

**Order Number 9300609**

**The “Musica practica” of Bartolomeo Ramos de Pareia: A  
critical translation and commentary**

**Fose, Luanne Eris, Ph.D.**

**University of North Texas, 1992**

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Fose, Luanne Eris, The Musica practica of Bartolomeo Ramos de Pareia: A Critical Translation and Commentary. Doctor of Philosophy (Music Theory), May, 1992, 518 pp., 20 tables, 29 illustrations, bibliography, 119 titles.

This dissertation contains the first complete Latin-English translation of one of the most controversial music theory treatises of the fifteenth century--the Musica practica (Bologna, 1482) of Bartolomeo Ramos de Pareia. Its title as well as its content illustrate the Renaissance transformation from the abstract mathematical approach of "musica speculativa" to that of an emphasis upon the everyday demands of the practicing musician.

Although Ramos provides traditional explanations of the modes, counterpoint, "musica ficta," and white mensural notation, his innovations in temperament, solmization, mutation, and the gamut set this treatise apart from other fifteenth-century music treatises. Ramos's rejection of the traditional Pythagorean-Boethian-Guidonian explanations, coupled with his strong polemic criticisms of the *auctoritas*, resulted in a treatise that remained at the center of heated debate well into the sixteenth century.

Part I of this dissertation includes a commentary in which the specific topics of the Musica practica are examined. Part II of this dissertation consists of a

critical translation of the Musica practica, with endnotes to illuminate issues that may prove confusing to the twentieth-century reader. These endnotes include translations of Franchinus Gaffurius's marginal annotations, as well as biographical information for the many musicians to whom Ramos refers in the text.

The translation is presented in parallel columns to facilitate a comparison of the original Latin text (A-80 edition) with its English translation; discrepancies between the extant editions (A-80, A-81, and A-7-35) have been catalogued in an appendix.



THE MUSICA PRACTICA OF BARTOLOMEO RAMOS DE PAREIA:  
A CRITICAL TRANSLATION AND COMMENTARY

DISSERTATION

Presented to the Graduate Council of the  
University of North Texas in Partial  
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

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Denton, Texas

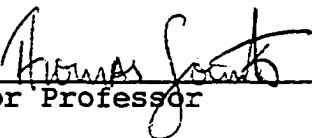
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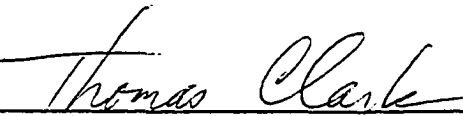
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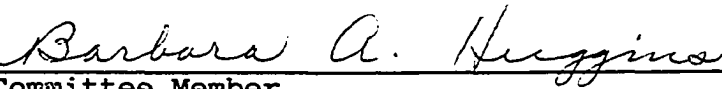
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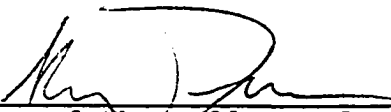
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. . . Thanks to the immortal God, provider of all good things, who established the liberal arts for the perfection and delight of men; to Him is the glory throughout the endless ages of ages. Amen.

Bartolomeo Ramos de Pareia  
*Musica practica* (1482)

## PREFACE

The primary purpose of this dissertation is to present the *Musica practica* (1482) of Bartolomeo Ramos de Pareia<sup>1</sup> in Latin-English translation. Because the *Musica practica* has never been translated into English, French, or German (the "required" languages of the theory historian), researchers have often been forced to struggle with the text in its original form or to rely on secondhand information. In many instances, this has resulted in out-of-context translations that have contributed to a general misunderstanding of Ramos's musical precepts.

This translation has been organized by means of parallel columns in order to facilitate a comparison of the original Latin text with the English translation. An attempt has been made to remain as faithful as possible to the intent of the original Latin while retaining the flavor

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<sup>1</sup>Johannes Wolf and Robert Stevenson point out that there are several different variants for the surname of this Spanish music theorist. In his *Honesta defensio* (1491), Giovanni Spataro refers to his teacher by the Latin form "Ramus"; however, in his *Tractato di musica* (1531), he refers to his teacher as "Ramis." Like Stevenson, this translation has adopted the form "Ramos," due to the fact that "Ramis" does not appear in Castilian and because "Ramos" is the currently preferred spelling of this Spanish surname. See Johannes Wolf, ed., *Musica practica Bartolomei Rami de Pareia*, (Leipzig: Breitkopf and Härtel, 1901; reprint, Wiesbaden: Breitkopf and Härtel, 1968), xii and Robert Stevenson, *Spanish Music in the Age of Columbus* (The Hague, Netherlands: Martinus Nijhoff, 1960), 55n.

of Ramos's personal style of rhetoric. Due to the nature of this style, filled with the typical lengthy sentences of the Latin language, some of the more lengthy sentences have been reapportioned, with the long passages of Ramos's continuous text divided into new paragraphs. At times, Ramos provides rather cryptic sentences and assumes that the reader understands the intentions of his prose; in the translation, clarification of the Latin text has been provided by means of brackets containing interpolative text.

Part I of this dissertation is comprised of a commentary upon the specific topics that have been addressed by Ramos in the *Musica practica*. Because the *Musica practica* generated several centuries of theoretical debate--with arguments often focused upon only short passages of text--this commentary attempts to investigate the validity of these discussions in light of a translation of the entire treatise.

Part II of this dissertation contains a critical translation of the *Musica practica*; this translation is preceded by technical information regarding the editions of the treatise and the procedures employed in preparing the translation. Endnotes have been provided to the English translation to illuminate issues that might have been perfectly obvious to the fifteenth-century musician but which may prove confusing to the twentieth-century reader. In addition, the endnotes provide biographical entries of

the many musicians that Ramos refers to in the *Musica practica*.

Unless otherwise noted, translations of all text and quotations are by the author of this dissertation. Quotations that have been extracted from other translations have retained the spelling and punctuation of the author cited.

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This translation is indebted to the scholarship of Johannes Wolf, Clemente Terni, José Luis Moralejo, and Calvin Bower, without whom such an in-depth study would not have been possible. Due to the vast nature of this project, a working knowledge of Latin, Spanish, Italian, German, French, and English was required; in this regard, I am indebted to the translation skills of Massimiliano Cannalire, Marie Perratore, and Alvaro Cano for their assistance in the translation of some of the more difficult passages in the respective languages. Most of all, I wish to express my deepest appreciation to Professor Barbara Huggins of the Department of Foreign Languages and Literatures at the University of North Texas for her patience and for the countless hours of guidance in the preparation of this translation. Her invaluable suggestions and unwavering support contributed immeasurably to the completion of this study.

I also wish to offer a very special thanks to my advisor, Dr. Thomas Sovík, who believed in this project and endeavored to do "whatever necessary" to bring it to fruition; further, I am especially grateful to the other members of my dissertation committee, Dr. Deanna Bush and Dr. Thomas Clark, for their many helpful suggestions and comments. Finally, I give praise to God for my husband Jeff--whose love, patience, and constant encouragement sustained me throughout the course of my doctoral studies.

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**PART I**

**THE COMMENTARY**

## CHAPTER I

### INTRODUCTION

The *Musica practica* (Bologna 1482) of Bartolomeo Ramos de Pareia was one of the most controversial music theory treatises of the fifteenth century. Although many of Ramos's propositions were rejected by his contemporaries, few other fifteenth-century theorists had such a monumental impact upon their musical community and the subsequent development of Western music theory.

The *Musica practica*, even in its title, illustrates the transformation in the Renaissance from an emphasis on *musica speculativa* to that of *musica practica*. Ramos was not greatly concerned with the speculative or mathematical aspects of music theory that were represented in the medieval quadrivium; rather, he endeavored to provide an approach that would be readily applicable to the everyday demands of the practicing singer-musician. Ramos's attempt to meet the needs of the performer stand in direct contrast to many of his predecessors who, in contrast, viewed the practicing musician with disdain.

The Renaissance was an era in which the role of the speculative theorist was redefined by the need for an uncomplicated assimilation of theory and practice. Treatises that addressed practical issues appeared with



increasing frequency in the late fifteenth century, and theorists themselves openly admitted the necessity to integrate practice with theory:

A pure and simple singer is like a body without a mind, since no one can be a good singer without a thorough [knowledge] of counterpoint . . . .<sup>1</sup>

. . . for a practicing musician without [speculative] theory is like a blind man without a walking stick.<sup>2</sup>

The *Musica practica* of Ramos figures predominantly in the history of music theory because of Ramos's theoretical propositions that stand in direct opposition to Pythagorean-Boethian-Guidonian explanations of Western music. Although Ramos provides traditional explanations of such topics as the modes, counterpoint, *musica ficta*, and white mensural notation,<sup>3</sup> he proposes new approaches to aspects of

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<sup>1</sup>"Un puro e semplice cantore è come un corpo senza anima, perche senza buon contrapunto nesuno puo esser buon cantore . . ." Letter dated June 16, 1523 from Giovanni del Lago to Giovanni da Legge. See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 58r-71v or Bologna, Liceo Musicale MS B107-1, 111-116.

<sup>2</sup>". . . practicus enim sine theorica est tamquam caecus sine baculo." Letter dated May 6, 1535 from Giovanni del Lago to Lorenzo Gazio. See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 85r-101v or Bologna, Liceo Musicale MS B107-1, 135-162.

<sup>3</sup>The topics of the modes, counterpoint, and *musica ficta* are addressed in Part I of this dissertation; because Ramos subscribes to the traditional rhythmic concepts that were established by Franco of Cologne (ca. 1280), there is no need for a comparable discussion of rhythm. Although Ramos devotes an entire section of the *Musica practica* to the subject of rhythm, remaining true to his mission of practicality he avoids the detailed explanations of complex proportions that are typical of speculative treatises of the fifteenth century. Ramos concentrates upon only the

temperament, solmization, mutation, and to even the gamut itself. One of the most revolutionary concepts advanced by Ramos involves the determination of pitch proportions and their realization on the monochord. Ramos simplifies the Pythagorean ratios for the major and minor thirds from 81:64 and 32:27 to 5:4 and 6:5, respectively. This modification lays the foundation for Zarlino's dual system of harmony and contributes to the shift from a modal system to that of a tonal system.

Yet another innovative but controversial idea is Ramos's proposal for a new method of solmization and mutation. The application of Guido's system of solmization based upon the hexachords of *C*, *F*, and *G* had become a speculative encumbrance to the music of the late fifteenth century. With the rise in chromaticism and the general acceptance of hexachords on nearly every pitch--largely brought about by John Hothby's treatise *Calliope legale*--Ramos felt that the Guidonian system no longer served its original purpose of simplifying the task of the practicing musician. Ramos proposes a system containing eight notes, as opposed to six, based upon the syllables *Psal-li-tur per vo-ces is-tas*. This system, beginning on the note *C*,

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fundamentals of rhythm that would be applicable to the everyday demands of a practicing musician, providing an overview of the essential elements of note and rest values, coloration, and the proportional signs. An examination of Ramos's discussion in the *Musica practica*, Part 3, Treatise 1, Chapters 1-3 will suffice.

required only one mutation rather than the multiple mutations inherent in the Guidonian system. Because musicians had come to rely on the placement of *mi-fa* for the identification of the semitone's position, traditionalists were highly critical of Ramos's innovation. Despite the intense opposition to the new "octochordal" solmization method, Ramos's proposal was not overlooked by the theorists of succeeding generations; it provided the basis for the "fixed *do*" solfège of the Common Practice Period.

Invective and Repercussion: Music at the End  
of the Fifteenth Century

Ramos himself predicted the reactions and (false) accusations that he was to receive from his contemporaries. Ramos was accused of both failing to read and of failing to understand the speculative concepts of Boethius and Guido; however, it is quite evident from his discussions of theoretical concepts and from his criticism of individual theorists, that the charges of his contemporaries were unsubstantiated. Ramos, in fact, was an extremely literate musician-theorist.

Although Ramos was a Spaniard residing in Italy at the time that he wrote his treatise, he elected to continue the academic tradition of writing in Latin as opposed to the vernacular Spanish or Italian. Because Ramos was an innovative man who concentrated upon the practical aspects

of music, one might expect the *Music practica* to have been written in the vernacular. Ramos realized, however, that in order to refute the authority of his esteemed predecessors and exert any authority of his own, he must address the musical-scholarly community according to the typical academic conventions. Thus, the choice of Latin as the language for the *Musica practica* was a conscious effort in an attempt to establish himself as a respected scholar.

Ramos's harsh, vitriolic manner stands in stark contrast to that of his predecessors. It was customary for theorists, when criticizing other authors, to merely allude to those who represented a differing point of view. Ramos, however, does not hesitate to criticize his colleagues by name, nor does he hesitate to malign a number of the most revered musicians in history; such attacks were directed toward St. Gregory the Great, Odo of Cluny, Guido d'Arezzo, Marchettus de Padua, Johannes de Muris, Ugolino of Orvieto, Johannes Tinctoris, Tristan de Silva, Pedro de Osma, Johannes de Santo Domingo, Robertus Anglicus, John Hothby, and Roger Caperon.

Ramos's disdain for the traditions of the past and his rejection of the authority of Guido and Boethius created a great deal of controversy in the musical circles of Italy. Although Ramos's criticisms are valid, the disrespectful manner in which he presented those criticisms resulted in the inability of his colleagues to objectively assess them.

Due to a reverence for the *auctoritas* of the past and a loyalty to their own teachers, the reactions of Ramos's colleagues were charged with emotion. Such an impassioned environment resulted in a series of polemic attacks and responses. Participants in this long-running quarrel include such figures as the Italian theorists Nicolaus Burtius, Franchinus Gaffurius, and Giovanni Spataro, as well as the English theorist John Hothby. As might be expected, Ramos had several faithful disciples who held him and his theories with the highest esteem. Ramos's most ardent supporter, Giovanni Spataro, defended the personal character and theoretical concepts of his teacher long after the death of his mentor.

The first published response to the *Musica practica* is the *Musices opusculum* (1487) of Nicolaus Burtius.<sup>4</sup> Burtius, a former student of Ramos and a disciple of Johannes Gallicus of Mantua, vehemently attacks Ramos for his dissolution of the Guidonian hexachord system and for his proposal of a solmization system that is based upon the octave. Burtius not only criticizes Ramos's innovations, but insults Ramos personally, engaging in name-calling and highly emotional denunciations of Ramos's character.

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<sup>4</sup>Nicolaus Burtius, *Musices opusculum* (Bologna 1487), facsimile edition ed. Guiseppo Vecchi (Bologna: Forni Editore, 1969).

It would appear that Burtius's disapproving attitude toward Ramos runs deeper than his opposition to Ramos's controversial theories, which Burtius believed would undermine musical tradition. It is probable that Burtius's reactions are largely a result of a negative experience as a student under Ramos. In the *Honesta defensio* (1491) of Giovanni Spataro--which, for the most part, is a reaction to Burtius's attacks against Ramos--Spataro reminds Burtius of an occasion when he had presented a selection of his contrapuntal compositions to Ramos for examination; after examining them, Ramos advised Burtius to refrain from performing his compositions until he had learned more about counterpoint:

And do you not remember when you showed my very learned teacher some of your compositions which were composed with such ignorance that you were not even able to match the contrabass with the soprano? For if the tenor was a fifth or a third from the soprano, the contrabass was a fifth below the tenor, which resulted in a ninth or a seventh with the soprano. And when my teacher humbly instructed you to refrain from showing those songs of yours to anybody before you had learned a little more, you became stupidly enraged against his paternal correction.<sup>5</sup>

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<sup>5</sup>"E non ti ricorda quando al mio doctissimo maestro mostrasti certe tue compositione composte cum tanta ignorantia, che tu non concordavi il contra cum il soprano. Ma se el tenore era quinta o terza cum lo soprano, lo contra era quinta sotto il tenore, che veniva a essere una nona, o una septima cum lo soprano; e perche il mio maestro humilmente te disse non mostrar questi toi canti fora finche non hai imparato un poco, te adirassi, come pessimo, a la paterna corectione." See Giovanni Spataro, *Johannis Spadarii musices ac Bartholomei Rami Pareie Honesta defensio in Nicolai Burtii Parmensis opusculum* (Bologna, 1491), facsimile edition ed. Guiseppe Vecchi, vol. I, *Opera Omnia*

In his numerous references to Ramos, Burtius generally refers to his former teacher as "the prevaricator of the truth." Compared to some of the other slurs that are directed toward the Spanish theorist by Burtius--"the author of paradoxes," "father of an ox," and "the dung of Spain"--this epithet appears to be quite complimentary. Further characterizations of Ramos, offered by Burtius in the *Musices opusculum*, employ a host of descriptive adjectives: ignorant, arrogant, conceited, impudent, insolent, mad, irrational, malicious, worthless, crass, contradictory, perverted, and depraved.<sup>6</sup> It appears that Burtius and Ramos did not enjoy the most congenial of relationships; nevertheless, Burtius provides a nearly word-for-word reiteration of many of Ramos's explanations of counterpoint and rhythm in his own *Musices opusculum*.<sup>7</sup>

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*Johannis Spatarii* (Bologna: *Antiquae Musicae Italicae Monumenta Bononiensia*, 1967), ff. 2v-3r.

<sup>6</sup>See especially the Prologue of Burtius's *Musices opusculum*, ff. a2r-a4v.

<sup>7</sup>Nicolaus Burtius's discussion of rhythm in Chapters 1 and 2 of the *Musices opusculum* addresses many of the topics that Ramos discusses in Part 3, Treatise 1, Chapters 1-3 of the *Musica practica*. Burtius does not include all the variant prolational symbols that Ramos demonstrates, preferring to use only  $\odot$ ,  $\mathbb{C}$ ,  $\circ$ , and  $\mathbb{C}$ . See Burtius's, *Musices opusculum*, Treatise 3, ff. flr-f6r. For further discussion of Burtius's explanations of counterpoint which resemble Ramos's discussions in the *Musica practica*, see Chapter VIII of this commentary.

