} \] Or thus: \[ \frac{\text{\textcopyright}}{} \] Or thus: \[ \frac{\text{\textcopyright}}{} \]

\[^{133}\] Again, he flouts similis ante simillem.
et tunc prima maior, secunda vero minima, tertia aut altera minima aut minor, quae in valore sunt idem, et tres aliae sequentes erunt minimeae. Tamen ista alteratio in minima, quando sequitur ipsam aliam minima et pro praedicta potest poni figura simplicis semibrevis, debet ut supra notatur evitari. Unde pro clariori loco ipsius minimeae alterae dicimus esse ponendam simplicem semibreven, videlicet quando sequitur ipsam aliam minima. Aut ut hic: et tunc prima erit maior, tres sequentes minimeae quae simul ad perfectionem reducuntur; aliarum duarum minimarum sequentium, quia alio modo non inveniretur mensura, debet secunda alterari. Aut ut patet hic: et tunc tres primae erunt minimeae, quarta erit maior, quinta minor, ultima minima, quae reducitur ad praedictum praecedentem minorem.

Videndum est etiam sicut praedictae sex possunt sincopari. Ostendendum est quia aliquando possunt sincopari ut hic: Prima pars erit tunc minima, secunda ratione illius signi perfectionis erit sincopa valoris trium minimarum.

And then the first [will be] a greater [semibreve], the second a minim, the third either an altered minim or a lesser [semibreve], which are the same in value, and the three other following will be minims. This alteration in the minim must be avoided when another minim follows it and the shape of a simple semibreve can be put in place of the aforesaid, as is noted above. Whence for clarification, in the place of the altered minim we say that a simple semibreve must be placed, namely when another minim follows it. Or like this: and then the first will be a greater [semibreve], the three minims following are grouped together into a perfection. Of the other two following minims the second must be altered because the measure cannot be found by any other means. Or as is shown here: and then the first three will be minims, the fourth will be a greater [semibreve], the fifth a lesser [semibreve], [and] the last a minim, which is grouped with the aforesaid lesser [semibreve].

Let us consider how the aforesaid six [notes] can be syncopated. This must be shown because sometimes they can be syncopated like this: The first part will then be a minim; the second, by reason of the sign of perfection, will be a syncopation worth three minims.
Praedicta prima minima refertur ad primas duas minimas post sincopam praefatam, et secunda illarum duarum in fine manentium per regulas antedictas et ad reinveniendum mensuram debet alterari. Aliquando sic:

\[ \underline{\text{\textbullet}} \underline{\text{\textbullet}} \text{et tunc primae tres erunt minimae, quarta etiam erit minima, quae causa illius signi perfectionis imperfectur non potest praecedentem notam sed debet reduciri ad ultimam quae ex causa necessitas debet alterari. Aliquando possunt figurari ut sic:} \]

\[ \underline{\text{\textbullet}} \underline{\text{\textbullet}} \text{ Duae primeae ratione illius signi divisionis tunc, quia secunda illarum non potest alterari, sunt minimae, tertia vero, quia est punctata, est sincopa de valore trium minimarum. Quarta erit minima et reducitur ad primas duas minimas, et duae sequentes erunt minimae quarum secunda alteretur. Et aliquando possunt sincopari ut sic:} \]

\[ \underline{\text{\textbullet}} \underline{\text{\textbullet}} \text{ Et tunc prima istarum est minima, secunda autem quia imperfectur a praecedente est minor, tertia quia remaneret sola ad ultimas duas quas divisionis nullam potest alterari reducitur; et quarta erit sincopa quoae trium minimarum est valoris. Adhuc ut patet possunt figurari, videlicet ut hic:} \]

\[ \underline{\underline{\text{\textbullet}}} \underline{\text{\textbullet}} \text{ Et tunc prima est minima, secunda vero minimae imperfectionis brevis, et omnes aliae erunt minimae. Vel e contrario ut patet hic:} \]

\[ \underline{\underline{\text{\textbullet}}} \underline{\text{\textbullet}} \text{ The first aforesaid minim is grouped with the first two minims after the aforementioned syncopation, and the second of the two remaining at the end must be altered to find the measure again in accordance with the aforesaid rules. Sometimes thus:} \]

\[ \underline{\underline{\text{\textbullet}}} \underline{\text{\textbullet}} \text{ and then the first three [notes] will be minims, the fourth will also be a minim, which cannot imperfect the following note as a result of the sign of perfection, but must be grouped with the last [note], which must be altered out of necessity. Sometimes they can be formed like this:} \]

\[ \underline{\underline{\text{\textbullet}}} \underline{\text{\textbullet}} \text{ By reason of the sign of division the first two are then minims, since the second cannot be altered; because it is dotted the third is a syncopation worth three minims. The fourth will be a minim and is grouped with the first two minims, and the two following will be minims of which the second is altered. And sometimes they can be syncopated like this:} \]

\[ \underline{\underline{\text{\textbullet}}} \underline{\text{\textbullet}} \text{ And then the first of these is a minim; the second is a lesser [semibreve] because it is imperfected by the preceding [note]; the third, which remains alone, is grouped with the last two, of which neither can be altered as a result of the [dot of] division; and the fourth will be a syncopation that is worth three minims. It can still be formed as is shown like this:} \]

\[ \underline{\underline{\text{\textbullet}}} \underline{\text{\textbullet}} \text{ And then the first will be a minim, the second a breve of the least imperfection,\textsuperscript{134} and all the others will be minims. Or the opposite as is shown here:} \]

\[ \underline{\underline{\underline{\text{\textbullet}}} \underline{\text{\textbullet}}} \textsuperscript{134} That is, a breve worth four minims.} \]
Visis diversitatibus divisionum ut supra, videndae sunt diversitates quando dividitur in septem praedictum tempus.

Quando dividitur tempus praedictum in septem per plures modos et diversitates, principaliter patet ut hic: 

Tres primae tunc erunt minimae et simul faciunt perfectionem, quarta minima refertur ad quintam quae est minor, et sexta ad septimam. Vel e contrario ut sic patet: 

Tunc prima minima refertur ad secundam, tertia ad quartam quae est minor, et tres sequentes minimae. Vel ut hic: 

Tunc prima est minima quae ad sequentem semibreven refertur, et ambae erunt valoris trium minimarum. Tres etiam mediae erunt minimae, illarum duarum sequentium per supraddictas regulas secunda alteratur. Vel sic: 

Prima erit tunc minor, secunda vero minima quae ad primam minorem refertur, et simul faciunt perfectionem. Tres mediae erunt minimae, sexta erit minor, et ultima minima.

Having considered the variety of divisions above, let us consider the differences when the aforesaid *tempus* is divided into seven [parts].

When the aforesaid *tempus* is divided into seven [parts] by many and various means, it is shown principally like this:

The first three are then minims and together they make a perfection. The fourth minim is grouped with the fifth [note], which is a lesser [semibreve], and the sixth with the seventh. Or the opposite as is shown here:

Then the first minim is grouped with the second [note], the third with the fourth, which is a lesser [semibreve], and the three following [notes are] minims. Or like this:

Then the first will be a lesser [semibreve], the second a minim, the third a lesser [semibreve], the fourth a minim, and the three following minims. Or like this:

Then the first is a minim which is grouped with the semibreve following it, and together they will be worth three minims. The three in the middle will also be minims, the second of the two following is altered by the rules stated above. Or thus:

Then the first will be a lesser [semibreve], the second a minim, which is grouped with the first lesser [semibreve], and together they make a perfection. The three [notes] in the middle will be minims, the sixth a lesser [semibreve], and the last a minim.
Aut sic: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) Prima erit minima quae refertur ad secundam quae est minor, tertia minima ad quartam minorem, et tres sequentes minimae. Aut possunt figurari sic: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) Tunc prima erit minima, secunda vero minor. Tres mediae erunt minimae, sexta etiam erit minor, et ultima quae est minima ad ipsam minorem refertur. Aut sic: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) et tunc prima erit [fol. 14v] minor, secunda minima quae reducitur ad praecedentem minorem. Tres mediae erunt minimae quae simul faciunt perfectionem, et sexta, quae minima est, refertur ad ultimam minorem. Vel sic: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) Tunc tres primae erunt minimae, quarta erit maior, et tres etiam sequentes erunt minimae. Vel ut hic: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) Tunc tres primae vadunt pro uno tempore semibreve, aliae tres mediae pro alio, et ultima maior erit. Vel e contrario ut sic: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) Tunc prima erit maior, tres sequentes minimae pro una perfectione computentur, et aliae tres ultimae pro alia.

Orthus: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) The first will be a minim, which is grouped with the second [note], which is a lesser [semibreve], the third [note] is a minim, [grouped] with the fourth, a lesser [semibreve], and the three following [will be] minims. Or they can be depicted thus: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) Then the first will be a minim, the second a lesser [semibreve]. The three in the middle will be minims, the sixth will also be a lesser [semibreve], and the last, which is a minim, is grouped with the lesser [semibreve]. Or thus: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) And then the first will be a lesser [semibreve], the second a minim, which is grouped with the preceding lesser [semibreve]. The three in the middle will be minims, which together make a perfection, and the sixth, which is a minim, is grouped with the last lesser [semibreve]. Or thus: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) And then the first three will be minims, the fourth will be a greater [semibreve], and the three following will also be minims. Or like this: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) Then the first three proceed rapidly in the time of one semibreve, the other three in the middle for another [semibreve], and the last will be a greater [semibreve]. Or the opposite like this: \(\text{\textit{\textbf{i}} \text{\textbf{i}} \text{\textbf{i}}}\) Then the first will be a greater [semibreve]. The three following minims sum up to one perfection, and the other three at the end to another.