For the most part, Spataro's 1491 rebuttal to the *Musices opusculum* of Burtius ended Burtius's attacks upon Ramos. Most of the polemic debates in which Spataro engaged involved the Italian theorist and composer Franchinus Gaffurius. Much of what is known of these debates has been extracted from their respective published works, which also serve as an abundant source of information regarding the controversy between the Bolognese and Milanese schools.

Spataro launched his initial attack against Gaffurius in 1510 by way of an unpublished treatise entitled *Utile e breve regule di canto composte per Maestro Zoanne di Spadari da Bologna*.<sup>8</sup> Spataro's *Utile e breve regule di canto* was largely a reaction to Gaffurius's marginal annotations on the "errors of Ramos" that Gaffurius had inscribed in a copy of the *Musica practica* loaned to him by Spataro.<sup>9</sup> In a letter dated 27 November 1531, Spataro expresses his extreme displeasure for Gaffurius's unsolicited annotations:

I sent it--that is, the *Musica practica* of Bartolomeo Ramis--to Franchino in Milan. Sometime later he sent it back to me all spoiled and annotated with personal

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<sup>8</sup>Giovanni Spataro, *Utile e breve regule di canto* (Cod. Londi., British Museum, Add. 4920), facsimile edition ed. Guiseppe Vecchi, vol. I, *Opera Omnia Johannis Spatarii* (Bologna: Antiquae Musicae Italicae Monumenta Bononiensia, 1967).

<sup>9</sup>Gaffurius's Latin annotations, with English translation, are provided in the endnotes to the translation of the *Musica practica* contained in Part II of this dissertation. Whenever possible, the annotations appear according to Gaffurius's placement in Spataro's copy (the A-80 edition).



remarks against the author's viewpoint. It is [in] such [poor condition] that I really do not care to show it [to anyone], because other people, who do not understand the objectives of the author could easily believe what was written by Franchino. If I were able to find another [copy], I would buy it; and in order not to have these annotations be read [by anyone], I would cast this one that I have into the fire.<sup>10</sup>

Gaffurius responded to the *Utile e breve regule di canto* with a published treatise entitled *De harmonia musicorum instrumentorum opus*<sup>11</sup> (1518), to which Spataro responded by means of eighteen personal letters. It is unfortunate that this particular correspondence between Spataro and Gaffurius is no longer extant; these letters would have provided subsequent generations with a glimpse of the private, informal discussions that took place between two prominent music theorists of the sixteenth century.<sup>12</sup>

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<sup>10</sup>"Io la scilicet la Musica practica di Bartolomeo Ramis mandai a Milano a Franchino et lui dopo me la mando tuta sesquinternata et de sua mano appostilata contro lo auctore, in modo che non me curo che sia veduta, perche altri, che non intendono li termini de lo auctore, facilmente potriano credere a quello che fu scripto da Franchino; et se io ne trovasse un altra, io la compraria et, perche tale appostille non fussino vedute, io geteria questa che tengo nel foco." See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 228r-229v, a compilation of over 100 letters of famous personages that were collected by Giovanni del Lago. A copy of this letter can also be found in the Bologna, Liceo Musicale MS B107-3, 368-377. The Bologna manuscripts are a collection of seventy-seven letters, forty-eight of which were written by Giovanni Spataro.

<sup>11</sup>See Franchinus Gaffurius, *De Harmonia Musicorum Instrumentorum Opus*, intro. and trans. by Clement A. Miller (Neuhausen-Stuttgart, Germany: American Institute of Musicology, 1977).

<sup>12</sup>*Ibid.*, 20.

Gaffurius's second published attack against Ramos and his disciples appears in the *Apologia Franchini Gafurii Musici adversus Joannem Spatarium et complices musicos Bononienses* (1520).<sup>13</sup> The title of this treatise is indicative of the type of invective that was exchanged between Spataro and Gaffurius. Here, Gaffurius implies that Spataro is the ringleader of a band of musical "accomplices" in Bologna, as if to suggest that a criminal act had been committed.

Spataro replies to Gaffurius's *Apologia* with his *Errori di Franchino Gafuria da Lodi, da maestro Joanne Spatario, musico Bolognese, in sua defensione, e del suo precettore maestro Bartolomeo Ramis hispano subtilmente dimostrati*<sup>14</sup> and with his *Dilucide et probatissime demonstratione de Maestro Zoanne Spatario musico Bolognese contra certe frivole et vane excusatione da Franchino Gafurio (Maestro de li errori) in luce aducte* (both

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<sup>13</sup>See Franchinus Gaffurius, *Apologia Franchini Gafurii Musici adversus Joannem Spatarium et complices musicos Bononienses*, vol. XCVI, *Monuments of Music and Music Literature in Facsimile* (New York: Broude Brothers Limited, 1979).

<sup>14</sup>See Giovanni Spataro, *Errori di Franchino Gafuria da Lodi, da maestro Joanne Spatario, musico Bolognese, in sua defensione, e del suo precettore maestro Bartolomeo Ramis hispano subtilmente dimostrati* (Bologna, 1521).

1521),<sup>15</sup> completing his criticism of Gaffurius in his final treatise, entitled *Tractato di musica* (1531).<sup>16</sup>

In addition to Spataro, Ramos found an enthusiastic supporter in the famous Italian theorist and composer Pietro Aaron who, in his *Thoscanello* of 1523, referred to Ramos as "a most estimable musician, truly worthy of veneration by every learned person."<sup>17</sup> Aaron's first treatise, *Libri tres de institutione harmonica* (1516), entangled him in the on-going controversy between Gaffurius and Spataro.<sup>18</sup> During the course of their debates with Gaffurius, Spataro and Aaron developed a close friendship; the amiable letters that were exchanged between Spataro and Aaron provide

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<sup>15</sup>See Giovanni Spataro, *Dilucide et probatissime demonstratione de Maestro Zoanne Spataro musico Bolognese contra certe frivole et vane excusatione da Franchino Gafurio (Maestro de li errori) in luce aducte* (Bologna, 1521), facsimile edition ed. Johannes Wolf (Berlin: Martin Breslauer, 1925).

<sup>16</sup>See Giovanni Spataro, *Tractato di musica* (Venice, 1531), facsimile edition ed. Guisepe Vecchi (Bologna: Forni Editore, 1970). This treatise addresses the difficult topic of proportional notation and points out Gaffurius's "errors" in this regard.

<sup>17</sup>"Bartholomeo rami musico dignissimo, veramente da ogni dotto venerato . . . ." See Stevenson, *Spanish Music in the Age of Columbus*, 59-60 and Pietro Aaron, *Thoscanello*, facsimile of the Venice 1523 edition, vol. LXIX, *Monuments of Music and Music Literature in Facsimile* (New York: Broude Brothers Limited, 1969), fol. 33v.

<sup>18</sup>See Pietro Aaron, *Libri tres de institutione harmonica*, vol. LXVII, *Monuments of Music and Music Literature in Facsimile* (New York: Broude Brothers Limited, 1976).

invaluable insight on the nature of the disputes between Spataro and Gaffurius.<sup>19</sup>

Ramos's proposal of a solmization system that contained a single mutation was not only a reaction to the Guidonian hexachord but was a response to the theoretical propositions of the English theorist John Hothby. In the treatise *Calliope legale*, Hothby advocates the placement of hexachords on all twelve pitches of the chromatic scale. In principal, Ramos concurs that hexachords are indeed possible at other locations than those established by Guido on C, F, and G; however, Ramos criticizes Hothby's insistence upon the employment of Guidonian solmization with the twelve hexachords due to the excessive number of complicated mutations that ensue from such arrangements. Hothby defends his theory, citing the authority of the ancients, in three treatises: *Dialogus Johannis Ottobi Anglici in arte musica*, *Excitatio quaedam musicae artis per refutationem*, and the *Epistola*.<sup>20</sup>

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<sup>19</sup>See Knud Jeppesen, "Eine musiktheoretische Korrespondenz des früheren Cinquecento," *Acta Musicologica* 13 (1941): 3-39. See also Bonnie J. Blackburn, Edward E. Lowinsky, and Clement A. Miller, *A Correspondence of Renaissance Musicians* (Oxford: Clarendon Press, 1991).

<sup>20</sup>See Albert Seay, ed., *Johannis Octobi tres tractatuli contra Bartholomeum Ramum*, vol. X, *Corpus Scriptorum de Musica* (Rome: American Institute of Musicology, 1964). The *Excitatio* is of special interest to the present study; this treatise contains quotations that have been extracted from the *Musica practica* followed immediately afterwards by Hothby's opposing viewpoints.

In the *Dialogus*, Section V, Hothby takes Ramos to task for his assumption that one can determine the mensuration of a composition without the assignment of a time signature. Hothby's reaction to Ramos's rebuke concerning the "errors of excess" has been repeated by other theorists and musicologists in subsequent centuries; it is a reaction that has resulted from a misunderstanding of Ramos's intentions, derived from an extraction of the following statements from the *Musica practica*:

For there is no real purpose for things to be done by many means which can be done by fewer means.<sup>21</sup>

Therefore, just as those who, lacking foresight, err by defect [when they] decide that the species without any sign is perfect, thus also, those who add another [sign] err by excess, since the perfect can be distinguished by one [sign]. For example, if a rest of a long occupies three spaces within a song, they err who add this sign  $\bigcirc$ 2; likewise also if two rests of a semibreve are found in this way  $\equiv$ , [then] this  $\bigcirc$  or this  $\odot$  is placed superfluously if minim rests are arranged in this way  $\equiv$ ; especially if both are found, since otherwise, anyone could say it was placed for the purpose of indicating that which was lacking.<sup>22</sup>

Hothby assumes from these statements that Ramos is advocating the abolishment of mensuration signs. Hothby argues that, if time signatures were really unnecessary, it would follow that all other musical symbols upon which

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<sup>21</sup>Bartolomeo Ramos de Pareia, *Musica practica* (Bologna: Enrico de Colonia, Biblioteca del Conservatorio, Liceo Musicale; oggi civico Museo Bibliografico Musicale, 11 maggio, 1482), 67.

<sup>22</sup>Ibid., 70.

musicians have come to rely upon might likewise be abolished! Hothby concludes his discussion in the *Dialogus* with a rhetorical question, asking if a musician could actually understand an entire composition without any written symbols whatsoever.<sup>23</sup>

Clearly, Ramos was not advocating an abolishment of all the symbols that clarify the perfection and imperfection of a composition. As a theorist with a proclivity for *musica practica*, Ramos demonstrates that one could determine the mensuration by examining merely the values of the rests in a composition, rather than by relying on a multitude of symbols that only complicate matters of mensural notation. Clearly, Hothby's criticism that Ramos sought to abolish all notational symbols is quite absurd and cannot be taken seriously.

### Conclusion

The *Musica practica* of Bartolomeo Ramos de Pareia has long been recognized as a significant and controversial cornerstone in the history of music theory. Ramos's innovations with regard to tuning and his proposal that musicians use the octave, rather than the Guidonian hexachord, as a basis for theoretical organization have had a profound and long-lasting impact upon the development of

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<sup>23</sup>See Albert Seay, "The Dialogus Johannis Ottobi Anglici in arte musica," *Journal of the American Musicological Society* VIII (1955): 98.

Western music. Ramos's more "radical" theories served as the source of polemic debate for decades to come, and his disciples--loyal and persistent--succeeded in preserving and transmitting his ideology to future generations.

Several respected twentieth-century musicologists have dismissed Ramos as an inconsequential figure in the development of music theory. This attitude can be attributed primarily to two factors: the lack of an English translation and critical evaluation of the *Musica practica*, and out-of-context translations of fragments that have resulted in both accidental and willful misrepresentations of Ramos's intent.

Upon investigation of the *Musica practica*, it is clear that many of Ramos's contemporaries "borrowed" his ideas without giving him due credit. Ramos's ideas appear, without proper attribution, in the treatises of the most celebrated music theorists of the fifteenth and sixteenth centuries, including Nicolaus Burtius, Pietro Aaron, Ludovico Fogliano, and Gioseffo Zarlino. While it is beyond the scope of this study to thoroughly investigate all the innovations proposed by Ramos, to assess their impact upon the discipline of the history of music theory, and to decipher the real and invented quarrels that ensued among Ramos's supporters and opponents, it is hoped that this translation and critical evaluation of Ramos's *Musica*

*practica* will facilitate future studies in the history of theory discipline.



## CHAPTER II

### THE BIOGRAPHY OF BARTOLOMEO RAMOS DE PAREIA

The musical theories of Bartolomeo Ramos de Pareia became widespread across Spain and Italy with the publication of his *Musica practica* (1482); whatever biographical information that may be surmised about the author, however, must be gleaned primarily from the *Musica practica* itself and from correspondence that ensued between two of Ramos's disciples--Giovanni Spataro and Pietro Aaron.

The colophon of the *Musica practica* (A-80) states that Ramos de Pareia was born in Baeza, a small city in the province of Baetica (currently the diocese of Jaén in southern Spain), itself within the jurisdiction of Gienna; the designation "de Pareia," however, remains a mystery. In the foreword to a recent Latin-Spanish translation of the *Musica practica*, Enrique Sánchez Pedrote suggests that the designation "de Pareia" may stem from a patronymic derivation.<sup>1</sup> Attempts to uncover a record of Ramos's birth in the archives of Baeza and Jaén, however, have been unsuccessful.

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<sup>1</sup>Bartolomeo Ramos de Pareia, *Musica Practica*, trans. José Luis Moralejo, with an introduction by Enrique Sánchez Pedrote (Madrid: Alpuerto Editorial, 1977), 7.

The exact date of Ramos's birth remains unknown; based upon the events of his life, however, we are able to surmise an approximate date of birth of 1440. The primary basis for this conjecture is a statement in the *Johannis Spadarii musices ac Bartholomei Rami Pareie honesta defensio in Nicolai Burtii Parmensis opusculum* (1491), in which Spataro informs us that Ramos spent ten years in writing the *Musica practica* before its publication in 1482:

Read a little of that profound doctrine of my [teacher] Pareia and you will understand the truth. For ten years had already passed since he had written that book and still he did not wish to publish it. However, the entreaties of his friends have been so enthusiastic that perhaps he will publish the third part.<sup>2</sup>

Moreover, Ramos himself mentions in the Prologue to the *Musica practica* that, over a lengthy duration, he had extracted information from the primary treatises of the discipline in order to provide a compendium and summary for the student:

After a long period of many sleepless nights and continual nocturnal studies, I have been able to collect [information] from the readings of the most esteemed authors and from the instruction of the most famous teachers. From this [effort]--as if from some overflowing and general source--one will be permitted with extremely quick and easy study to absorb all

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<sup>2</sup>"Legi un poco quella piena doctrina del mio Pareia et intenderai la verita, che za erano diece anni che havea facto quel libro: et anchora non lo voleva porre fora: se non che tanto furono li preghi de li amici, che quasi la terza parte divulgò." Spataro, *Honesta defensio*, fol. 14.

[these things] and reach the highest pinnacle of music by the most tranquil course.<sup>3</sup>

Having such a familiarity with the theories of both his predecessors and his contemporaries, it is reasonable to assume that Ramos was a mature musician by the publication of the *Musica practica* in 1482 and, consequently, it is reasonable to suggest a birth year of 1440 in the absence of any reliable documentation.

An examination of Ramos's treatise reveals that its author was indeed well-educated. To the credit of the author, much of his knowledge appears to have been self-acquired; he acknowledges only a single teacher--the Spaniard Juan de Monte, "who was the first to instruct me in the rudiments of music . . .,"<sup>4</sup> and whom Ramos elevates to the status of such musical celebrities as Ockeghem, Busnois, and Dufay.<sup>5</sup> The exact dates or duration that Ramos was in contact with Juan de Monte is unknown; what is known is that de Monte was highly respected both as a practicing musician-theorist, and that he served as cantor at the pontifical chapel of Nicolas V between 1447-57.

As one might expect, artistic and literary records provide no information about Ramos's physical appearance.

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<sup>3</sup>Ramos de Pareia, *Musica practica*, 1.

<sup>4</sup>"qui fuit primus qui me musices imbuit rudimentis . . ." Ibid., 69.

<sup>5</sup>"Et istud servat Ockeghem, Busnois, Dufai et Johanis de Monte et alii viri in hac facultate famosi." Ibid., 66.

A brief remark by Spataro, however, in response to the sarcastic remarks expressed by Nicolaus Burtius in his *Musices opusculum*,<sup>6</sup> confirms that Ramos was short of stature (this response also gives us a glimpse of Spataro's loyalty and his determination to defend his teacher against even the most inconsequential of criticisms):

By saying that he is a short man, you [Burtius] actually honor him, since the majority of learned men are short rather than tall, and the reason is this: their head is closer to their heart.<sup>7</sup>

#### Ramos's Tenure at the University of Salamanca

The first professorship of music acquired by Ramos was at the University of Salamanca, a chair that had been established in the thirteenth century by Alfonso X "el Rey Sabio" as the first chair of music in a European university. University records indicate that Ramos held this position for several years, beginning in 1452. The position was

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<sup>6</sup>"Condoleo patres ac fratres venerandi de huius homuncionis insulsissimi ostentatione et arrogantia omnino deridenda, qui veluti stercus in Hispaniae finibus velit his sanctissimis patribus doctrina, consilio, prudentiamque, nec non et sanctitate praeponi. O insaniam! O verecundiam non ferendam!" Translation: "Venerable fathers and brothers, I feel severe pain on account of the ostentation and complete arrogance of this very silly little man who, as the dung of Spain, desires after death to be placed above these most holy fathers as a result of his teaching, judgment, prudence, and integrity. O how insane! O the unbearable shame [of it all]!" Burtius, *Musices opusculum*, fol. c2v.