It is also necessary to consider that the aforesaid seven notes in the aforesaid tempus can be syncopated and how is shown in the noteshapes.
It must be said that sometimes they are represented thus: \[\frac{1}{4}\] Then the first note, which is a minim, cannot imperfect the semibreve that follows by reason of the sign. On the contrary, it must be grouped with the other minims; and through the ternary rhythm in the time of the aforesaid division the aforesaid minims sum up to a perfect semibreve. Also sometimes thus: \[\frac{2}{4}\] Then the first two will be minims by reason of the sign of division, the third which is dotted by the sign of perfection is a syncopation and perfect according to its genus because it is worth three minims. The fourth minim is grouped with the first two minims because it would otherwise remain by itself, which cannot be, and the last three will be minims. Or thus: \[\frac{3}{4}\] Then the first three will be minims and are grouped together; the fourth is grouped with the last two notes. This is why: Because a unit or perfection cannot be made with the following semibreve by reason of the sign.

Why is it that the second of the two remaining [notes] at the end is now not altered when, as is stated above, the second of two [notes] is always altered, or must be altered? This is why: Because in accordance with the rules, it is said that a minim cannot remain alone after the second grouping, and on that occasion it would remain alone in the fourth position. Sometimes as is shown here: \[\frac{4}{4}\] Then the first two will be minims, which make a unit or perfection with the last minim by reason of the sign.
Tres etiam mediae erunt minima et simul faciunt perfectionem, et sexta erit sincopa valoris trium minimarum. Aliquando sic: 

\[\text{Tunc prima erit minima quae ratione illius signi unitatem neque perfectionem facere non potest cum sequente semibreve, ita quod ad primas duas minimas sequentes referetur, et tres sequentes erunt minima et simul ad perfectionem reducuntur.} \]

Viso quomodo figurantur septem notae pro tempore novenario, videndum est sicut figurantur octo pro dicto tempore.

Quando octo ponuntur, aliquando figurantur sic: \[\text{Tunc tres primae minima vadunt pro uno tempore semibreve, tres mediae pro alio; septima est minima et octava minor. Aliquando ut hic:} \]

\[\text{Tunc omnes per ternarium numerum computentur, et quilibet numerus pro una perfectione semibreve ponatur, et si duae in fine remaneant minimae, secunda alteretur. Aliquando ut sic:} \]

\[\text{Tunc tres et tres computari debent; septima vero erit minor et ultima minima. Vel e contrario ut sic:} \]

\[\text{Vel ut patet hic:} \]

\[\text{Tunc prima erit minima, secunda minor aut altera minima, quae idem est, et omnes aliae per ternarium numerum computentur; et illa secunda minima ex vigore illius signi divisionis alteratur. Possunt aliquando figurari ut sic:} \]

\[\text{Possunt aliquando figurari ut sic:} \]

The three in the middle will also be minims and together they make a perfection, and the sixth will be a syncopation worth three minims. Sometimes thus: \[\text{Then the first will be a minim which, by reason of the sign, can make neither a unit nor perfection with the semibreve following, so that it is grouped with the first two minims following and the three following will be minims and are grouped together into perfection.} \]

Having considered how the seven notes in the time of the novenaria are formed, let us consider how eight [notes] are notated in the said tempus.

When eight are set down, they are sometimes formed like this: \[\text{Then the first three minims proceed quickly in the time of one semibreve, the three in the middle for another; the seventh is also a minim and the eighth a lesser [semibreve]. Sometimes like this:} \]

\[\text{Then all will sum up to ternary rhythmic units, and each unit takes the time of one perfect semibreve, and if the two remaining at the end are minims, the second will be altered. Sometimes like this:} \]

\[\text{Then three and three must be summed up; the seventh will be a lesser [semibreve] and the last a minim. Or the opposite like this:} \]

\[\text{Or as is shown here:} \]

\[\text{Then the first will be a minim, the second a lesser [semibreve] or an altered minim, which are the same, and all the others will sum up to ternary rhythmic units; and the second minim is altered by force of the sign of division. They can sometimes be formed like this:} \]

\[\text{If this note were an altered minim, it would defy similis ante similem.} \]
Tunc tres primae erunt minimae, secunda illarum duarum quae sunt in medio ex vigore illius signi debet alterari, et tres sequentes ultimae minimae vadunt simul. Aliquando possunt praedictae figurari ut sic:

\[\text{\textbf{Tunc tres primae erunt minimae quae simul faciunt perfectionem, quarta erit minor, quinta minima erit et ad praecedentem minorem refertur, et tres ultimae minimae erunt quae simul reducuntur ad perfectionem. Etiam possunt aliquando sincopari sic:}}\]

\[\text{\textbf{Tunc ratione illius signi divisionis secunda alterari non potest, immo quarta, [fol. 15r] quae est minima, ad faciendum perfectionem ad ipsas primas refertur; teria quae est minor, cum quinta facit perfectionem. Tres etiam ultimae minimae simul ad perfectionem reducuntur. Vel e contrario ut hic:}}\]

\[\text{\textbf{Tunc tres primae erunt minimae; duae etiam mediae cum secunda dictarum mediarum nunc per regulas antedictas quia ultima remaneret sola alterari non potest, sunt minimae, et ad ipsas causa implendi perfectionem prima minima post praedictas reduci debet. Sexta erit minor ad quam ultima minima ad perfectionem reducitur.}}\]

\[\text{\textbf{Quando novem pro praedicto tempore erunt, omnes erunt aequales ut patet hic:}}\]