<sup>7</sup>"In quello che tu dici lui esser homo piccolo, li fai grande honore, perche li homini piccoli sono la maggior parte piu docti che li grandi e la ragione e questa: perche hanno il capo piu appresso al core." Spataro, *Honesta defensio*, fol. 19v.

undoubtedly prestigious, given the fact that Salamanca was one of the most important cultural and humanistic centers in the fifteenth and sixteenth centuries. Music played a prominent role in the academic affairs and traditions at the university.<sup>8</sup>

A royal decree of 1538 established the duties of the professor of music to include addressing the various topics of *musica speculativa* for half the available lecture allotment, with the remaining class time expended on aspects of *musica practica*: plainsong, mensural music, and the writing of counterpoint exercises. These statutes also reveal that lectures in the discipline of music, along with those in astrology and *gramatica de menores*, were not invariably delivered in Latin, but that lectures in the vernacular were acceptable.<sup>9</sup> Although these statutes were confirmed in 1538 (somewhat later than Ramos's tenure at the university), they provide insight into the academic atmosphere that Ramos must have enjoyed while residing in Salamanca.

The long history of theoretical disputations between Ramos and his contemporaries begins in Salamanca with Pedro Martínez de Osma, a professor of music and theology residing

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<sup>8</sup>Nan Cooke Carpenter, *Music in the Medieval and Renaissance Universities* (Norman, Oklahoma: University of Oklahoma Press, 1958; reprint, New York: Da Capo Press, 1973), 210.

<sup>9</sup>*Ibid.*, 210-12.

at the university from 1463-78. It appears that the source of this particular dispute stemmed from Ramos's lectures on the teachings of Boethius, particularly in regard to the *differentia musicae* and the implementation of the diatonic, chromatic, and enharmonic genera in modern practice.

Evidently, Ramos responded to Pedro de Osma's attacks with his first treatise, written in the vernacular Spanish. This treatise is, unfortunately, no longer extant; proof of its existence, however, stems from a citation in the *Musica practica*, in which Ramos proudly declares himself to be the victor of the dispute:

However, we have already refuted this publicly in his [Pedro de Osma's] presence when we were doing research in Salamanca, and in the treatise that we published in the mother tongue while on the faculty there. We have contradicted him on everything to such a degree that he himself, after viewing and examining my treatise, said: "I am not as familiar with Boethius as he is."<sup>10</sup>

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<sup>10</sup>Ramos de Pareia, *Musica practica*, 32. This treatise is also referenced in Book IV Chapter 4 of Pietro Aaron's *Lucidario in musica*: "Et Bartolomeo Rami in un certo suo compendio composto in lingua materna dice che gli antichi dicevano che il contrapunto ovvero organizatione non era altro che considerare la consonanza che fanno duoi soni ovvero due voci o piu una piu acuta o piu grave dell'altra giuntamente profferite." Translation: "And Bartolomeo Ramis in a certain one of his compendiums written in the mother tongue says that the ancients believed that counterpoint--that is, organum--was nothing other than considering the consonance that two sounds or two voices--either one higher or lower than the other--produce when they are sounded at the same time." Pietro Aaron, *Lucidario in musica*, vol. LXVIII, *Monuments of Music and Music Literature in Facsimile* (New York: Broude Brothers Limited, 1978), fol. 18v.

In Pedro de Osma we find a scholar with the true humanistic spirit of intellectual honesty. Shortly after this public debate, Pedro de Osma and Ramos became friends and continued to engage in congenial academic dialogue for many years thereafter. It should be noted, however, that the nature of the dispute between Pedro de Osma and Ramos was quite unlike the malicious polemics that were to later ensue between Ramos and his critics at the end of the fifteenth century.

The dispute with Pedro de Osma was not the only academic challenge for Ramos during his tenure at Salamanca. It appears that Ramos engaged in a another debate with Tristan de Silva--a Spanish poet and musician who served at the chapel of the Portuguese king, Alfonso V--regarding the nature of the conjunct and disjunct tetrachord. Despite their disagreement, however, Ramos appears to have a great deal of respect for de Silva, referring to him as "the Spaniard Tristan de Silva--our dearest friend, and a man with the most sagacious talent."<sup>11</sup> Further, in his section on counterpoint in the *Musica practica*, Ramos cites Tristan de Silva as an authority in matters of employing the diapente and the semidiapente in succession.<sup>12</sup> Even while

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<sup>11</sup>Ibid., 12.

<sup>12</sup>"Tristanus vero de Silva in quinta, ut ait, non prohibetur taliter, quoniam potest fieri quinta post quintam, dum tamen una sit semidiapente, alia vero diapente, sicut reperimus in cantilena *Sois emprantis* et in aliis

noting their points of disagreement, Ramos is careful to maintain that such differing points of view do not affect their long-standing friendship. Such is the case in the passage where Ramos discusses Tristan's endorsement of Johannes de Muris's view of perfect and imperfect prolation, an opinion that Ramos perceives as faulty in light of the doctrine of ancient authorities:

And it is not known by all the singers how the perfection or imperfection is distinguished in the *prolatio maior*, nor [is it known] by some musicians, such as our friend Tristan de Silva, who affirms the vulgar opinion of Johannes de Muris [by] saying: "The *prolatio perfecta* is major and the [*prolatio*] *imperfecta* is minor." We wish to reject this, first with the authority of the ancients and [then] with an example and mathematical demonstration of the progressive moderns.<sup>13</sup>

As in the case of the debate with de Osma, the dispute between Ramos and de Silva was relatively mild compared to the later attacks that would be made by Burtius, Hothby, and Gaffurius.<sup>14</sup>

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antiquioribus." Translation: "For as Tristan de Silva says, 'It is not prohibited in such a manner on the fifth, since a fifth after a fifth can be made as long as one is a semidiapente and the other is a diapente, as we find in the song *Sois emprantis* and in other more ancient [songs].'" Ibid., 51.

<sup>13</sup>Ibid., 68.

<sup>14</sup>The only other musician of whom Ramos speaks with such fondness is Johannes de Urrede, a Flemish composer active in Spain during the second half of the fifteenth century who served as Kapellmeister for Ferdinand V. Ramos expresses his high esteem for de Urrede, referring to him as "carissimus noster regis Hispaniae capellae magister." Ibid., 67.



In the epilogue of the *Musica practica*, Ramos refers to a second treatise that he had written in the vernacular during the Salamanca period--the *Introductorium* or *Isagogicon*. Our only knowledge of this document comes from remarks that Ramos himself provides in the *Musica practica*, in which he recommends this treatise to the musician who seeks an easier path in an attempt to avoid the tedious arguments of *musica speculativa*:

But whoever desires to take the true and easy path of this discipline without the obscurity of arguments [and] without the long digressions of demonstrations and disapprobations, let him seek our little music book which we have entitled *Introductorium* or *Isagogicon*. There you will find in abundance the most vital issues of theory [stated] briefly and clearly. And when you wish to fortify those things which you will see there with reasons and consider them in more depth, you will return to this work which [acts] as a refuge and a bulwark for that [other work].<sup>15</sup>

Ramos's growth as a scholar is clearly demonstrated by his authorship of two treatises while residing in Salamanca. His compositions of this period include various canons, a requiem, a mass, and a *Magnificat*; however, only one of these works--a four-voice circle canon--remains extant for examination.<sup>16</sup>

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<sup>15</sup>Ramos de Pareia, *Musica practica*, 82.

<sup>16</sup>See Chapter IX of this commentary for a discussion, facsimile, and transcription of this canon.

Speculations on Ramos's Place of Residence (1472-82)

Ramos eventually left Salamanca for Italy, although the specific reasons for this departure and his location of immediate resettlement are unknown. It is possible that Ramos may have been asked to leave the faculty at the University of Salamanca because of his unpopular theories and the heated debates that were fueled by such theories. Clemente Terni, historian of theory and author of a Spanish translation of the *Musica practica*, suggests that Ramos may have immediately settled in Naples. Terni bases this argument on the polemics that were directed towards Johannes Tinctoris in the *Musica practica*; polemics which address the specific theories that were held by Tinctoris and which may have been the result of Ramos's provocative discussions with Tinctoris during his residence in Naples. Terni acknowledges, however, that his evidence is tenuous at best, and speculates that Ramos may have alternatively visited the northern Italian cities of Orvieto, Perugia, and possibly Arezzo--the home of his predecessor and academic adversary, Guido d'Arezzo.<sup>17</sup>

Different locales have been proposed for Ramos's place of residency in the period 1472-82. Some historians believe that Ramos was in Bologna as early as 1472, delivering

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<sup>17</sup>Bartolomeo Ramos de Pareja, *Música Práctica*, trans. Clemente Terni, vol. 2, *Estudio Preliminar, Edición Y Comentarios* (Madrid: Joyas Bibliográficas, 1983), 21.

public lectures and completing the first volume of the *Musica practica*; others argue that Ramos spent the Salamanca-Bologna interim in Florence. The latter theory is based upon: (1) the testimony of Ramos's student, Giovanni Spataro, who relates that Ramos visited Florence to review the choral books at the Church of the SS. Annunziata;<sup>18</sup> (2) the appearance of Ramos's four-voice canon *Sive lidium in synēmmenōn* in a Florentine codex,<sup>19</sup> which includes illuminations from the Florentine artists Gherardo and Monte di Giovanni del Flora who were active in Florence during the latter portion of the fifteenth century;<sup>20</sup> and (3) John Hothby's reference to "ipsi quoque Florentini" [Ramos and his Florentine associates] in the first section of the *Dialogus Johannis Ottobi Anglici in arte musica*.<sup>21</sup>

Previously discussed is the comment by Spataro that Ramos spent the ten years 1472-82 in writing and editing the *Musica practica*. Albert Seay proposes that, because Spataro

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<sup>18</sup>See Spataro, *Honesta defensio*, fol. 15v.

<sup>19</sup>Florence, Biblioteca Nazionale Centrale, Banco Rari 229, fol. 3v. See Howard Mayer Brown, ed., *A Florentine Chansonnier From the Time of Lorenzo the Magnificent: Florence, Biblioteca Nazionale Centrale MS Banco Rari 229*, vol. VII, *Monuments of Renaissance Music* (Chicago: The University of Chicago Press, 1983), 16-22 and plate II.

<sup>20</sup>See Albert Seay, "Florence: The City of Hothby and Ramos," *Journal of the American Musicological Society* IX (1956): 193-95.

<sup>21</sup>See Seay, "The Dialogus Johannis Ottobi Anglici in arte musica," 91-92.

does not identify the specific city in which Ramos completed the *Musica practica*, it is possible that Ramos finished and circulated the treatise in Florence before his departure for Bologna. The fact that Hothby indirectly (and derogatorily) refers to Ramos and his followers as "these Florentines" is offered as support for this argument. As further evidence, Seay refers to a letter by Hothby that was addressed to a Florentine priest;<sup>22</sup> here Hothby complains about Ramos's disrespect toward him personally, and claims that Ramos's radical theories are accepted by neither the Florentine musical community nor by the rest of the world.

Claude Palisca takes issue with Seay's conclusions in his article on Ramos in *Die Musik in Geschichte und Gegenwart*, proposing that Ramos spent time in Florence after, but not before, his residence in Bologna. Palisca argues that the canon *Sive lidium in synēmmenōn* was written after the *Musica practica*, and dismisses Hothby's letter to the Florentine priest as inconsequential evidence, viewing this letter as merely a request that the priest pass along Hothby's reaction to the attacks that were directed against him by Ramos in the *Musica practica*. Palisca believes that the *Musica practica* was, in fact, written in Bologna. He supports this opinion by reference to a remark by Nicolaus Burtius in the *Musices opusculum* in which Burtius states

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<sup>22</sup>Magliabecchiana XIX, 36, fol. 74. Ibid.

that he lent his copy of a Guidonian manuscript to Ramos in Bologna.<sup>23</sup> It is suspected that the specific work loaned by Burtius was Guido's *Micrologus*--a work that Ramos later criticized in his *Musica practica*.

#### Ramos in Bologna

It is possible that Ramos arrived in Bologna prior to 1482. The colophon to the *Musica practica* states that Ramos had been presenting public readings about music--for an unspecified period--prior to the publication of the treatise.<sup>24</sup> There is little doubt, however, that Ramos was living in Bologna by 1482; for this was the year that the *Musica practica* was published and its colophon clearly identifies Bologna as the city of publication.

The Archivio di Stato di Modena holds a letter from the Bolognese nobleman Floriano Malvezzi to the Duke of Ferrara--Hercules I of Este--that confirms Ramos's lectures on music in 1482. In this letter, Malvezzi refers to Ramos

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<sup>23</sup>"Legisti aliquando private guidonis opusculum: Dum esses bononie: a me prestitum: et a te non intellectum." Translation: "While you were in Bologna you read Guido's little book in private that you borrowed from me, and you did not understand [it]." Burtius, *Musices opusculum*, fol. a2v.

<sup>24</sup>The A-80 edition of the *Musica practica* states: ". . . almae urbis Bononiae, dum eam ibidem publice legeret impressa . . . ." Translation: "[For] it was published in the nourishing town of Bologna while he lectured publicly there . . . ." The A-81 edition states: ". . . cum publice musicam Bononiae legeret . . . ." Translation: ". . . [published] while he lectured publicly on music in Bologna. . . ." See Ramos de Pareia, *Musica practica*, 82.

as "that Spaniard who publicly lectures on music in Bologna."<sup>25</sup> Gaffurius also substantiates Ramos's public readings in Bologna with a comment regarding Ramos's motet *Tu lumen tu splendor patris*:

But your teacher's song *Tu lumen tu splendor patris* (which the illiterate wrote while lecturing publicly in Bologna), enlightened [us] to his practice of the enigmatic canon with an arrangement of the tenor in this succession of the third with the fourth.<sup>26</sup>

Ramos himself affirms his public lectures in Bologna and the composition of his work, *Tu lumen tu splendor patris*, with a brief remark in the *Musica practica*:

But in the motet *Tu lumen* where we have established *In perfectione minimorum per tria genera canitur melorum* (which we composed while we lectured publicly in Bologna), we recommended that any note be worth six measurements by means of syllables designated on lines and spaces . . . .<sup>27</sup>

Ramos was evidently quite satisfied with this motet due to the fact that it could be performed by implementing

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<sup>25</sup>" . . . quello Spagnolo, che lege publice a Bologna musica." See Oscar Mischiati, "Un'inedita testimonianza su Bartolomeo Ramis de Pareia," *Fontes Artis Musicae*, XIII/I (1966): 84-86.

<sup>26</sup>"At cantici ipsius praeceptoris tui *Tu lumen tu splendor patris*, quod, dum Bononiae illitteratus tamen publice legeret, adnotavit, tenoris hoc ordine descripti quarto tertii practicae suae enigmatis canonem sic elucidavit." Gaffurius, *Apologia*, fol. 8v. Note that Gaffurius does not miss any chance to demonstrate his disdain for Ramos, here referring to him as "an illiterate."

<sup>27</sup>"Sed in moteto *Tu lumen* ubi posuimus: *In perfectione minimorum per tria genera canitur melorum*, quod Bononiae, dum publice legeremus, composuimus, insinuavimus quamlibet vocolam per syllabas in lineis et spatiis denotatas 6 mensuras valere . . . ." Ramos de Pareia, *Musica practica*, 71.

all three of the genera; not only could it be sung with the tenor moving diatonically, but chromatically and enharmonically as well. Gaffurius was less impressed, however, submitting his opinion that Ramos was "never able to grasp the true meaning of the chromatic and enharmonic genera."<sup>28</sup>

Spataro asserts that Ramos was drawn to the city of Bologna in the hope of receiving the chair in music at the University of Bologna. In anticipation of being offered such a position, Ramos had written the *Musica practica* with plans for two additional volumes. In the *Musica practica*, Ramos promises the reader a more thorough explanation of various topics--topics that were discussed only superficially in the *Musica practica*. Ramos pledges to address the more difficult speculative topics in a forthcoming *Musica theorica* and *Musica semimathematica*; unfortunately, this tripartite structure was never realized.

The University of Bologna was a logical career advancement for Ramos. As in other universities of the time, music at the University of Bologna had previously been taught by private teachers who collected payment directly from their students; at the beginning of 1450, however, Nicholas V established an endowed position in music at the

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<sup>28</sup>"Inde enigma et canonem ipsum Bartholomaeus praeceptor tuus, quem imitaris non sane disposuit neque ipsorum generum spissorum formalem naturam intellexit." Gaffurius, *Apologia*, fol. 9v.

university. Unfortunately for Ramos, this position was soon abolished due to the opposition of the mathematics faculty, who felt that the traditional connection between mathematics and music should not be severed. Realizing that the dream of a salaried position in Bologna would not be realized, and distraught over the mounting controversy created by his *Musica practica*, Ramos prepared to leave the city.

It has been proposed that the date of Ramos's departure from Bologna was after 1484; this date is based upon Spataro's testimony that he possessed a "small treatise" given to him by Ramos in 1484 that was written in his teacher's own handwriting:

That doctrine is not my own; however, I have extracted it from a small treatise that was given to me by my teacher in the year 1484, and that treatise was written by his own hand.<sup>29</sup>

The date of the post 1484 departure, however, is based upon the assumption that Ramos was actually in Bologna when he gave the treatise to Spataro. It is quite possible that Ramos had already left Bologna by 1484, and that he sent the treatise to Spataro from Rome; it is equally plausible that Spataro may have visited Ramos in Rome and received the treatise at that time.