Then the first three will be minims, the second of the two that are in the middle must be altered by force of the sign, and the last three following minims proceed rapidly at the same time. Sometimes the aforesaid are notated like this:

\[\text{Tunc tres primae erunt minimae quae simul faciunt perfectionem, quarta erit minor, quinta minima erit et ad praecedentem minorem refertur, et tres ultimae minimae erunt quae simul reducuntur ad perfectionem. Etiam possunt aliquando sincopari sic:}}\]

\[\text{\textbf{Tunc ratione illius signi divisionis secunda alterari non potest, immo quarta, [fol. 15r] quae est minima, ad faciendum perfectionem ad ipsas primas refertur; teria quae est minor, cum quinta facit perfectionem. Tres etiam ultimae minimae simul ad perfectionem reducuntur. Vel e contrario ut hic:}}\]

\[\text{\textbf{Tunc tres primae erunt minimae; duae etiam mediae cum secunda dictarum mediarum nunc per regulas antedictas quia ultima remaneret sola alterari non potest, sunt minimae, et ad ipsas causa implendi perfectionem prima minima post praedictas reduci debet. Sexta erit minor ad quam ultima minima ad perfectionem reducitur.}}\]

\[\text{\textbf{Quando novem pro praedicto tempore erunt, omnes erunt aequales ut patet hic:}}\]

When there are nine [notes] in the aforesaid tempus, all will be equal, as is shown here:
Notandum est quod plures sunt varietates figurationum et sincopationum, sed quia per praedictas omnes diversitates ipsarum noscuntur, de aliis est tacendum.

Visis omnibus ut supra patet de tempore novenario, videndae sunt diversitates figurationum temporis imperfecti senariae divisionis.


Note that there are many varieties of figuration and syncopation, but because all the different types are understood by means of the aforesaid, we must be silent about the others.

Having considered everything about the novenaria tempus as is shown above, let us consider the different types of figuration of the imperfect tempus of the senaria division.

The aforesaid tempus is divided principally into two equal parts, like this: or like this: or as is shown here: or like this: Then each of the said parts is called a greater semibreve. Sometimes the aforementioned tempus can be divided into two parts like this: or thus: The minim is grouped with the preceding or with the following breve because, as is stated above, it is derived from it, and must be grouped with it. Sometimes the aforementioned tempus can be divided into two unequal parts like this: or thus: Then the larger part can be called a breve of the quaternaria [division], and the smaller part a lesser semibreve, which is grouped with the preceding or following breve. The aforementioned tempus is also divided into three unequal parts like this: Then the first will be a minim, the second a lesser [semibreve] with which the first is grouped into a perfection, [and] the third will be a greater [semibreve]. Or the opposite like this: and then the first will be a greater [semibreve], the second a lesser [semibreve], and the last a minim. Or thus:
Tunc prima erit minor, secunda vero minima quae nisi per divisionem modi ad primam minorem reducitur; et tertia, nisi prima punctata sit, erit [⁹¹] maior. Vel ut hic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\]. Tunc istarum duarum minimarum causa implendi perfectionem oportet alterari. Aut sic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\] et tunc prima erit maior, illarum duarum minimarum secunda debet alterari. Insuper praedictae tres possunt sincopari sic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\]. Tunc ratione illius signi perfectionis media semibrevis est sincopa valoris trium minimarum, et secunda illarum minimarum per regulas antedictas debet alterari. Aut ut sic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\] et tunc ultima minima imperficere non potest praecedentem semibreven quia pericitur per illud signum, ita quod ad primam debet reduci et facere simul perfectionem. Dividitur etiam praedictum tempus aliquando in tres minores ut hic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\] Et tunc omnes erunt aequales, et unaquaque est valoris duarum minimarum. Potest etiam prae Sit tempus dividii in quattuor partes principaliter ut hic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\] vel sic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\]. Tunc prima pars erit minima, secunda minor aut altera minima, quod idem est, quae prima perfectionem facit cum secunda et per prae dicatum modum, tertia cum quarta facit perfectionem. Vel e converso sic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\] et prima pars erit minor, secunda minima, tertia minor, et ultima minima. Figurantur etiam ut hic: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\].

Then the first will be a lesser [semibreve], the second a minim, which is grouped with the first lesser [semibreve] unless there is a dot of division; and the third, unless the first is dotted, will be a greater [semibreve]. Or like this: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\]. Then in order to fill out the perfection it is appropriate to alter the second of these two minims. Or thus: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\] and then the first will be a greater [semibreve]; of the two minims the second must be altered. Moreover, the aforesaid three [notes] can be syncopated thus: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\]. Then, by reason of the sign of perfection the semibreve in the middle is a syncopation worth three minims, and the second of these minims must be altered by means of the aforesaid rules. Or like this: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\]. And then the last minim cannot imperfect the semibreve preceding because it is perfected by the sign, so that it must be grouped with the first [note] and together make a perfection. The aforesaid tempus is also sometimes divided into three lesser [semibreves] like this: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\]. And then all will be equal, and each is worth two minims. The aforementioned tempus can also be divided into four parts, principally like this: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\] or thus: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\]. Then the first part will be a minim, the second a lesser [semibreve] or an altered minim,¹³⁶ which are the same. The first [note] makes a perfection with the second and, by the aforesaid means, the third makes a perfection with the fourth. Or the opposite thus: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\] and the first part will be a lesser [semibreve], the second a minim, the third a lesser [semibreve], and the last a minim. They are also formed thus: \[\text{\textsuperscript{1}}\text{\textsuperscript{1}}\].