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<sup>29</sup>"Tale doctrina non e mia; ma io l'ho havuta da un piculo tractato, el quale me fu donato dal mio preceptore de l'ano 1484, el quale tractato tengo scripto de sua propria mano." See Gaetano Gaspari, *Ricerche Documenti e Memorie risguardanti la storia dell'arte musicale in Bologna* (Bologna, 1867), 6.



One can speculate that this "small treatise" may have been an unfinished manuscript of Ramos's proposed *Musica theorica*. Spataro was, in fact, later accused of possessing unpublished works of his master and of using them to strengthen his arguments against his teacher's detractors-- an accusation that Spataro strongly denied in a letter to Pietro Aaron dated 13 March 1532:

There have been many who believed that I have his complete treatise, and that I have kept it hidden in order to keep my thefts from being discovered, but I assure you that they are gravely mistaken.<sup>30</sup>

#### Ramos in Rome

Little is known about Ramos after his departure from Bologna; what little information is known comes from the *Honesta defensio* (1491) in which Spataro relates that Ramos was living in Rome and was enjoying success as a well-respected member of the musical community:

. . . after he departed from us, appreciation for him grew dramatically . . . and you know that he is in Rome now where his merits are recognized more than they were here among us, since very learned men in each and every doctrine come together there. He is esteemed there as master of masters just as, among us, he is well-known by the wisest men of this art whom you ignore.<sup>31</sup>

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<sup>30</sup>"Son stati multi, li quali hano creduto che Io habia tale suo tractato complecto et che Io el tenga oculto, aciochè li mei furti non restino scupertti; ma certamente sono in grande errore." See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 236r-v or Bologna, Liceo Musicale MS B107-3, 399-401.

<sup>31</sup>". . . da poi che lui si parti da nui senza proportionione sonno le laude sue cresciute . . . e adesso perchè tu sai che lui e a Roma, dove assai piu sonno le

The exact date of Ramos's death is unknown. In a letter to Aaron dated 13 March 1532, Spataro provides information regarding the possible reasons that Ramos left Bologna as well as his own theory regarding the cause of his teacher's death:

As far as the work of my teacher is concerned (which you desired to have [in its] entirety and complete), I can tell you for sure that he never finished it, and [even] the one that is available is incomplete. This is due to the fact that he had part of it printed in Bologna, because he believed that he was going to read it in public [for which he would receive] a stipend. Then, because of various reasons, it happened that he did not obtain the public lectureship and he went off to Rome rather angry, taking with him all the printed parts with the intention of delivering them in Rome. However, he never delivered them [there]; for he devoted himself to a lecherous lifestyle which was the cause of his death.<sup>32</sup>

François Joseph Fétis, in his *Biographie Universelle des Musiciens et Bibliographie Générale de la Musique*, proposes that Ramos was still alive as late as 1521. Fétis

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virtu sue cognosciute che qui fra nui, perche ivi concorreno homini in ciascuna faculta doctissimi: et e tenuto per maestro delli maestri come fra nui e noto da homini sapientissimi in questa da te ignorata arte." Spataro, *Honesta defensio*, fol. 23r.

<sup>32</sup>"In quanto a l'opera del mio preceptore, la quale desiderati de haver tuta et complecta, Ve dico certamente che lui ma non dete complemento a tale opera, et quella che se trova non e complecta, perche lui fece stampare a Bologna tale particole, perche el se credeva de legerla con stipendio in publico. Ma in quello tempo acade che per certe cause lui non hebe la lectura publica, et lui quasi sdegnato ando a Roma et porto con lui tute quelle particule impresse con intentione de fornirle a Roma. Ma lui non la fornite mai, ma lui attendeva a certo suo modo de vivere lascivo, el quale fu causa della sua morte." See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 236r-236v or Bologna, Liceo Musicale MS B107-3, 399-401.

based this assumption upon the premise that Spataro, having published the *Errori* in that same year, would have mentioned the death of his teacher had such a tragedy occurred.<sup>33</sup> Spanish historians Higinio Anglés and Enrique Sánchez Pedrote support Fétis in this assumption.<sup>34</sup> Conversely, Stevenson notes that Gaffurius, in his *Apologia* (1521), writes that Ramos has "long been dead".<sup>35</sup> Whether Gaffurius is speaking in the literal or figurative sense cannot, of course, be known with certainty.

#### Conclusion

The *Musica practica* is the only extant treatise written by the controversial Spanish theorist, Bartolomeo Ramos de Pareja. Although biographical information about Ramos must be gleaned primarily from private correspondence between Pietro Aaron and Giovanni Spataro, and the on-going controversy between the latter and Franchinus Gaffurius, the treatise itself is rich in content and includes comments upon the teachings of other fifteenth-century theorists.

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<sup>33</sup>François Joseph Fétis, *Biographie Universelle des Musiciens et Bibliographie Générale de la Musique*, 2nd ed., s.v. "Ramis ou Ramos de Pareja ou Pereja," (Paris: Firmin-Didot, 1870-75), VII: 176-79.

<sup>34</sup>See Higinio Anglés's *Diccionario de la Música Labor*, s.v. "Ramos de Pareja," and Enrique Sánchez Pedrote's introduction to the Latin-Spanish translation of the *Musica practica* by José Luis Moralejo, 5.

<sup>35</sup>". . . quanquam culpae mortuos leue sit non responsuros . . ." Gaffurius, *Apologia*, fol. a5r. See also Stevenson, *Spanish Music in the Age of Columbus*, 56.

In the *Musica practica*, Ramos claims to have written a Spanish treatise concerning his teachings on Boethius at the University of Salamanca as well as a Latin treatise on the fundamentals of music; however, neither treatise is extant. In the *Musica practica*, Ramos discusses several of his own musical compositions; unfortunately, only the four-voice canon *Sive lidium in synēmmenōn* has survived. Further evidence of his compositional style would perhaps provide a clearer understanding of his theoretical propositions as well as recognition of his talent as a musician. Perhaps, these lost treatises and compositions may one day be rediscovered to shed further light on this most colorful figure in the history of music theory.

### CHAPTER III

#### THE DIVISION OF THE MONOCHORD ACCORDING TO BARTOLOMEO RAMOS DE PAREIA

The attacks that were directed toward Ramos personally and toward his theoretical proposals focus primarily upon two propositions: his alteration of traditional Pythagorean tuning and his elimination of the hexachordal system as the organizing framework of Western music theory. Due to its affect upon traditional Pythagorean tuning, Ramos's division of the monochord ultimately required him to abandon the Guidonian hexachordal system. For the fifteenth-century theorist, however, the concept of *auctoritas* was an issue that demanded respect. Ramos's open disregard for the traditional reverence of the ancients was the insurmountable obstacle that led to the unwillingness, and even inability, of his contemporaries to consider his alternative theories.

In his *De institutione musica* (sixth century), Boethius provides Western music with its tripartite division of the music discipline and establishes the categories into which musicians would fall well into the Renaissance:

Thus, there are three classes of those who are engaged in the musical art. The first class consists of those who perform on instruments, the second of those who compose songs, and the third of those who judge instrumental performance and song.

But those of the class which is dependent upon instruments and who spend their entire effort there--

such as kitharists and those who prove their skill on the organ and other musical instruments--are excluded from comprehension of musical knowledge, since, as was said, they act as slaves. None of them makes use of reason; rather, they are totally lacking in thought.

The second class of those practicing music is that of the poets, a class led to song not so much by thought and reason as by a certain natural instinct. For this reason this class, too, is separated from music.

The third class is that which acquires an ability for judging, so that it can carefully weigh rhythms and melodies and the composition as whole. This class, since it is totally grounded in reason and thought, will rightly be esteemed as musical. That person is a musician who exhibits the faculty of forming judgments according to speculation or reason relative and appropriate to music concerning modes and rhythms, the genera of songs, consonances, and all things which are to be explained subsequently, as well as concerning the songs of the poets.<sup>1</sup>

Further, Boethius establishes the hierarchical order of the categories of musicians:

Now one should bear in mind that every art and also every discipline considers reason inherently more honorable than a skill which is practiced by the hand and the labor of an artisan. For it is much better and nobler to know about what someone else fashions than to execute that about which someone else knows; in fact, physical skill serves as a slave, while reason rules like a mistress. Unless the hand acts according to the will of reason, it acts in vain. How much nobler, then, is the study of music as a rational discipline than as composition and performance!<sup>2</sup>

With respect to the societal role of the theorist, a profound change may be observed in the fifteenth century. Previously, the theorist was one who considered himself to

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<sup>1</sup>Anicius Manlius Severinus Boethius, *Fundamentals of Music*, trans., intro., and notes by Calvin M. Bower, ed. by Claude V. Palisca (New Haven, Conn.: Yale University Press, 1989), 51. See also Boethius, *De institutione musica*, ed. by Godofredus Friedlein (Lipsiae: Teubneri, 1867), 225.

<sup>2</sup>Ibid., 50. See also Friedlein edition, 224.

be the guide and critic of the performer; he filled his treatises with speculative theories and wrote primarily for the approval of his academic peers. In a break with tradition, Ramos attempts to bridge the gap between the speculative theorist and the practicing musician. In the Prologue to the *Musica practica*, Ramos forewarns the reader of his emphasis on music as a "practical" discipline, making his intentions quite clear:

Let no one fear the majesty of philosophy, nor the complexity of arithmetic, nor the digressions of proportions. For here, anyone is able to become a most outstanding and skillful musician--even if he is unskilled in everything--provided that he is willing to devote attention to learning and is not completely destitute of reasoning. For indeed, inasmuch as we have desired to serve intelligence, we have retained the blending of expression and the control of style, so that in these readings the experts will be able to be amply refreshed, the poorly educated will be able to make great progress, and the altogether untrained may be able to be instructed with the greatest of pleasure. We undertake [this work] not so much for the purpose of preparing philosophers or mathematicians here; anyone instructed only with the first rudiments of grammar may understand this our [discourse]. Here, the mouse and the elephant alike can float side by side; Daedalus and Icarus can fly away together.<sup>3</sup>

Here Ramos attempts to bring together the two previously estranged species of the mouse (practicing musician) and the elephant (speculative theorist). Ramos is well-equipped for such a task, for as a speculative theorist and a practicing composer he realizes the necessity of providing instruction that is useful for the performer--the one who will

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<sup>3</sup>Ramos de Pareia, *Musica practica*, 1.

ultimately realize speculative theories in the manner of performing compositions.

It is precisely this new understanding of the role and need of the practicing musician that prompted Ramos to present an alternative to the cumbersome ratios of traditional Boethian (Pythagorean) tuning. As acknowledged by James Barbour, Ramos had no intent of thwarting tradition just for the sake of innovation by "nailing his ninety-five theses to the church door";<sup>4</sup> rather, Ramos sought to make speculative theory more relevant to the practicing musician.

In Part 1, Treatise 1, Chapter 2, Ramos states that his division of the monochord--which ultimately results in a new method of tuning--is rooted in practicality:

The regular monochord is accurately divided by Boethius with numbers and measurement. Although it is agreeable and useful for theorists, it is laborious and difficult for singers to understand. Truly, since we have promised to satisfy both [the theorists and the singers], we will render an extremely easy division of the regular monochord. Let no one think that we came upon it with ordinary labor, inasmuch as we devised it with hard work during many sleepless nights, reading and re-reading the precepts of the ancients and avoiding the error of the modern theorists. Anyone even moderately educated will be able to easily understand it.<sup>5</sup>

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<sup>4</sup>James Murray Barbour, *Tuning and Temperament: A Historical Survey* (East Lansing, Michigan: Michigan State College Press, 1951; reprint, New York: Da Capo Press, 1972), 4.

<sup>5</sup>Ramos de Pareia, *Musica practica*, 4.



Again, near the end of the *Musica practica*, Ramos reiterates his intent to provide a simpler explanation of the monochordal division:

In the first division of our regular monochord we have said that Boethius accurately divided his regular monochord by numbers and measurement. However, for the sake of the inexperienced [singers], we have divided our [monochord] with common fractions by means of a continuous quantity, so that it would not be necessary for the student to have previously learned both arithmetic and geometry; for, without a doubt, he would fall into error, which we have prevented. Indeed, we have said that neither of these things are necessary in order for our doctrine to be understood--provided that [the student] has been thoroughly instructed in the beginning rudiments.<sup>6</sup>

#### The Tetrachord and the Three Genera

An understanding of Ramos's proposed division of the monochord requires a familiarity with the monochordal division espoused by Boethius as well as an understanding of the earlier Greek system, out of which the Boethian system emanated.

The Greek musical system was divided into two components: the Greater Perfect System (GPS) and the Lesser Perfect System (LPS). The GPS consists of a descending scale of two octaves, comprised of four tetrachords (each with a fixed intervallic pattern of tone--tone--semitone) plus an additional note. The tetrachords of the GPS are linked either conjunctly (a *synaphē*, in which the tetrachords share a common pitch) or disjunctly (a

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<sup>6</sup>Ibid., 76.

*diazeuxis*, in which the tetrachords are separated by a whole tone) to span the range of an octave plus a seventh. The two-octave scale was made complete by the addition of a pitch one whole tone below the lowest tone of the fourth tetrachord. The highest tetrachord of the GPS was given the designation *hyperbolaiōn*, followed by the tetrachords--in descending order--*diezeugmenōn*, *mesōn*, and *hypatōn*. The lowest note of the gamut was identified as *proslambanomenos*, while the other individual notes within the tetrachords were identified both by their tetrachordal encompassment as well as by their relative position within the individual tetrachord (see Table 1).

In Part 1, Treatise 1, Chapter 3 of the *Musica practica*, Ramos explains the Greater Perfect System according to the (incorrect) description given by Boethius in the sixth century, i.e., from the lowest *hypatōn* tetrachord to the highest *hyperbolaiōn* tetrachord. This reversal is wholly in accordance with Boethius's transmission of the GPS, brought about by Boethius's misunderstanding of Greek theory.

Likewise, both Boethius and Ramos reverse the order of the Lesser Perfect System. The Lesser Perfect System (LPS) consisted of three conjunct tetrachords with the addition of *proslambanomenos* in the lowest position. The LPS differed from the GPS by the absence of the tetrachord *hyperbolaiōn*, and by the substitution of a conjunct *synēmmenōn* tetrachord

TABLE 1  
 THE GREATER PERFECT SYSTEM  
 ACCORDING TO BOETHIUS

	A	T	Proslambanomenos
		T	Hypatē Hypatōn
Tetrachord <i>Hypatōn</i>	B	S	Parhypate Hypatōn
	c	T	Lichanos Hypatōn
	d	T	Hypatē Mesōn
	e	S	Parhypatē Mesōn
Tetrachord <i>Mesōn</i>	f	T	Lichanos Mesōn
	g	T	Mesē
	a	T	Paramesē
		S	Tritē Diezeugmenōn
Tetrachord <i>Diezeugmenōn</i>	b	T	Paranētē Diezeugmenōn
	c <sup>1</sup>	T	Nētē Diezeugmenōn
	d <sup>1</sup>	S	Tritē Hyperbolaiōn
	e <sup>1</sup>	T	Paranētē Hyperbolaiōn
Tetrachord <i>Hyperbolaiōn</i>	f <sup>1</sup>	T	Nētē Hyperbolaiōn
	g <sup>1</sup>		
	a <sup>1</sup>		

for the disjunct *diezeugmenōn* tetrachord. The *synēmmenōn* tetrachord (a, bb, c, d) results in a fixed intervallic pattern of semitone--tone--tone. Table 2 illustrates the arrangement of the tetrachords in the Lesser Perfect System.

TABLE 2  
 THE LESSER PERFECT SYSTEM  
 ACCORDING TO BOETHIUS

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	A		Proslambanomenos
		T	
Tetrachord <i>Hypatōn</i>	B		Hypatē Hypatōn
	c	S	Parhypate Hypatōn
	d	T	Lichanos Hypatōn
	e	T	Hypatē Mesōn
conjunct	f	S	Parhypatē Mesōn
Tetrachord <i>Mesōn</i>	g	T	Lichanos Mesōn
	a	T	Mesē
	bb	S	Tritē Synēmmenōn
conjunct	c <sup>1</sup>	T	Paranētē Synēmmenōn
Tetrachord <i>Synēmmenōn</i>	d <sup>1</sup>	T	Nētē Synēmmenōn

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In Greek theory, the GPS and LPS were combined through the addition of the tetrachord *synēmmenōn* to the Greater Perfect System, creating a fusion called *ametabolōn* (immutable). Ramos disapproved of his contemporaries employing the Immutable System; he felt it was contrary to the descriptions that were provided by Boethius and therefore, unacceptable. In Part 1, Treatise 1, Chapter 5 of the *Musica practica*, Ramos admonishes his friend Tristan de Silva for his employment of the Immutable system that uses the five tetrachords *hypatōn*, *mesōn*, *diezeugmenōn*,

*synēmmenōn*, *hyperbolaiōn*, and for his misunderstanding of the conjunct and disjunct nature of the *synēmmenōn* and *diezeugmenōn* tetrachords:

Truly, it was discussed and demonstrated above that the *synēmmenōn* tetrachord is conjunct but the *diezeugmenōn* [tetrachord] is disjunct. However, some [people] being ignorant of this (as we have found in a long dispute with the Spaniard Tristan de Silva--our dearest friend, and a man with the most sagacious talent) establish the *diezeugmenōn* [tetrachord] after they reach *mesē*. After this, they place the *synēmmenōn* [tetrachord], [and] then the *hyperbolaiōn*. And thus, they cause the *nētē hyperbolaiōn* to stand apart from the *proslambanomenos* by [the distance of] three strings beyond a bisdiapason, which is clearly contrary to the truth and the teaching of Boethius.<sup>7</sup>

Likewise, Ramos criticizes Marchettus de Padua for the employment of an Immutable System that merely adds the *synēmmenōn* tetrachord to *nētē hyperbolaiōn* by conjunction and for the appendage of two additional pitches:

Indeed, I do not doubt that [Marchettus] may be saved, since Christ on the cross prayed for those who know not what they do. A certain brother--the Frenchman Johannes Carthusiensis--saves him by saying that he is "both untrained and deserving of chastisement." However, I value this Marchettus so much that I have no doubt that four *marchetti* could be swallowed down together in one gulp by the Frenchman Roger Caperon . . . .  
 . . . And thus, sinking into the error of others, [Roger Caperon also] establishes [a total of] twenty strings.<sup>8</sup>

It is surprising that Ramos attacks Marchettus with such vehemence, for Marchettus, unlike Tristan de Silva, continued to preserve the conjunct and disjunct character of these tetrachords. Here, however, we see Ramos following

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<sup>7</sup>Ibid., 12.

<sup>8</sup>Ramos de Pareia, *Musica practica*, 12-13.

the mandates set down by Boethius, preserving the Greater Perfect System of fifteen pitches and the Lesser Perfect System of eleven. Ramos was appalled by Marchettus's use of the Immutable System and by his extension that incorporated twenty notes by the addition of the pitch *F* at the bottom of the gamut and the pitch *e*<sup>2</sup> at the top.

In Greek theory, the inner two notes of each tetrachord could be altered to effect a "modulation" by means of three different genera--diatonic, chromatic, and enharmonic. The two outer notes of the tetrachord were considered "immovable" and thus provided tetrachordal stability for the variable inner notes.

The "diatonic" genus of the tetrachord is comprised of a semitone followed by two tones (*E F G A*), the "chromatic" genus of two semitones plus a semiditone of some sort (*E F F# A*), and the "enharmonic" genus of two quarter tones plus a ditone (*E E\* F A*).<sup>9</sup> In this regard, Ramos follows Boethius's discussion in Book I, Chapter 23 of *De institutione musica*, which contains an explanation and illustration of the use of the three genera and from which the three scales of the diatonic, chromatic, and enharmonic genera are generated.<sup>10</sup> Theorists typically recognized six

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<sup>9</sup>The asterisk symbol denotes the raising of a note by a quarter tone.

<sup>10</sup>Boethius, *Fundamentals of Music*, 43. See also Friedlein edition of *De institutione musica*, 216-17.

variants or "shades" of the genera, that is--two diatonic, three chromatic, and one enharmonic; however, for the purposes of this study a discussion of their most typical forms will suffice.

In his comprehensive survey of monochord division, Cecil Adkins proposes that "within limits, the upper interval in the enharmonic and chromatic genera and the upper two intervals in the diatonic seem to be the real determinants of genus."<sup>11</sup> Adkins confirms his assertion with a discussion of J.F. Mountford's article, "The Musical Scales of Plato's *Republic*," which demonstrates that the two most common variations of the diatonic genus (256:243 x 9:8 x 9:8; or 16:15 x 9:8 x 10:9) result in the whole tone ratios of 9:8 and 10:9, while the three possible variations of the chromatic genus (28:27 x 15:14 x 6:5; or 28:27 x 243:224 x 32:27; or 22:21 x 12:11 x 7:6) focus recurrently upon the pure minor third of 6:5, and finally, the tetrachordal division of the enharmonic genus (28:27 x 36:35 x 5:4) results in the pure major third of 5:4.<sup>12</sup>

Ramos believed that the three genera had been abused by contemporary theorists and sought to resurrect their correct use by means of his own theories. Examination of

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<sup>11</sup>See Cecil Dale Adkins, "The Theory and Practice of the Monochord" (Ph.D. diss., State University of Iowa, 1963), 43.

<sup>12</sup>J.F. Mountford, "The Musical Scales of Plato's *Republic*," *The Classical Quarterly* XVII (1923): 133.

Ramos's division of the monochord demonstrates that Ramos did, in fact, implement the "real determinants" of the genera in his tuning by employing the pure major third (5:4), the pure minor third (6:5), and the two different whole tones (10:9 and 9:8).

### Pythagorean Tuning

To comprehend the radical innovations that resulted from Ramos's division of the monochord, an understanding of both the authority and mechanics of Pythagorean tuning is required. The tuning that was attributed to Pythagoras (fifth century B.C.) had enjoyed a long-standing and unchallenged tradition throughout the Middle Ages and well into the Renaissance until the new emphasis upon practicality initiated its decline. Due to the simplicity of its application on the monochord, Pythagorean tuning had retained its popularity among speculative theorists who revelled in concrete evidence; practicing musicians, however, preferring the sound of pure intervals and contending on a daily basis with the ever-increasing use of *musica ficta*, eventually rejected Pythagorean tuning in favor of alternative and more "practical" tunings.

Pythagorean tuning is based upon a preponderance of perfect fifths (3:2). Beginning on the pitch *F* and continuing in a series of perfect fifths (i.e., *F c g d<sup>1</sup> a<sup>1</sup> e<sup>2</sup> b<sup>2</sup>*), Pythagorean tuning can generate seven pitches that



can subsequently be combined into a single octave scale. An alternative demonstration of the scale occurs through the superparticular ratios of the numbers from one to four, which are used to designate the consonances of the perfect octave (2:1), the perfect fifth (3:2), and the perfect fourth (4:3). This method was especially useful for demonstrating the ratios upon the monochord, because the remaining pitches of the system could be deduced by calculating the differences between these various intervals. Table 3 illustrates such a deduction of the various intervals, while Table 4 demonstrates the formation of the Pythagorean diatonic scale by means of five whole tones (each possessing a 9:8 ratio) and two semitones (each possessing a ratio of 256:243).

The necessity for temperament, or the slight adjustment for "purer" tunings in instrumental music, is a consequence of the enharmonic discrepancy that occurs in a series of pure intervals. The generation of three pure major thirds, for example, fall short of a pure octave by the *lesser diesis*--approximately one-fifth of a whole tone (41.1 cents); the generation of four pure minor thirds exceed the pure octave by the *greater diesis* (62.6 cents); the generation of twelve pure fifths result in the

TABLE 3

THE DEDUCTION OF THE PYTHAGOREAN RATIOS  
FROM THE DIFFERENCES OF THE INTERVALS<sup>13</sup>

Perfect 8ve (2:1)	-	Perfect 5th (3:2)	=	Perfect 4th (4:3)
Perfect 5th (3:2)	-	Perfect 4th (4:3)	=	Whole Tone (9:8)
Perfect 4th (4:3)	-	2 Whole Tones (9:8) <sup>2</sup>	=	Diatonic Semitone (256:243)
Perfect 4th (4:3)	-	Whole Tone (9:8)	=	Minor 3rd (32:27)
Minor 3rd (32:27)	-	Whole Tone (9:8)	=	Minor Semitone (256:243)
Whole Tone (9:8)	-	Minor Semitone (256:243)	=	Major Semitone (2187:2048)
Major Semitone (2187:2048)	-	Minor Semitone (256:243)	=	Comma (531441:524288)

TABLE 4

THE PYTHAGOREAN DIATONIC SCALE

	9:8	9:8	256:243	9:8	9:8	9:8	256:243	
C	D	E	F	G	A	B	C	

<sup>13</sup>See C. André Barbera, "Pythagorean Scale," *The New Harvard Dictionary of Music*, ed. by Don Michael Randel (Cambridge, Mass.: The Belknap Press of Harvard University Press, 1986), 672-73.

*Pythagorean comma* (an enharmonic difference of 23.5 cents).<sup>14</sup>

Although the octave, fifth, and fourth are "pure" in Pythagorean tuning, the disadvantage of this system becomes apparent in the practical employment of thirds; these are not only "impure," but are considerably "sharp." The sum of four perfect fifths above the pitch *C*, for example, will produce an *E* whose ratio is 81:64 rather than the pure third 5:4. The discrepancy inherent in the difference between these two ratios--the *syntonic comma*--subsequently became a source of dispute between those theorists who preferred the pure fifths of Pythagorean tuning and those who subscribed to alternative tunings that allowed for pure thirds and sixths.

#### Traditional Applications of the Monochord

The monochord was used by the Greeks as early as sixth century B.C. to test the mathematical ratios of musical acoustics. Although this device figures significantly in the history of music theory, its actual construction is quite unpretentious:

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<sup>14</sup>Mark Lindley, "Temperaments," vol. 18, *The New Grove Dictionary of Music and Musicians*, ed. by Stanley Sadie (London: Macmillan Press Limited, 1980): 660-61.

A device consisting of a single string stretched over a long wooden resonator to which a movable bridge is attached so that the vibrating length of the string can be varied.<sup>15</sup>

By the time of the Renaissance, the monochord had assumed three primary functions in the disciplines of speculative and practical theory: (1) to visually and audibly demonstrate intervallic proportions; (2) to aid and instruct singers in the study of intonation through the comparison of various intervals; and (3) to serve theorists in experiments with new methods of tuning and in their application to the construction of new instruments.<sup>16</sup>

Adkins explains that three basic acoustical systems can be applied to the monochord: (1) a proportional system that is a result of the manual division of the monochord--a division in which a "linear mechanical operation" is utilized with a single, tensioned string; (2) a system utilizing various string lengths to effect a comparison of the pitches; and (3) a system of "cents"--a nineteenth-century measurement of one one-hundredth of a semitone that provides a constant for the comparison of various intervals.<sup>17</sup> Because Ramos proposes a manual division,

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<sup>15</sup>Willi Apel, "Monochord," *The Harvard Dictionary of Music* 2d ed. (Cambridge, Mass.: Harvard University Press, 1972), 537-38.

<sup>16</sup>Adkins, "The Theory and Practice of the Monochord," 192-93.

<sup>17</sup>*Ibid.*, 12-17.

this discussion focuses upon the aspects inherent to the first category; measurement by cents, however, will be used to clarify discrepancies between the Pythagorean division of the monochord and the division proposed by Ramos.

Adkins further notes that the monochord division is discussed in terms of either sub-superparticular or superparticular proportions. A division that compares the sound of the total length of the string (the lowest pitch) to a higher stopped note produces sub-superparticular proportions (e.g., 8:9, 2:3, etc.), whereas a division that compares the sound of a stopped note (usually two octaves above the fundamental pitch) to another stopped note below this pitch produces superparticular proportions (e.g., 9:8, 3:2, etc.). Thus, an "ascending division" occurs by means of the sub-superparticular proportions that arise from lower- to higher-sounding pitches through the employment of increasingly shorter portions of the string, whereas a "descending division" occurs by means of the superparticular proportions that result from the employment of increasingly longer portions of the string from higher- to lower-sounding pitches.<sup>18</sup>

#### Ramos's Division of the Monochord

Ramos's monochordal division is based upon the Boethian ascending division. At the beginning of the *Musica*

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<sup>18</sup>Ibid., 19-24.

*practica*, Ramos describes a monochordal division that provides the seven notes of what is essentially a two-octave A natural minor scale notated with the letters A-P. It should be noted that Ramos includes the pitch *Bb* even in this simple division of the monochord. Later, in Part 1, Treatise 2, Chapter 5, he provides those notes that are needed to complete the chromatic scale (*C#*, *Eb*, *F#*, and *Ab*).

Ramos's division of the monochord results in sub-superparticular proportions; Ramos is not, however, particularly conscientious in his description of these proportions. In Part 3, Treatise 1, Chapter 3, Ramos discusses the relationships of the sounds produced by the entire string in comparison to increasingly shorter portions, i.e., in comparison to higher stopped notes. In this discussion, Ramos incorrectly describes these proportions as "superparticular" rather than "sub-superparticular." This oversight does not affect the sound of the pitches; it may, however, prove confusing for those concerned with the speculative aspects of his division. The technique of an ascending or descending derivation is not a significant matter for Ramos. Although his step-by-step method proposes an ascending division, he notes that one can either compare the high sound to the low sound or vice-versa, and that this option will not make a difference in pitch:

Let the stretched string be struck in its entire length and let the sound be noted. Then, let the finger, or something else more accurate and indeed not very wide, be placed above [the string] and again let the string be struck: the result will be that it emits a considerably higher sound. And when you will have considered a comparison of the higher sound with the low sound or, if you prefer, the lower sound with the high sound, you will perceive the distance to be that of a tone.<sup>19</sup>

As previously mentioned, Ramos's division of the monochord does not appear to be an attempt to effect a new system of tuning; rather, it is the result of his avid interest in providing a simpler division for the practicing musician, and possibly of an attempt to reflect the type of ratios that were actually being sung by the performers of his time. While Ramos may not have intended to create a new tuning, a new tuning was, in fact, advanced by Ramos in the *Musica practica*--a treatise that contains the first published explanation of a complete system of just intonation. *The New Harvard Dictionary of Music* defines just intonation in the following manner:

Any tuning that incorporates five or more acoustically pure types of interval within the octave; in the case of diatonic or chromatic scales, those based on acoustically pure major thirds and acoustically pure fifths.<sup>20</sup>

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<sup>19</sup>Ramos de Pareia, *Musica practica*, 5.

<sup>20</sup>*The New Harvard Dictionary of Music*, s.v. "Just intonation."

Ramos's monochordal division results in pure perfect octaves, fifths, and fourths, pure major and minor thirds, and pure major and minor sixths.<sup>21</sup>

In the *Errori di Franchino Gafurio da Lodi*, Giovanni Spataro responds to Gaffurius's remark that the syntonic comma (the difference between the Pythagorean third and the pure major third, i.e., 21.5 cents) is imperceptible--an argument used by many theorists to justify their retention of the Pythagorean tuning.

. . . the more you try to criticize Bartolomé Ramos, my master, the more you get enmeshed and show clearly your ignorance, small knowledge, malice, and obstinacy . . . Bartolomé Ramos has said that (only in practice, that is in musical usage and activity) the ditone corresponds to the 5/4 ratio, but not in speculative music, . . . where the ditone corresponds to the ratio 81/64 . . . the 81/80 ratio [the syntonic comma] (which is the difference between the Pythagorean intervals and the intervals used by experienced musicians is audible--not imperceptible as in your above-mentioned chapter you have concluded. For were it not appreciable, the harsh Pythagorean monochord would not [have to] be reduced, smoothing [it] to the sense of hearing . . . Bartolomé Ramos [also] judged that the difference is perceptible between the 6/5 minor third and the minor third corresponding to the 32/27 ratio, because otherwise it would be self-defeating to add the

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<sup>21</sup>Although Ramos was the first to publish a complete tuning that incorporated these intervals as pure entities, he cannot be awarded credit as the first theorist to propose the use of pure thirds. As early as 1275, Walter Oddington notes in his *De speculatione musice* that singers were using the pure thirds of 5:4 and 6:5 more often than the tertian ratios of 81:64 and 32:27 extracted from Pythagorean tuning. See Hugo Riemann, *History of Music Theory: Polyphonic Theory to the Sixteenth Century*, trans. with preface, commentary, and notes by Raymond H. Haggh (Lincoln, Nebraska: University of Nebraska Press, 1966; reprint, New York: Da Capo Press, 1974), 94-99.



81/80 interval in order to reduce the musical intervals from harshness to smoothness.<sup>22</sup>

Comments from the late fifteenth century--such as that of Gaffurius in the *Practica musicae* (1496) regarding *participata* (the tempering of intervals)--suggest that the properties of tuning and intonation were gradually becoming more of an aural consideration governed by the practicing musician, rather than a speculative issue. Although Gaffurius advocated the Pythagorean third of 81:64 rather than the pure major third of 5:4, he was not completely inflexible to alterations in Pythagorean tuning. While quite apart from Ramos on the matter of specific tuning

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<sup>22</sup>" . . . quanto piu tu cerchi reprehendere Bartolomeo Ramis mio preceptore, tanto piu te ne vai intrucando: et fai manifesta la tua ignorantia: poco sapere: malignita: et obstinatione . . . da Bartolomeo Ramis e stato dicto che (solo in practica overo in la Musica usitata: et activa el ditono cadete in la comparatione sesquiquarta: & non in la Musica speculativa . . . in la quale cade el ditono tra .81. ad .64. comparati . . . la proportione cadente tra .81. ad .80. laquale e la differentia cadente tra li pythagorici intervalli: & li intervalli da li modulanti usitati e sensibile; & non insensibile come nel predicto tuo capitolo hai concluso. Perche non essendo sensibile: el duro monochordo pythagorico non seria reducto in molle al senso de lo auditio . . . da Bartolomeo Ramis e stato inteso essere differentia sensibile tra il semiditono sesquiquinto & il semiditono cadente tra .32. ad .27. comparati: perche altramente: el seria frustratorio la additione de lo intervallo cadente tra .81. ad .80. circa el ridurre li Musici intervalli de duro in molle . . . ." Giovanni Spataro, *Errori di Franchino Gafuria da Lodi* (Bologna, 1521), ff. 21v-22r; quoted and translated by Mark Lindley, "Fifteenth-Century Evidence for Meantone Temperament," *Proceedings of the Royal Music Association* 102 (1975-6): 42.

procedures, Gaffurius was, in fact, probably the first theorist to suggest the concept of temperament:

Nevertheless, the fifth itself, so organists assert, leniently sustains a diminution of a very small and hidden and somewhat uncertain quantity which indeed is referred to by them as *participata*.<sup>23</sup>

In this regard, Barbour notes that the organs which were tuned according to Gaffurius's instructions were probably closer to equal temperament than to either just intonation or meantone temperament; for when a Pythagorean fifth of 702 cents is tempered by a "very small and hidden quantity," it could easily approximate 700 cents--the size of the perfect fifth in equal temperament.<sup>24</sup>

In addition to a new type of "pure" third, Ramos's division of the monochord results in a tuning that requires two types of whole tones--in ratios of 9:8 and 10:9--to replace the single 9:8 whole tone of Pythagorean tuning. Barbour calls attention to the fact that the ratios of just intonation result from a combination of Ptolemy's syntonic-diatonic tuning and Didymus's diatonic arrangement of the monochord.<sup>25</sup> Indeed, an examination of Ramos's diatonic arrangement of the monochord applied to a C major scale

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<sup>23</sup>"Tamen quinta ipsa (quod organistae asserunt) minimae ac latentis incertaeque quodammodo quantitatis diminutionem patienter sustinet quae quidem ab ipsis *participata* vocatur." Book III, Chapter 3, Rule 2, Gaffurius, *Practica musicae*, fol. ddir.