¹³⁶ Again, in defiance of similis ante similem.
Tunc prima erit minima, secunda vero minor et simul reducuntur ad perfectionem, tertia minor, et ultima minima, et simul ambae reducuntur. Vel etiam sic: Tunc prima pars erit minor, secunda vero minima quae ad praecedentem minorem refertur, quarta etiam minima quae reducitur ad sequentem quae est minor. Praedictae etiam quattuor semibreves possunt causa sincopationum per alium modum figurari sic: Tunc prima erit minima, quae non potest [fol. 15v] sequentem semibrevem imperficere propter praefatum signum perfectionis sed est sincopa et perfecta secundum genus suum. Quae prima minima, quia sola non debet manere, oportet reduci ad ultimas duas quarum ista de causa nunc secunda non debet alterari. Vel e contrario ut hic: et tunc duae primae erunt [92] minimae; et quia ultima remaneret sola, non debet secunda alterari. Tertia erit sincopa valoris trium minimarum, et ultima erit minima quae ad primas duas minias reducitur ad perfectionem. Potest etiam praefatum tempus in quinque partes dividit ut hic: Tunc tres primae erunt minimae, et secunda illarum duarum sequentium causa implendi perfectionem debet alterari. Then the first will be a minim; the second a lesser [semibreve], and together they are grouped into a perfection; the third [will be] a lesser [semibreve] and the last a minim, and they are both grouped together. Or also thus: Then the first part will be a lesser [semibreve], the second a minim, which is grouped with the preceding lesser [semibreve]. The fourth is also a minim which is grouped with the following [note], which is a lesser [semibreve]. The aforementioned four semibreves can also be formed by other means because of syncopations, like this: Then the first [note] will be a minim, which cannot imperfect the following semibreve because of the aforementioned sign of perfection, but is a perfect syncopation according to its genus. Because the first minim cannot remain alone, it should be grouped with the last two [notes] the second of which, because of this, now cannot be altered. Or the opposite like this: and then the first two [notes] will be minims; and because the last remains alone, the second cannot be altered. The third [note] will be a syncopation worth three minims, and the last will be a minim which is grouped with the first two minims in a perfection. The aforementioned tempus can also be divided into five parts like this: Then the first three [notes] will be minims, which are grouped together into a perfection, and the aforementioned last [note] is called a lesser [semibreve]. Or like this: Then the first three [notes] will be minims, and the second of the following two must be altered to fill out the perfection.

137 This should say the third.

Dicto de diversitatibus manerierum et figurationum perfecti temporis et reductionem novenariae divisionis et senariae imperfecti temporis a praedicto perfecto tempore derivato, dicendum est de diversitatibus manerierum, divisionem seu reductionem, et figurationum temporis perfecti minimi seu diminutii, quod idem est, senariae etiam divisionis.

Quod tempus, ut dictum est superius et patet in arbore, in duas inaequales partes dividitur quoad valorem ut hic: vel sic: Or thus: or thus: Then the first [note] will be a minim, the second a lesser [semibreve] or an altered minim, which are the same, and the three following [notes will be] minims. Or thus: Then the first will be a lesser [semibreve], the second a minim, and both take the time of a semibreve. And the three following [notes] will be minims, and together they take the time of or are grouped into another semibreve. They can still be formed thus: Then the first three will be minims and are grouped together into the time of one semibreve. The fourth will be a lesser [semibreve] with which the last minim makes a perfection. By reason of the syncopation, the aforesaid can be notated like this: Then all the minims will be equal, and the lesser [semibreve] in the middle will be worth two minims. When the aforementioned tempus of the aforesaid senaria division is divided into six parts as is shown here: then all will be equal and they are grouped into ternary rhythmic units into a perfection.

Having spoken of the differences of the mensurations and figurations of the perfect tempus and the grouping of the novenaria division and of the imperfect senaria tempus, derived from the aforementioned perfect tempus, we shall speak of the variousness of the mensurations, divisions, or reductions, and the figuration of the least perfect or diminished tempus of the senaria division, which are the same.