<sup>24</sup>Barbour, *Tuning and Temperament*, 5-6.

<sup>25</sup>*Ibid.*, 21.

reveals that Ramos's tuning employs the ratios of Didymus's diatonic tuning in the lower diatessaron from the pitches *C-F*, and Ptolemy's syntonic-diatonic tuning in the upper diapente from the pitches *F-C*. A comparison of Tables 5, 6, and 7 demonstrates these similarities.

TABLE 5

DIDYMUS'S DIATONIC TUNING  
APPLIED TO THE C MAJOR SCALE

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	10:9	9:8	16:15	10:9	9:8	9:8	16:15	
C	D	E	F	G	A	B	C	

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TABLE 6

PTOLEMY'S SYNTONIC-DIATONIC TUNING  
APPLIED TO THE C MAJOR SCALE

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	9:8	10:9	16:15	9:8	10:9	9:8	16:15	
C	D	E	F	G	A	B	C	

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TABLE 7

RAMOS'S DIATONIC DIVISION OF THE MONOCHORD  
APPLIED TO THE C MAJOR SCALE

	10:9	9:8	16:15	9:8	10:9	9:8	16:15
C	D	E	F	G	A	B	C

Initially, Ramos describes a "diatonic" tuning of the monochord; somewhat later, in Part 1, Treatise 2, Chapter 5, Ramos provides a "chromatic" tuning with the addition of the necessary *coniunctae* (accidentals).<sup>26</sup> Table 8 illustrates the ratios that result when these additional *coniunctae* are applied to a chromatic scale beginning on C.

TABLE 8

THE CHROMATIC SCALE  
ACCORDING TO PYTHAGOREAN TUNING<sup>27</sup>

C	C $\sharp$	D	E $\flat$	E	F	F $\sharp$	G	A $\flat$	A	B $\flat$	B	C
Cents:												
0	114	204	294	408	498	612	702	816	906	996	1110	1200

<sup>26</sup>For a thorough explanation of the various meanings of this term *coniunctae*, see Chapter VI of this commentary.

<sup>27</sup>Barbour, *Tuning and Temperament*, 90.

Barbour, however, notes that the series of pitches in perfect fifths from *D* to *C#* (*D, A, E, B, F#, C#*) lie a comma lower in Ramos's division than those brought about by Pythagorean tuning (see Table 9).<sup>28</sup>

TABLE 9  
THE CHROMATIC SCALE  
ACCORDING TO RAMOS'S DIVISION OF THE MONOCHORD<sup>29</sup>

C	C#	D	Eb	E	F	F#	G	Ab	A	Bb	B	C
Cents:												
0	92	182	294	386	498	590	702	792	884	996	1088	1200
0	*-1	-1	0	-1	0	-1	0	0	-1	0	-1	0
* (-1 = pitches a comma lower than Pythagorean ratios)												

<sup>28</sup>Ibid., 89-90. Barbour's tables correctly illustrate his intended premise. His text, however, contains two errors: (1) the six notes "lie a comma higher" [*sic.*, lower] than the corresponding notes of the Pythagorean scale; (2) the six notes that lie a comma lower are pitches in a series of perfect fifths from *D-C#*, not *D-F#* as Barbour incorrectly states in the text.

<sup>29</sup>Ibid.

### Conclusion

Ramos's division of the monochord results in the essential intervals of the three genera, i.e., the two whole steps of 9:8 and 10:9 indigenous to the diatonic genus, the minor third ratio of 6:5 from the chromatic genus, and the major third ratio of 5:4 from the enharmonic genus. An ardent disciple of Boethius, Ramos was justifiably proud of the fact that his division of the monochord incorporated the three genera in modern practice. The desire to prove that these genera could be used in modern practice may have been one of the reasons that Ramos was so insistent on creating a monochordal division with these ratios.

Ramos's method of tuning paved the way for the monumental changes in harmonic practice that were to be realized in the succeeding generation. Ramos's division of the monochord--which utilizes pure thirds and sixths--not only laid the foundation for Ramos's other controversial theories, but served as the framework for the tertian-based harmonic system espoused by the sixteenth-century theorist Gioseffo Zarlino.

## CHAPTER IV

### THE APPLICATION AND EVALUATION OF THE MONOCHORD ACCORDING TO THE DIVISION PROPOSED BY BARTOLOMEO RAMOS DE PAREIA

In the final chapter before the epilogue to the *Musica practica*, Ramos categorizes those intervals which are pleasing to the ear and those which should be avoided. This discussion clearly demonstrates the mathematical ratios of which Ramos approved and disapproved, for he meticulously assigns "good" and "bad" values to each of them.

Ramos's division of the monochord results in three types of semitones: a "diatonic" semitone (16:15, 112 cents) that is the difference between the perfect fourth and the pure major third (4:3 - 5:4); a "chromatic" semitone (135:128, 92 cents) that is the difference between the whole tone and the diatonic semitone (9:8 - 16:15); and a "Pythagorean diatonic" semitone, also referred to as the *limma* (256:243, 90 cents), that is the difference between the perfect fourth and two whole tones (4:3 - (9:8)<sup>2</sup>). While several theorists have noted that Ramos fails to mention that his division necessitates the use of the Pythagorean diatonic semitone, this must not be construed as an oversight by the author. Ramos did not propose a tuning system with the intent of discarding all Pythagorean ratios;

rather, his system was offered as a refinement that attempted to explain contemporary practice. It should further be noted that Ramos's chromatic semitone differs from the Pythagorean diatonic semitone by merely 2 cents (the *schisma*).

A small discrepancy from traditional terminology results when Ramos refers to the chromatic semitone, or *apotome*, as the "major semitone."<sup>1</sup> In the Pythagorean system, the chromatic semitone (114 cents)--larger than the diatonic semitone of 90 cents--is labeled the "major semitone"; conversely, Ramos's diatonic semitone (112 cents) is actually larger than his chromatic semitone (92 cents). Thus, Ramos's designation of the chromatic semitone as the "major semitone" seems inappropriate. To avoid confusion, and because their mathematical ratios actually correspond in this manner, Ramos's chromatic semitone will hereafter be referred to as the "minor semitone" while his diatonic semitone will be referred to as the "major semitone." Table 10 illustrates the application of Ramos's semitonal ratios in a chromatic scale beginning on C, as well as Ramos's designations of "good" and "bad" semitones.

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<sup>1</sup>See Ramos de Pareia, *Musica practica*, 13.



TABLE 10

EVALUATION OF SEMITONES IN CENTS  
ACCORDING TO RAMOS'S DIVISION

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	good ┌90┐		bad ┌92┐		bad ┌92┐		good ┌90┐		good ┌112┐		good ┌112┐	
C	C#	D	E <sup>b</sup>	E	F	F#	G	A <sup>b</sup>	A	B <sup>b</sup>	B	C
	┌92┐ bad		┌112┐ good		┌112┐ good		┌112┐ good		┌92┐ bad		┌92┐ bad	

---

Type of semitone:

C	P	D	C	D	C	D	P	C	D	C	D
---	---	---	---	---	---	---	---	---	---	---	---

\*\* (C = chromatic, D = diatonic, P = Pythagorean)

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Ratios: 90¢ = 256:243, 92¢ = 135:128, 112¢ = 16:15

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Ramos obtains the two types of whole tones (9:8 and 10:9) by incorporating the possible combinations of semitones that result from his division of the octave. The major semitone plus the minor semitone produces the major whole tone (112 + 92 = 204 cents, 9:8); the minor semitone plus the Pythagorean *limma* produces the minor whole tone (92 + 90 = 182 cents, 10:9).

In his evaluation of the resulting whole tones, Ramos designates all of the major and minor whole tones as "good," but disapproves of the whole tones that are located between C#-E<sup>b</sup> and F#-A<sup>b</sup>. This evaluation seems odd in light of the

fact that these "bad" whole tones are valued at 202 cents-- only a schisma in difference from the major whole tone of 204 cents. Conversely, Ramos unconditionally accepts the minor whole tones of 182 cents that hold a difference of the syntonic comma (22 cents)! The possible answer to this paradox may stem from the fact that Ramos bases his evaluation upon the specific notation of these intervals, accepting all whole tones spelled as major seconds but rejecting those spelled as diminished thirds. Table 11 demonstrates Ramos's evaluation of the whole tones and their corresponding ratios in cents.

TABLE 11

EVALUATION OF WHOLE STEPS IN CENTS  
ACCORDING TO RAMOS'S DIVISION

C	D	E	F $\sharp$	A $\flat$	B $\flat$	C
—182—	—204—	—204—	—202—	—204—	—204—	
good	good	good	bad	good	good	
C $\sharp$	E $\flat$	F	G	A	B	C $\sharp$
—202—	—204—	—204—	—182—	—204—	—204—	
bad	good	good	good	good	good	
Ratios: 182¢ = 10:9, 204¢ = 9:8, 202¢ = 9:8 - schisma						

Likewise, in his discussion of "good" and "bad" semiditones, Ramos accepts the pure minor third (316 cents) and the Pythagorean semiditone (294 cents), but rejects the three semiditones located between  $Eb-F\sharp$ ,  $Ab-B$ , and  $Bb-C\sharp$ , even though these particular semiditones are only a schisma greater than the Pythagorean semiditone. According to Ramos, all semiditones are "good" except where there is a mixture of one "accidental order" (a mixture of flats and sharps) with another.<sup>2</sup> Semiditones that are notated as minor thirds are acceptable; those that are notated as augmented seconds are unacceptable. Table 12 demonstrates Ramos's evaluation of the semiditones and their corresponding ratios in cents.

As in the case of the semiditone, it is again this difference of a schisma that leads Ramos to label particular ditones as unacceptable. In his monochordal division, Ramos considers those ditones which are notated as diminished fourths ( $C\sharp-F$ ,  $E-Ab$ ,  $F\sharp-Bb$ , and  $B-Eb$ ) and which hold the value of 406 cents to be objectional; conversely, the pure major third (386 cents) and the Pythagorean ditone (408 cents) that are notated as major thirds are acceptable. Table 13 demonstrates Ramos's evaluation of the ditones and their corresponding ratios in cents.

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<sup>2</sup>Ibid., 79.

TABLE 12

EVALUATION OF SEMIDITONES IN CENTS  
ACCORDING TO RAMOS'S DIVISION

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C	E $\flat$	F $\sharp$	A	C	
┌───294───┐		┌───296───┐		┌───294───┐	
└───┘		└───┘		└───┘	
good		bad		good	

---

C $\sharp$	E	G	B $\flat$	C $\sharp$	
┌───294───┐		┌───316───┐		┌───294───┐	
└───┘		└───┘		└───┘	
good		good		bad	

---

D	F	A $\flat$	E	D	
┌───316───┐		┌───294───┐		┌───296───┐	
└───┘		└───┘		└───┘	
good		good		bad	

---

Ratios: 294¢ = 32:27, 296¢ = 32:27 + schisma, 316¢ = 6:5

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The most interesting discrepancy in Ramos's discussion of acceptable and unacceptable intervals occurs in his evaluation of the perfect fifths and perfect fourths. One of the major defects of both Pythagorean tuning and just intonation is the appearance of a perfect fifth--a "wolf fifth"--that is noticeably out-of-tune in relation to the other fifths. In a Pythagorean tuning on C, the wolf fifth occurs between the pitches G $\sharp$ -E $\flat$ ; the problem of the wolf fifth is somewhat mitigated, however, by the fact that the

TABLE 13

EVALUATION OF DITONES IN CENTS  
ACCORDING TO RAMOS'S DIVISION

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		bad 406			good 386			good 408		
C	C#	E	F	Ab	A	C	C#			
	386 good		406 bad		408 good					

---

		good 408			good 386			bad 406		
D	Eb	F#	G	Bb	B	D	Eb			
	408 good		406 bad		386 good					

---

Ratios: 386¢ = 5:4, 408¢ = 81:64, 406¢ = 81:64 - schisma

---

fifth  $G\#-Eb$  would rarely appear in contemporary practice. In Ramos's tuning system, the wolf fifth occurs between the pitches  $G-D$ --a much more objectionable location. According to Ramos's tuning, the wolf fifth  $G-D$  (40:27) is 22 cents smaller than the pure perfect fifth (680 cents vs. 702 cents). This difference of a syntonic comma is quite audible and creates a perfect fifth that is very flat. Yet, consistent with his previous considerations in regard to the mixture of the accidental orders, Ramos labels the interval

G-D as "good" while designating the interval C $\sharp$ -A $\flat$  as a "useless diapente."<sup>3</sup> This "useless interval" holds the value of 700 cents--only a schisma difference from a pure perfect fifth! Once again, Ramos chooses to accept the intervals that are notated as perfect fifths, but rejects the diminished sixth interval of C $\sharp$ -A $\flat$ .

TABLE 14  
EVALUATION OF THE DIAPENTE IN CENTS  
ACCORDING TO RAMOS'S DIVISION

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		bad 700		good 702		good 702	
C	C $\sharp$	G	A $\flat$	D	E $\flat$	A	B $\flat$
	┌─── 702 ──┐		┌─── 680 ──┐		┌─── 702 ──┐		
		good		good		good	

---

		good 702		good 702			
A	B $\flat$	E	F	B	C	F $\sharp$	C $\sharp$
	┌─── 702 ──┐		┌─── 702 ──┐		┌─── 702 ──┐		┌─── 702 ──┐
		good		good		good	good

---

Ratios: 680¢ = 40:27, 702¢ = 3:2, 700¢ = 3:2 - schisma,

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<sup>3</sup>Ibid., 80.

Likewise, in his discussion of "good" and "bad" perfect fourths, Ramos accepts the interval *D-G* (27:20, 520 cents) that is a syntonic comma greater than the pure perfect fourth, but rejects the augmented third *A<sup>b</sup>-C<sup>#</sup>* that is only a schisma greater than the pure perfect fourth (500 vs. 498 cents).

TABLE 15

EVALUATION OF THE DIATESSARON IN CENTS  
ACCORDING TO RAMOS'S DIVISION

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		good 498		good 498		good 498	
C	C <sup>#</sup>	F	F <sup>#</sup>	B <sup>b</sup>	B	E <sup>b</sup>	E
	498		498		498		
	good		good		good		

---

		good 498		bad 500		
D	E <sup>b</sup>	G	A <sup>b</sup>	C	C <sup>#</sup>	F
	520		498			
	good		good			

---

E	A	D
498	498	
good	good	

---

Ratios: 498¢ = 4:3, 500¢ = 4:3 + schisma, 520¢ = 27:20

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In many ways, Ramos remained a Pythagorean. He understood that the ditone must "theoretically" correspond to the Pythagorean ratio of 81:64 but, due to its audible harshness, he proposed an alternative that provided for pure major and minor thirds at some of the more common locations.

Ramos well understood that the typical fifteenth-century performer had little interest in the complicated ratios of speculative theory. Thus, rather than inundating the performer with complicated instrumental ratios, Ramos based his acceptance and rejection of the intervals upon regular and irregular notational spellings; a method that the performer could easily understand and subsequently apply to effect purer thirds and sixths.

Lindley's Misinterpretation (1975) of Ramos's Tuning

In "Fifteenth-Century Evidence for Meantone Temperament," Mark Lindley asserts that Ramos is a proponent of meantone temperament--tempering fifths in order to acquire more resonant thirds and sixths. This assertion is grounded upon Lindley's manipulative and incorrect translation of Ramos's text, and justified by references to other period writings (including those of Gaffurius--Ramos's strongest opponent). Lindley's interpretation of Ramos's theories are, for the most part, nothing less than incredible leaps to unsubstantiated conclusions.



Lindley is correct to point out that Ramos oddly categorizes the wolf fifth  $G-D$  as a "good" interval while disapproving of the interval  $C\sharp-A\flat$  but, as explained above, Ramos's intervallic evaluations are based upon the specific notation of the intervals rather than upon the actual value of the mathematical ratios themselves.

Lindley states that he could accept Ramos's tuning as a "Pythagorean" tuning if only Ramos had dismissed the interval  $C\sharp-A\flat$  as a "bad" fifth. Lindley explains that either this Pythagorean tuning designation would be based upon a wolf fifth from  $C\sharp-A\flat$  ("in which the thirds that beat profusely are labelled 'good' and those nearly pure 'bad,'"), or that Ramos's division is essentially a "regular meantone temperament with three flats and two sharps."<sup>4</sup> An analysis of Ramos's evaluation of ditones (see Table 13 above), however, demonstrates the inaccuracy of Lindley's assertion. While it is true that Ramos labels the intervals that "beat profusely" (408 cents) as "good," the thirds that Ramos labels as "bad" can hardly be called "nearly pure," as categorized by Lindley. Ramos's "bad" thirds are only a schisma in difference from his "good" thirds (406 vs. 408 cents), and the "bad" thirds are actually closer to the pure intervals of 386 cents than to his "good" thirds.

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<sup>4</sup>Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 41.