The tempus, as it says above and is shown in the tree, is divided into two parts equal in value like this: or thus: 

407
Tunc secunda pars altera semibrevis appellatur; tamen [93] quattuor minimarum est valoris, et prima pars, quae est minor, duarum minimarum est valoris et minor semibrevis appellatur. Vel sic: [\[\text{\textasteriskcentered}\]

quae prima est minor semibrevis et minor pars

appellatur, et maior pars brevis quaternaria\textsuperscript{138} minimae imperfectionis et maioris subdivisionis appellatur. Vel e contrario sic:

et tunc maior pars brevis etiam 4

maioris subdivisionis et minimae

imperfectionis\textsuperscript{139} appellatur. In duas

inaequales partes praefatum tempus dividi

potest ut hic: \[\frac{1}{2}\] vel e contrario sic: \[\frac{3}{4}\]. Et

tunc minor pars, quae est minima nisi per

signum divisionis aut perfectionis, ad

sequentem vel praeecessorem brevem

referred. Et hoc quare: Quia ab ipsa breve

descendit et ad ipsam debet reduci. Potest

etiam praefatum tempus in duas aequales

partes dividi, tamen mediante signo

perfectionis ut hic: \[\text{\textasteriskcentered}\] Et tunc unaquaque

istarum semibrevium trium minimarum est

valoris et maior semibrevis appellatur.

Praefatum tempus in tres aequales partes

dividitur ut etiam patet hic: \[\text{\textasteriskcentered}\] Tunc

unaquaque dictarum partium minor

appellatur et duarum minimarum est

valoris. Dividitur etiam in tres inaequales

partes sic: \[\text{\textasteriskcentered}\] Tunc duae praeaeq

minimae, et tertia altera minor appellatur.

Vel sic: \[\text{\textasteriskcentered}\] sic: \[\text{\textasteriskcentered}\]

[fol. 16r] quod erunt tunc omnes minores. Aut sic:

\[\text{\textasteriskcentered}\] Tunc prima pars ratione illius signi

perfectionis erit maior, et secunda illarum

duarum alio modo non inveniretur

mensura, oportet alterari.

Then the second part is called an altered

semibreve, it is worth four minims, and the

first part, which is a lesser [semibreve], is

worth two minims and is called a lesser

semibreve. Or thus: [\[\text{\textasteriskcentered}\]. The first part is a

lesser semibreve and it is called the smaller

part, and the larger part is called a

quaternaria breve of the least imperfection of

the greater subdivision. Or the opposite

thus: [\[\text{\textasteriskcentered}\] and then the larger part is called a

breve of the quaternaria also of the greater

subdivision and of the least imperfection.

The aforesaid tempus can be divided into two

unequal parts, like this: \[\frac{1}{2}\] or the opposite

thus: \[\text{\textasteriskcentered}\]. And then the smaller part, which is

a minim, will be grouped with the breve

following or preceding unless [this is

prevented] by means of a sign of division or

perfection. And this is why: Because it

descends from the breve and it must be

grouped with the same [breve]. The

aforementioned tempus can also be divided

into two equal parts, still by the sign of

perfection, like this: \[\text{\textasteriskcentered}\]. And then each of

these semibreves is worth three minims and

is called a greater semibreve. The

aforementioned tempus is divided into three

equal parts as is also shown here. \[\text{\textasteriskcentered}\] Then

each of the said parts is called a lesser

[semibreve] and is worth two minims. It is

also divided into three equal parts like this:

\[\frac{1}{3}\] Then the first equal will be minims, and

the third is called an altered lesser

[semibreve]. Or thus: [\[\text{\textasteriskcentered}\] and like this:

\[\text{\textasteriskcentered}\] then they will all be lesser

[semibreves]. Or thus: [\[\text{\textasteriskcentered}\]. Then the first

part will be a greater [semibreve] by reason

of the sign of perfection, and the second of

these two [minims] must be altered, [since]

the measure cannot be not found by any

other means.

\textsuperscript{138} The manuscript reads “4,” (f. 15v). Hammond transcribes this word as “quattuor.” I changed this
to quaternaria so that this phrase would accord with the sense of the following sentence.