If one were to rely, as did Lindley, upon the comments of Ramos's contemporaries in order to understand the inconsistency in Ramos's terminology, a degree of clarity may be found in the passage where Spataro discusses the theoretical vs. practical nature of specific intervals:

. . . the more you try to criticize Bartolomé Ramos, my master, the more you get enmeshed and show clearly your ignorance, small knowledge, malice, and obstinacy . . . Bartolomé Ramos has said that (only in practice, that is in musical usage and activity) the ditone corresponds to the  $5/4$  ratio, but not in speculative music, . . . where the ditone corresponds to the ratio  $81/64$  . . . the  $81/80$  ratio [the syntonic comma] (which is the difference between the Pythagorean intervals and the intervals used by experienced musicians is audible--not imperceptible as in your above-mentioned chapter you have concluded. For were it not appreciable, the harsh Pythagorean monochord would not [have to] be reduced, smoothing [it] to the sense of hearing . . . Bartolomé Ramos [also] judged that the difference is perceptible between the  $6/5$  minor third and the minor third corresponding to the  $32/27$  ratio, because otherwise it would be self-defeating to add the  $81/80$  interval in order to reduce the musical intervals from harshness to smoothness.<sup>5</sup>

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<sup>5</sup>" . . . quanto piu tu cerchi reprehendere Bartolomeo Ramis mio preceptore, tanto piu te ne vai intricando: et fai manifesta la tua ignorantia: poco sapere: malignita: et obstinatione . . . da Bartolomeo Ramis e stato dicto che (solo in practica overo in la Musica usitata: et activa el ditono cadete in la comparatione sesquiquarta: & non in la Musica speculativa . . . in la quale cade el ditone tra .81. ad .64. comparati . . . la proportione cadente tra .81. ad .80. laquale e la differentia cadente tra li pythagorici intervalli: & li intervalli da li modulanti usitati e sensibile; & non insensibile come nel predicto tuo capitulo hai concluso. Perche non essendo sensibile: el duro monochordo pythagorico non seria ridotto in molle al senso de lo auditio . . . da Bartolomeo Ramis e stato inteso essere differentia sensibile tra il semiditono sesquiquinto & il semiditono cadente tra .32. ad .27. comparati: perche altramente: el seria frustratorio la addictione de lo intervallo cadente tra .81. ad .80. circa el ridurre li Musici intervalli de duro in molle . . . ." Spataro,

Lindley interprets this passage, in which Spataro discusses the syntonic comma, as evidence that Ramos promoted meantone temperament; Spataro, however, makes no mention in this passage of tempering the fifths or of any division of the syntonic comma into fourths--a necessary requisite in the generation of meantone temperament. Moreover, the wolf fifth that would arise from meantone temperament falls between  $G\sharp-E\flat$  (approximately 59 cents larger than the wolf fifth of just intonation), whereas the wolf fifth in Ramos's tuning occurs between  $G-D$ . Spataro does, in fact, refer to a tuning discrepancy, but it is not the discrepancy between Pythagorean tuning and meantone temperament as Lindley asserts; rather, it is a discrepancy between Pythagorean tuning and just intonation.

Lindley continues his discourse by addressing Ramos's disregard for the necessity of having a pure fifth on  $C\sharp-G\sharp$ . Because Ramos's monochordal division uses the pitch  $A\flat$  rather than  $G\sharp$ , Ramos proposes cadential alternatives that can be utilized by the performer in order to avoid the interval of  $C\sharp-G\sharp$  which, he claims, is a "useless diapente, since it is rarely made and, to tell the truth, should never be made."<sup>6</sup>

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*Errori di Franchino Gafuria da Lodi* (Bologna, 1521), ff. 21v-22r; quoted and translated by Mark Lindley, "Fifteenth Century Evidence for Meantone Temperament," 42.

<sup>6</sup>Ramos de Pareia, *Musica practica*, 80.

In order to avoid the problem that results from the use of  $A\flat$  instead of  $G\sharp$ , Ramos provides an alternative for the traditional double leading-tone cadence, demonstrated below in Figure 1. Because Ramos's scale does not have the pitches  $D\sharp$  and  $G\sharp$ , but rather the enharmonic spellings of  $E\flat$  and  $A\flat$ , Ramos suggests that poor intonation can be avoided by moving the tenor from  $B\flat$  down to  $A$ , the middle voice from  $D$  to  $E$ , and the cantus from  $G$  to  $A$ . The final result is a Phrygian cadence, rather than a Lydian cadence. By changing the cadence in this manner, singers can not only avoid both the "bad ditone" of  $B-E\flat$  and the "bad major hexad" of  $B-A\flat$  but, as Ramos states, such a transition will not only be "good," but will be even "better, sweeter, and smoother"<sup>7</sup> than the first.

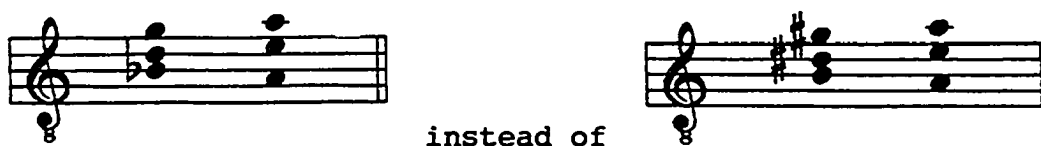


Figure 1. Ramos's Proposed Alternative to the Traditional Double Leading-Tone Cadence

Ramos's suggestion of a cadential alternative to avoid the  $G\sharp$  and the discourse that follows clearly demonstrates his interpretation of the A cadence as a representative of the deuterus, rather than the protus, mode. In *Musica Ficta: Theories of Accidental Inflections in Vocal*

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<sup>7</sup>Ibid.

*Polyphony from Marchetto da Padova to Gioseffo Zarlino*, Karol Berger notes that there was considerable disagreement during the period regarding the modal interpretation of the A cadence, especially in regard to the choice of which leading tone should be implemented by the performer.<sup>8</sup> Most theorists maintained that A was the *finalis* of the protus mode and, therefore, such a *finalis* implied a lower leading tone G#; Prosdocimus, Ugolino, and Ramos, insisted that A was the *finalis* of the deuterus mode with a key signature of one flat and, therefore, such a *finalis* implied an upper leading tone of Bb.<sup>9</sup> Although examples do exist to provide evidence that composers did acknowledge the A cadence within the confines of the deuterus mode--even when there were no flats in the signature--the overwhelming majority of fifteenth-century musicians favored the use of the A cadence within the confines of the protus mode. In fact, no matter what the mode, there seems to be a preference at cadences for the implementation of the lower leading tone whenever

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<sup>8</sup>Karol Berger, *Musica Ficta: Theories of Accidental Inflections in Vocal Polyphony from Marchetto da Padova to Gioseffo Zarlino* (Cambridge, Mass.: Cambridge University Press, 1987) 143-48.

<sup>9</sup>See Ugolino d'Orvieto's *Declaratio musicae disciplinae*, ed. by Albert Seay, vol. II (Rome: American Institute of Musicology, 1960), 51ff and Prosdocimus de Beldemandis's *Tractatus musice speculative contra Marchetum de Padua* in D. Raffaello Baralli and Luigi Torri, "Il Trattato di Prosdocimo de'Beldomandi contro Il Lucidario di Marchetto da Padova," *Rivista musicale italiana* XX (1913), 750-51.

possible. There can be little doubt of Ramos's conviction that the A cadence is representative of the deuterus mode:

And if anyone wishes to say that there [on *h*]<sup>10</sup> the *protus* is born again, and the conditions which *d* held to should also be obtained on *h*, and [that] since *d* was shown to have a semitone below and above itself, *h* also [ought to proceed] in the same way, we will respond by saying that the argument does not proceed [logically], since the former held *g*, which claims all similitude to itself below and above in the *synēmmenōn* tetrachord. Nevertheless, [this is not true] with *h*, because it contains two tones below itself. . . .

Therefore, that string [*h*] is the *deuterus* in the conjunct [tetrachord, and it is] as much authentic as it is plagal.<sup>11</sup>

Ramos's conviction is grounded in logic; his choice for a modal interpretation of the A cadence within the deuterus mode rests heavily upon a determination to avoid the necessity of the pitch *G#*--a pitch that does not occur in Ramos's monochordal division.

It should be noted that Ramos does not prohibit the use of the lower leading tone in the *D* cadence. In his discussion of counterpoint, Ramos advises the reader to change the minor sixth into a major sixth whenever this penultimate interval leads to the octave, and provides an example with a lower leading tone (*C#*) instituted by means of *musica ficta* (see Figure 2).<sup>12</sup>

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<sup>10</sup>For Ramos, *h* refers to the pitch *a*.

<sup>11</sup>Ramos de Pareia, *Musica practica*, 80.

<sup>12</sup>But if [the tenor] descends from *e* to *d*, or at another similar place, the organum must not make *k l* because it is a minor sixth. But if we wish to do [this], it is necessary to raise *k* if we ascend from the lower part [to a

Further, in his fifth rule of counterpoint--a rule in which the minor third leads to the unison--Ramos reveals a bias for the upper leading tone cadence in passages that come to rest on a unison.



Figure 2. Ramos's Lower and Upper Leading-Tone Cadences

In the penultimate chapter of his treatise, Ramos continues his discussion relative to the tuning of *g* and *h*, referring to the fact that the major third above *E* (*G#*) will be out-of-tune in a Burgundian cadence approaching an *A finalis*. Ramos advocates the complete elimination of the *G#* either by employing only the root and fifth of the concord, or by substituting the pitch *G#* for *G#* (see Figure 3).

But other practicing musicians say: "If this [tuning of the note between *g* and *h*] were to be made, the diapente *e-square*  $\sharp$  would not have an intermediate third [*g#*]," which is a major [third] in relation to the lower [note] and a minor [third] in relation to the upper [note], as we have said in the second part, the third treatise [in the chapter] concerning composition. But this is not an obstacle, because when that [harmony] of the Phrygian is aroused, it does not matter if it lacks the intermediate third, or if the major [third] is established in relation to the upper [note] and the

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higher] note, or to sustain [*e*] if we descend from the higher note [to the lower note--that is, from *c* to *b*]." Ibid., 52.

minor [third] is established in relation to the lower [note].<sup>13</sup>

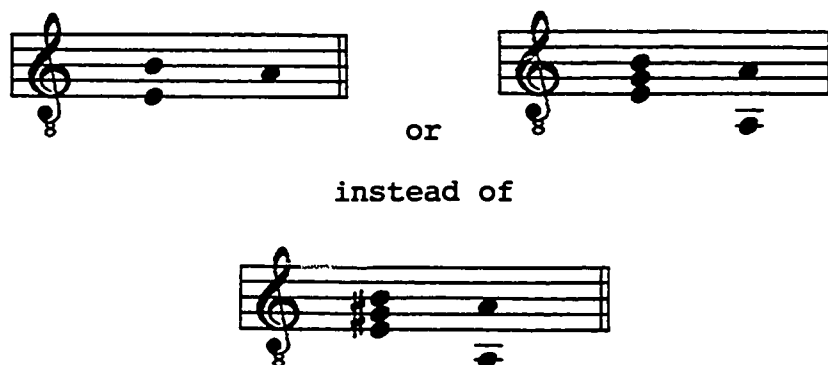


Figure 3. Ramos's Alternatives to the Traditional Burgundian Cadence

Lindley, however, translates the passage related to Burgundian alternatives in the following manner:

Now other practitioners say [that] in this arrangement *B* and its fifth do not have the intermediate third [*D*♯] major to the lower note [*B*] and minor to the upper [*F*♯]. But that is no obstacle, because in a Phrygian [cadence] it does not matter if that third is missing or if the third placed there is a major third to the upper note and minor to the lower [i.e., *D*♯].<sup>14</sup>

The fifth to which Ramos's discussion is directed concerns *E-B*♯, not *B-F*♯ as is stated by Lindley. It is possible that Lindley's error results from a misunderstanding of Ramos's literary style. In the phrase "*diapente e-♯ quadro*," Lindley translates the Latin "*e*" ("from," or

<sup>13</sup>Ibid, 80.

<sup>14</sup>Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 48.



"out of") followed by the letter *b* (*♯*) as "B and its fifth," i.e., *B-F♯*. Ramos, however, does not employ the word "e" in the sense of "from" in any part of the treatise; rather, Ramos uses the word "ex" to render this meaning.<sup>15</sup>

Further, Ramos makes absolutely no mention of the pitch name *F♯* in this passage. One may argue that a literary preposition should occur before the pitch *E*, but Ramos rarely uses a preposition before such a letter that represents a pitch; rather, the reader must insert this preposition for himself. Ramos is not, as Lindley believes, referring to a cadence (in modern terms) of V-i in *E* minor,<sup>16</sup> nor is Ramos referring to the major third above *B* (*D♯*), for he has already demonstrated in preceding paragraphs that the pitches *B-D♯* (*E♭*) will be acoustically unacceptable. Rather, Ramos is emphasizing that the pitches *E-G♯* will result in intonation problems and that such a concord should be avoided whenever his tuning method is employed.<sup>17</sup> Ramos assumes that the reader knows exactly

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<sup>15</sup>In Part 1, Treatise 1, Chapter 2, Ramos uses the word "e" in the phrase "e regione" ("in a straight line"). This is an idiomatic phrase and does not serve to support the argument of "e" as a typical component in Ramos's Latin style usage.

<sup>16</sup>See Lindley's Example 1, 47.

<sup>17</sup>This error also appears in Barbour's *Tuning and Temperament*, 92. Such a mistake is understandable due to the fact that Ramos leaves out the necessary nouns and pitch names that would help to clarify his meaning.

what he means; singers are to avoid  $D\sharp$  and  $G\sharp$  whenever they choose to implement his division of the monochord.

This interpretation of the passage relating to Burgundian alternatives is verified by the subsequent paragraph in the *Musica practica*:

But some [people], wishing to satisfy both parts, insert another string between the third  $b$  [ $ab$ ] and  $h$ , which they make distant from the third  $b$  [ $ab$ ] by the space of a comma. Nevertheless, this is not praised on account of this: because then it would be another mixed genus rather than the simple diatonic [genus].<sup>18</sup>

Here, Ramos notes that one solution to the concerns posed by the lack of  $G\sharp$  is to insert an additional string between  $a\flat$  and  $h$ . Lindley makes use of this passage in an attempt to substantiate his hypothesis that Ramos was an advocate of meantone temperament. Although it is true that additional strings were occasionally employed on keyboard instruments to split certain black keys that would have otherwise produced unacceptable intonations, and while it is also true that the use of split keys was a manifestation of meantone temperament, Ramos clearly instructs against this approach based on the fact that it results in another mixed genus rather than the simple diatonic genus.

Lindley again misinterprets Ramos's comments concerning Tristan de Silva's endorsement of an extra string inserted between  $F$  and  $F\sharp$  that would serve to introduce  $G\flat$  to the gamut. Having supplied yet another faulty

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<sup>18</sup>Ramos de Pareia, *Musica practica*, 80.

translation--one clearly taken out of context with the blatant omission of a section that is necessary for its correct understanding--Lindley concludes that Ramos is of the opinion that the extra string proposed by de Silva is "pointless," and that Ramos prefers to split  $A\flat/G\sharp$ :

Now my friend Tristan de Silva used to say that another string should be inserted between  $F$  and  $F\sharp$ . From this intermediate third we gain not utility, but discrepancy and discord in the whole system, since neither another natural nor an accidental of another type [i.e., a flat] is to be gained by this means. But enough on this point. (However, the first proposal is better proof of which in another volume I shall explain with very firm mathematical reasoning.) But now with an epilogue to the above I shall end this work.<sup>19</sup>

Lindley's interpretation is nothing short of a manipulation of the original text; it serves to support Lindley's argument that Ramos was an advocate of meantone temperament.

First, Ramos states that de Silva's solution is erroneous, and that he, Ramos, accepts neither the addition of the string between  $F$  and  $F\sharp$  nor the addition of the string between  $A\flat$  and  $A$ . Second, an accurate translation of the passage clearly demonstrates a view quite opposed to the one advanced by Lindley:

But our friend Tristan de Silva used to say that another string should be inserted between  $f$  and the second  $\sharp$  [ $f\sharp$ ]. And thus he claimed to have discovered it by means of the numbers themselves. Indeed, we believe that the error will appear to him just as [the error] that *gamma*--a note which was added by our

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<sup>19</sup>Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 51.

[predecessors]--would someday be treated as *proslambanomenos*. Therefore, we do not believe that the latter [the string between *F* and *F#*] nor the former [the string between *A<sup>b</sup>* and *A*] should be admitted in our diatonic genus. For then we would fall into that error which we have read Timotheus of Miletus fell into--according to the testimony of Boethius--namely, that he converted the diatonic genus into the chromatic (which is better). [And] on account of this, the Lacedaemonians of Laconia cast him out of the city, since he was harming the souls of the young boys which he had accepted for the purpose of teaching, and by deviating from the moderation of virtue toward softness, he was producing effeminate [young men]. Therefore, that intermediate third does not bring usefulness as much as it advances discrepancy and discord in the entire order, since, as the masters say, by this means it may not be arranged according to the natural [order] nor according to another accidental order. But enough concerning these things. Nevertheless, they will better perceive [the concepts] of the first [volume], whose truth we will explain in the following volume with the firmest numerical calculations. But now, let us put an end to this work by continuing [with] the epilogue mentioned above.<sup>20</sup>

One might assume that Lindley's omission of the significant text concerning Ramos's rejection of the extra strings can be attributed to differences between the A-80 and A-81 editions; for the missing section of text that would destroy Lindley's argument may only be found in the A-81 edition of the *Musica practica*. An examination of Lindley's article, however, reveals that Lindley possessed and relied largely upon Johannes Wolf's modern reprint of the *Musica practica*; this reprint includes the text for both

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<sup>20</sup>Ibid., 80-81.

the A-80 and A-81 editions.<sup>21</sup> Further, Lindley's translation of the last portion (referring to the discrepancy and discord brought about by the intermediate third) reveals that he did indeed have A-81 in his possession,<sup>22</sup> for this portion of text only appears in the A-81 edition. By means of this evidence, one can only conclude that Lindley had access to the A-81 edition, but chose to omit this important passage because it undermines his hypothesis of meantone temperament.