\textsuperscript{139} Hammond’s edition here reads “perfectionis.” I emended this to reflect the text in \textit{Vat}307.
Aut ut hic: \( \frac{1}{4} \) et tunc secunda istarum mininarum duarum ratione illius signi debet alterari, et ultima erit maiori. Vel sic: \( \frac{1}{4} \) et tunc duae primae erunt minimeae, et ultima brevis quaternaria minimeae imperfectionis et maioris subdivisionis appellatur. Vel e contrario ut sic: \( \frac{1}{4} \). Vel sic: \( \frac{1}{4} \). Tunc prima pars et illa quae est in medio mininarum duarum brevis 4 vocatur, et duae sequentes erunt minimeae. Aut ut videtur hic: \( \frac{1}{4} \). Tunc prima erit sincopa valoris trium mininarum, secunda vero minima quae ad tertiam minorem refertur. Aut sic: \( \frac{1}{4} \). Tunc prima pars erit minor ad quam secunda, quae est minima, refertur. Tertia vero maior semibrevis appellatur. Aut ut hic: \( \frac{1}{4} \). Tunc prima erit minima quae unitatem seu perfectionem ratione illius puncti facere non potest cum sequente semibreve, sed ad ultimam quae est minor debet reduci. Vel e contrario sic: \( \frac{1}{4} \) et tunc prima erit minor ad quam ultima, quae est minima, reducitur. Mediaque punctata ex se facit perfectionem et trium mininarum est valoris, et maior semibrevis, quae est sincopa, vocatur. Potest praefatum tempus in quattuor partes dividi ut hic: \( \frac{1}{4} \). Vel ut hic: \( \frac{1}{4} \). Vel sic: \( \frac{1}{4} \). Tunc duae primae erunt minimeae et duae sequentes minores. Vel e contrario ut patet hic: \( \frac{1}{4} \) et tunc sic: \( \frac{1}{4} \) et sic: \( \frac{1}{4} \). Et tunc duae primae erunt minores et duae sequentes minimeae. Aut sic: \( \frac{1}{4} \). Or like this: \( \frac{1}{4} \). And then the second of these two minims must be altered by reason of the sign, and the last will be a greater [semibreve]. Or thus: \( \frac{1}{4} \). And then the first two will be minims, and the last is called a quaternaria breve of the least imperfection and greater subdivision. Or the opposite like this: \( \frac{1}{4} \) or thus: \( \frac{1}{4} \). Then the first part and that which is in the middle of the two minims is called a quaternaria breve, and the two following will be minims. Or as is seen here: \( \frac{1}{4} \). Then the first will be a syncopation worth three minims, the second a minim that is grouped with the third lesser [semibreve]. Or thus: \( \frac{1}{4} \). Then the first part will be a lesser [semibreve] with which the second, which is a minim, is grouped. The third is called a greater semibreve. Or like this: \( \frac{1}{4} \). Then the first [note] will be a minim, which cannot make a unit or perfection with the semibreve following by reason of the dot, but must be grouped with the last [note], which is a lesser [semibreve]. Or the opposite thus: \( \frac{1}{4} \). And then the first [note] will be a lesser [semibreve] with which the last [note], which is a minim, is grouped. And the dotted [note in the] middle makes a perfection by itself and it is worth three minims and is called a greater semibreve, which is a syncopation. The aforementioned tempus can be divided into four parts, like this: \( \frac{1}{4} \) or like this: \( \frac{1}{4} \) or thus: \( \frac{1}{4} \). Then the first two will be minims and the following two lesser [semibreves]. Or the opposite as is shown here: \( \frac{1}{4} \). Or thus: \( \frac{1}{4} \) and thus: \( \frac{1}{4} \). And then the first two will be lesser [semibreves] and the following two minims. Or thus: \( \frac{1}{4} \).
Tunc prima erit et ultima minor, et duae mediae, nisi divisae sint, erunt minimae. Vel e contrario ut sic: $\frac{1}{2}$ et tunc prima et ultima erunt minimae, et ambae mediae erunt minores. Vel ut hic: $\frac{1}{2}$ et $\frac{1}{2}$. Tunc prima erit minima, secunda minor, tertia minima, et ultima minor. Vel e contrario sic: $\frac{1}{2}$ et tunc prima erit minor, secunda vero minima, tertia minor, et ultima minima; quae ambae minimae simul faciunt perfectionem. Possunt etiam sincopari ut hic: $\frac{1}{2}$ et $\frac{1}{2}$. Tunc prima erit minima, secunda vero sincopa quae trium minimarum est valoris, et ultimae duae erunt minimae. Aut ut hic: $\frac{1}{2}$ et $\frac{1}{2}$. Tunc omnes istae tres primae erunt \footnote{3} minimae, et ultima erit maior. Vel e contrario ut patet hic: $\frac{1}{2}$ et $\frac{1}{2}$ et tunc prima, quae est punctata, est sincopa de valore trium minimarum, aliae tres sequentes minimae appellantur. Tempus praefatum in quinque partes dividi potest ut hic: $\frac{1}{2}$ et $\frac{1}{2}$. Tunc quattuor primae erunt minimae quae duarum minorum sunt valoris, et ultima erit minor. Vel e contrario ut hic: $\frac{1}{2}$.

Then the first and last will be lesser \[\text{semibreves}\], and the two in the middle, unless they are divided, will be minims. Or the opposite like this: $\frac{1}{2}$ and then the first and last \[notes\] will be minims, and both in the middle will be lesser \[semibreves\]. Or like this: $\frac{1}{2}$ Then the first \[note\] will be a minim, the second a lesser \[semibreve\], the third a minim, and the last a lesser \[semibreve\]. Or the opposite thus: $\frac{1}{2}$ and then the first will be a lesser \[semibreve\], the second a minim, the third a lesser \[semibreve\], and the last a minim; together both minims make a perfection. They can also be syncopated like this: $\frac{1}{2}$ Then the first will be a minim, the second a syncopation which is worth three minims, and the last two will be minims. Or like this: $\frac{1}{2}$ and then the first two will be minims, the third a syncopation which is worth three minims, and the last will be a minim. Or like this: $\frac{1}{2}$ Then all of these first three \[notes\] will be minims, and the last will be a greater \[semibreve\]. Or the opposite as is shown here: $\frac{1}{2}$ and then the first \[note\], which is dotted, is a syncopation worth three minims; the other three following are called minims. The aforementioned \textit{tempus} can be divided into five parts like this: $\frac{1}{2}$. Then the first four \[notes\] will be minims, which are worth two lesser \[semibreves\], and the last will be a lesser \[semibreve\]. Or the opposite like this: $\frac{1}{2}$.
Then the first part will be a lesser [semibreve], and all the others following will be minims, which are grouped into a perfection by means of binary rhythmic units. And this is why: Because the aforementioned tempus, as is stated above and shown in the tree, is composed of three lesser [semibreves]. And each lesser [semibreve], as is shown in the example, is worth two minims. Or like this: Then the semibreve that lacks a stem is called a lesser semibreve, and the first and last two [notes] will be minims which are grouped into a perfection by means of binary rhythmic units. The aforementioned five [notes] can also be syncopated like this:

The first minim must be grouped with the third [note], and the lesser [semibreve] that lacks a stem is a syncopation, and the other two following will be minims. Or thus: and then the first two will be minims and are grouped together, the third minim is grouped with the last, and the middle of the aforesaid minims is called a syncopation. The aforementioned tempus can also be divided into six parts like this: And then all will be equal and grouped into a perfection by means of binary rhythmic units.

Having seen the divisions of the mensurations and figurations of the perfect tempus of the novenaria division, and the imperfect senaria derived from this, and the perfect diminished tempus or also the least senaria division, let us consider how the tempus of the quaternaria division is divided, which descends from the said perfect diminished tempus.

De minima quando debet mutare figuram.

The aforesaid tempus of the quaternaria is divided into two parts equal in value, principally like this: or thus: or also like this: Then all will be equal in value, and each of these is worth two minims. It can also be divided into two parts unequal in value like this: Then by force of the sign of perfection the second [note], which is dotted, is a syncopation and contains the value of three minims and is called a greater [semibreve]. And this first minim is grouped into a measure with the aforesaid [note]. Or the opposite like this: Then the first will be a syncopation and it is also worth three minims, with which the following, which is a minim, can be grouped to fill out the measure or rhythmic unit. The aforementioned tempus can also be divided into three parts, which can be formed like this: Then the first two will be minims, the third a lesser [semibreve]. Or the opposite as is shown here: because the first will then be a lesser [semibreve] and the two following [notes will be] minims. Or like this: And then the first and last [notes] will be minims and together they make a grouping, and the middle [note] worth two minims is a syncopation. And when there are four in the aforesaid tempus thus: all will be equal and called minims.

On the minims when their shape must be changed.
Ut dictum est superius quia tres notas, videlicet per semibrevem maiorem, minorem et minimam, divisiones et subdivisiones tam de tempore perfecto maiore, minore et minimo, imperfecto maiore, minore et minimo quam semiperfecto et semiimperfecto maiore, minore et minimo, tam etiam maioris, minoris quam minimeae subdivisionis, omnes cognoscuntur. Hoc est verum. Tamen quia aliquando divisio minoris subdivisionis miscitur cum maiori et minima cum minori, et quia inter praedictas esset magna confusio quia non bene reducerentur ad perfectionem, oportet quod de necessitate una prolatio cognoscatur ab alia, minimae minoris subdivisionis inter minimas maioris.

Aut minimae minimeae subdivisionis inter minimas minoris mutentur aliqualiter in figura, videlicet ut patet hic: ☞. Et quod minima mutet figuram non requiritur, nisi quando prolatio minor miscitur cum maiore aut minima prolatio cum minore.

[97] Finito libro sit laus gloria Christo.

Dexteram scriptoris salvet eam deus cunctis horis. Amen.

Explicit liber de musica Magistri Iohannis Vetuli de Anagnia.

As is stated above, everything comes to be known by means of three notes, namely the greater and lesser semibreves, and the minim; the divisions and subdivisions of the greater, lesser, and least perfect tempus; the greater, lesser, and least imperfect [tempus]; as much the greater, lesser, and least semi-perfect and semi-imperfect [tempus] as the greater, lesser, and least subdivision. This is true. Nevertheless, because the division of the lesser subdivision is sometimes mixed with the greater and the least with the lesser, and because there would be great confusion between these aforesaid [notes], since they would not be properly grouped into a perfection, it is appropriate that one extension should be distinguished from another out of necessity, the minims of the lesser subdivision from the minims of the greater. Or else the minims of the least subdivision among the minims of the lesser are sometimes changed in shape, as is shown here: ☞. And a minim that changes its shape is not sought, unless it is when the lesser extension is mixed with the greater or the least extension with the lesser.

Having finished the book praise be to Christ in his glory.

May God save the right hand of the scribe at all hours. Amen.

The Book on Music was written by Magister Johannes Vetulus de Anagnia.
Bibliography


423


Ars cantus mensurabilis, edited by Gilbert Reaney and André Gilles, Corpus scriptorum de musica, vol. 18, ([Rome]: American Institute of Musicology, 1974).


Rico, Gilles, “Music in the Arts Faculty of Paris in the Thirteenth and Early Fourteenth Centuries,” PhD diss., Oxford University, 2005.