#### Conclusion

Twentieth-century musicologists have attempted to categorize Ramos's monochordal division as either a form of meantone temperament or of just intonation. Clearly, Ramos's tuning does not fall under the generally accepted definition of meantone temperament. Although meantone temperament is similar to just intonation with respect to the employment of pure major thirds, meantone temperament is based upon the tempering of fifths (by one-fourth of a syntonic comma) and upon the utilization of equal-sized whole tones.<sup>23</sup> Lindley's assertion that a form of meantone

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<sup>21</sup>See Lindley, "Fifteenth-Century Evidence for Meantone Temperament," footnotes 3, 4, 5, 8, 9, 25, 27, and 42. See also Wolf, ed., *Musica practica*, 102.

<sup>22</sup>See Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 51.

<sup>23</sup>The first true discussion of meantone temperament appears in Pietro Aaron's treatise *Thoscanello* (1523).

temperament is proposed in the *Musica practica* is without merit; Ramos advocates the use of ten pure fifths and two different sizes of whole tones (9:8 and 10:9). Admittedly, Ramos accepts two impure fifths (G-D and C $\sharp$ -A $\flat$ ) rather than the single wolf fifth that was indigenous to most tuning systems of the fifteenth century, but this single inconsistency is hardly sufficient to label Ramos as a proponent of meantone temperament. Further, Ramos advises against the use of split keys--a salient feature of meantone temperament--because he strongly discourages the use of different strings for enharmonic pitches.

Several musicologists, including François Fétis, have assumed that Ramos was an advocate of equal temperament.<sup>24</sup> Ramos, however, did not believe that enharmonic spellings could be acoustically equivalent and, therefore, the argument that Ramos was an advocate of equal temperament must be rejected.

The tuning method proposed by Ramos results in a temperament that is more conducive to some keys than to others; such a factor could lead one to conclude that Ramos's tuning was actually a type of irregular temperament. While irregular keyboard temperaments were more prevalent during the late seventeenth and early eighteenth centuries,

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<sup>24</sup>Fétis, *Biographie Universelle des Musiciens*, 178.

Ramos's monochordal division does indeed contain characteristics inherent to irregular temperament.

Irregular keyboard temperaments generally require that the more frequently used thirds are tempered to a lesser degree than the thirds that are employed less frequently, and that not all fifths have the same ratio. Ramos himself proposes the use of three different sizes of thirds, which results in a temperament where certain key signatures are more "in tune" than others. Ramos's method cannot be classified as irregular temperament, however, because the purpose of re-tuning the fifths in irregular keyboard temperaments is to eliminate the wolf fifth; the wolf fifth is a salient feature of Ramos's system.<sup>25</sup>

Barbour's description of Ramos's method as "an irregular tuning, combining features of both the Pythagorean tuning and just intonation"<sup>26</sup> may be the best description to encompass the intricacies of Ramos's tuning system. Ramos's system not only provided the practicing musician with a simpler division of the monochord, but allowed for a

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<sup>25</sup>The first published description of irregular temperament within a complete chromatic tuning appeared twenty-nine years after the publication of the *Musica practica*. See Arnolt Schlick's *Spiegel der Orgelmacher und Organisten* (1511).

<sup>26</sup>Barbour, *Tuning and Temperament*, 4.

greater number of pure intervals and triads whenever the division was utilized in certain key signatures.<sup>27</sup>

A examination of Ramos's monochordal division and his comments about this division in the *Musica practica* reveal his true intentions. Ramos did not propose his tuning with the intention of abolishing the Pythagorean ratios; for these ratios figure predominantly in his proposed monochordal division. Rather, Ramos offered his tuning system as a refinement to Pythagorean tuning in order to meet the demands of the fifteenth-century practicing musician. The result of Ramos's modifications to the Pythagorean system was a tuning that greatly increased the number of pure intervals, thus improving intonation, and profoundly influencing the future development of instrumental tuning.

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<sup>27</sup>Although Ramos's tuning results in unacceptable major and minor triads on G (an audible *faux pas* that is difficult to dismiss), an examination of Ramos's monochordal division reveals the existence of several pure triads that fall within the common key signatures employed during this period, i.e., the three pure major triads of C-E-G, F-A-C, B $\flat$ -D-F and the three pure minor triads of A-C-E, D-F-A, E-G-B. Furthermore, there are several other triads in Ramos's tuning that would likewise find acceptance among the advocates of Pythagorean tuning as well as in the circles of the fifteenth-century practicing musician.



## CHAPTER V

### PSALLITUR PER VOCES ISTAS: AN ALTERNATIVE TO GUIDONIAN SOLMIZATION

Guido d'Arezzo introduced a new method for the singing of plainsong in his *Epistola de ignoto cantu* (ca. 1032). This method is based upon the assumption of hexachords of identical construction, beginning on the pitches C, F, and G, that overlap to form a range of twenty-two available pitches.<sup>1</sup> The intervallic successions are identified by the six vocables *ut, re, mi, fa, sol, la*--the first textual syllables of the six phrases that appear in the Latin hymn *Ut queant laxis*--each of which begins a step higher than the preceding phrase.

Each of the hexachords consists of an intervallic succession of tone--tone--semitone--tone--tone; to preserve this pattern *B $\flat$*  (*b rotundum*) and *B $\natural$*  (*b quadratum*) are required in the respective F and G hexachords.<sup>2</sup> Thus, in the hexachord system, the semitone is always fixed by the

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<sup>1</sup>Ramos claims that Guido separated the initial pitches of the hexachords by the distance of the tetrachord (G, c, f) in order to imitate the teaching of Boethius and thereby, adhere to the *auctoritas*. Ramos de Pareia, *Musica practica*, 10.

<sup>2</sup>These signs *b rotundum* and *b quadratum* are the precursors of the flat and natural/sharp signs, respectively, that appear in modern notation.

syllables *mi-fa* that serve to establish the relative positions of the seven overlapping hexachords extending from  $G$  ( $\Gamma$ ) to  $e^2$ . These seven interlocking hexachords, alternatively referred to as the *deductiones*, begin on the respective pitches of  $G, c, f, g, c^1, f^1, g^1$ . The hexachord beginning on  $G$  ( $G A B \natural C D E$ )--due to its employment of the *hard* or *square b* (*b durum* or *b quadratum*)--is designated as the *hard* hexachord (*hexachordum durum*); the hexachord on  $F$  ( $F G A B \flat C D$ )--due to its employment of the *soft* or *round b* (*b molle* or *b rotundum*)--is designated as the *soft* hexachord (*hexachordum molle*); and the hexachord on  $C$  ( $C D E F G A$ )--without either *soft* or *hard b*--is designated as the *natural* hexachord (*hexachordum naturale*).

No ambiguity exists regarding the specific location and function of a pitch. The exact location of a pitch within the gamut is identified by its letter name and its appropriate vocable or vocables. Thus, a particular pitch is identified by one, two, or three solmization syllables--depending upon that pitch's location in the gamut--as well as its function within the system.<sup>3</sup> Wherever the same letter name and syllable occur on the same pitch class, the additional designation of *graves*, *acutae*, or *superacutae* is employed (i.e., the pitch  $A$  is more properly identified as a

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<sup>3</sup>This explains why the Guidonian gamut is a construct of 22, rather than 23 pitches. Only two of the three  $B$ 's possess the dual function of *hard b* and *soft b*; the lowest,  $B$  *mi*, functions only as *hard b*.

re, while the pitch *a* is called a *la mi re (graves)*, and the pitch *a*<sup>1</sup> is called a *la mi re (acutae)*).<sup>4</sup> For pedagogical purposes, the hexachord gamut is illustrated in Medieval-Renaissance treatises in the form of a *scala* (ladder). Table 16 is a modern representation of the typical *scala* that was used to illustrate the Guidonian system.

Even in the positions of *b* and *b*<sup>1</sup> (which contain syllables that differ in pitch by a chromatic semitone), the use of the syllables *mi* and *fa* designate the desired pitch: *mi* refers to *b quadratum*<sup>5</sup> while *fa* refers to *b rotundum*. In general, *b quadratum* is assumed unless flat signature signs or principles of *musica ficta*<sup>6</sup> are used to express the opposite alternative.

Plainsong of the Middle Ages was not, of course, limited to the six-note range of the hexachord. To enable a singer to freely ascend and descend throughout the gamut, a procedure known as *mutation* serves to accommodate those melodies extending beyond the range of a single hexachord. If, for example, a singer wishes to sing an ascending eight-

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<sup>4</sup>Although Ramos uses the traditional designations of *acutae* and *graves* in his explanation of the Guidonian gamut, he generally refers to these pitches simply as the "first" or the "second" *a la mi re*, respectively.

<sup>5</sup>Because the square *b* sign is the ancestor of our present-day natural sign, the sign *♮* is used in this dissertation to designate *b mi*.

<sup>6</sup>See Chapter VI of this commentary for a more thorough discussion of *musica ficta*.

TABLE 16<sup>7</sup>

## THE GAMUT OF THE GUIDONIAN HEXACHORD SYSTEM

Present-day designations	<i>Deductiones</i>			Medieval designations
e <sup>2</sup>			la	ee la
d <sup>2</sup>			la sol	dd la sol
c <sup>2</sup>			sol fa	cc sol fa
b <sup>1</sup>			fa mi	bb fa (or) bb mi
a <sup>1</sup>		la	mi re	aa la mi re
g <sup>1</sup>		sol	re ut	g sol re ut
f <sup>1</sup>		fa	ut (D)	f fa ut
e <sup>1</sup>		la	mi (M)	e la mi
d <sup>1</sup>	la	sol	re	d la sol re
c <sup>1</sup>	sol	fa	ut	c sol fa ut
b	fa	mi	(N)	b fa (or) b mi
a	la	mi	re	a la mi re
g	sol	re	ut	G sol re ut
f	fa	ut	(D)	F fa ut
e	la	mi	(M)	E la mi
d	sol	re		D sol re
c	fa	ut		C fa ut
B	mi	(N)		B mi
A	re			A re
G	ut			Γ ut
(D)				

<sup>7</sup>This dissertation uses the modern designation of c<sup>1</sup>, c<sup>2</sup>, etc. rather than the capital, lower-case, or double lower-case letters found in Medieval-Renaissance treatises; (D), (N), and (M) represent the *durum*, *naturale*, and *molle*, hexachords, respectively.

note scale from *G* to *g*, he should make a shift from *hexachordum durum* to *hexachordum naturale* via the reassignment of a particular pitch's function within the system. Thus, when the singer arrives at the pitch *c fa* (its designation in the hard hexachord), he replaces it with *c ut* (its designation in the natural hexachord) and continues his ascent to complete the eight-note scale. The concept of mutation is an integral component of the functional hexachord system; although variants are proposed by several Medieval-Renaissance theorists, the technique itself had suffered only minor modifications before the publication of the *Musica practica*.

#### Ramos's Discussion of the Gamut

In Part 1, Treatise 1, Chapter 3, Ramos discusses the "errors" of Guido and his followers in regard to the technical organization of the medieval gamut. He notes that only seven letters exist--not twenty as Guido claimed--because the letters are repeated at the octave. Further, Ramos criticizes the Guidonian division of the gamut that classifies the pitches as eight *graves*, seven *acutae*, and five *superacutae*, because "the eighth and the first letter are shown to differ only in respect to [their] highness and lowness."<sup>8</sup> Ramos discusses how the Guidonians claim to have based their division on Boethius, since Boethius

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<sup>8</sup>Ramos de Pareia, *Musica practica*, 9.

himself placed *g* among *graves*; Ramos notes, however, that *g* no longer belongs to *graves* due to the later addition of the letter *F* by Pope Gregory. In a clear attempt to organize the gamut by octaves rather than hexachords, Ramos re-categorizes its pitches as seven *graves* (*F*, *A*, *B*, *c*, *d*, *e*, *f*), seven *acutae* (*g*, *a*, *b*, *c*<sup>1</sup>, *d*<sup>1</sup>, *e*<sup>1</sup>, *f*<sup>1</sup>), and six *superacutae* (*g*<sup>1</sup>, *a*<sup>1</sup>, *b*<sup>1</sup>, *c*<sup>2</sup>, *d*<sup>2</sup>, *e*<sup>2</sup>).

#### Ramos's Alternative to Guidonian Solmization

Ramos's division of the monochord requires two sizes of whole tones, 9:8 and 10:9. A significant problem evolves from this division, however, if the performer chooses to use the solmization syllables that were proposed by Guido d'Arezzo: the notes *ut re mi* of the natural hexachord result in the whole tone intervals of 9:8 and 10:9, respectively, while the notes *ut re mi* of the soft hexachord result in the whole tone intervals of 10:9 and 9:8. This incongruity between whole tones appears to be the main reason behind Ramos's abandonment of Guido's method of solmization; for Ramos points to this incongruity as the justification for suggesting an alternative method.

In Part 1, Treatise 2, Chapter 6, Ramos addresses the difference that occurs between the whole tones of 9:8 and 10:9 when the hexachord system is employed within his monochordal division. He notes that the pitch *g sol re ut*

holds a difference in size depending upon its function in the various hexachords:

For the difference of music is built upon the quantity of the arsis and thesis, and it is not based upon the magnitude or, if you prefer, the strength or weakness of a note. For when the three properties of the notes--differing among themselves--are arranged in Guido's theory, it is necessary to establish a difference between the equal notes. For it will be necessary to make a difference between *g sol re ut* (the *sol* of the *natural* [hexachord]) and *re* of the *soft b* [hexachord] or *ut* of the *hard ♯* [hexachord]. Likewise also [it will be necessary to make a difference between] *re* and *ut*. As I was saying, they are not equals, and consequently a mutation cannot be made upon them. And nevertheless, [Guido's followers] make [a mutation] according to their doctrine that was already discussed above.<sup>9</sup>

The difference between the whole tones that result from Ramos's monochordal division is not, however, the only reason that he sought an alternative method of solmization. The increased use of chromaticism through the recognition and employment of irregular hexachords, i.e., *coniunctae*, resulted in flat or sharp accidentals on virtually every note and greatly complicated the matter of mutation. With characteristic sarcasm, Ramos begins his discussion in Part 1, Treatise 1, Chapter 4 by casting an insult toward Guido, proclaiming him "a better monk than a musician."<sup>10</sup> Ramos scolds Guido for his dependence upon the *senaria* as the theoretical justification for the hexachord system and,

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<sup>9</sup>Ibid., 31.

<sup>10</sup>Ibid., 10.

in Chapter 8 of the *Musica practica*,<sup>11</sup> exalts the merits of the number eight over the number six in the hope of demonstrating the superiority of his own system over that proposed by Guido.

Such homage to number is typical of the Medieval-Renaissance musician. In his discussion of Guido's hexachord system, Ramos briefly mentions that mathematicians consider the number six, the *senaria*, to represent perfection; Ramos does not elaborate on the reasons for this perfection, assuming that its quality of perfection is obvious to the reader. In the introduction to Gioseffo Zarlino's treatise *Le institutioni harmoniche* (1558), Claude Palisca gives the present-day reader an explanation of the *senaria's* significance in the Middle Ages and Renaissance:

The number 6 has the virtue of being the first perfect number, meaning that it is the sum of all the numbers of which it is a multiple ( $1 + 2 + 3 = 1 \times 2 \times 3 = 6$ ). Many evidences are given of the power of this number. There are six planets in the sky. In the *Philebus*, Plato says hymns should not celebrate more than 6 generations. There are 6 species of movement: generation, corruption, increase, diminution, alteration, and change of location. According to Plato, there are 6 differences of position: up, down, ahead, behind, right, left. There are six types of logic, and the world was created in six days. And these do not exhaust the list. In music, the significance of the *senario* is that all the primary consonances can be

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<sup>11</sup>It is not coincidental for such a Medieval-Renaissance author to have reserved "Chapter 8" for his discussion of the "number 8."



expressed as superparticular ratios [2:1, 3:2, 4:3, 5:4, 6:5] using only numbers from 1 to 6.<sup>12</sup>

In Part 1, Treatise 1, Chapter 8, Ramos spends an entire chapter promoting the perfection of the number eight, which forms the basis of his octochordal solmization system. Ramos reasons that, although the number six is considered to be perfect by mathematicians, and while the number seven represents the (known) planets of the universe, the number eight, also can be shown to possess "great perfection." Ramos proposes that by adding the firmament to the seven planets, one arrives at a more "heavenly" perfection than that achieved by those mathematicians who exalt the number six. Ramos provides further evidence for the perfection of the number eight with his observation that it is proven to be "geometrically perfect" within the solid body of a cube containing eight angles. Ramos concludes his discussion with the admonition that "whoever truncates or diminishes the eight notes from our music takes perfection and fullness away from it."<sup>13</sup>

In Part 1, Treatise 1, Chapter 7, Ramos introduces his alternative method of solmization as a replacement for the six-vocable system that had been devised by Guido. He

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<sup>12</sup>Gioseffo Zarlino, *The Art of Counterpoint*, Part 3 of *Le istituzioni harmoniche*, 1558, trans. by Guy A. Marco and Claude V. Palisca, *Music Theory Translation Series* (New Haven, Conn.: Yale University Press, 1968), xix.

<sup>13</sup>Ramos de Pareia, *Musica practica*, 19.

suggests that the student first become familiar with the pitches in the octave from *c* to *c*<sup>1</sup> by using the monochord as a reference. Although Ramos refers to various syllable systems that had been suggested by theorists of the past (e.g., noe noananne caneagis, tu pro de no tri te ad, and of course, ut re mi fa sol la), he believes that the employment of such syllables had become greatly overvalued, and he derides the followers of Guido for acting as though the syllables are "entirely necessary to music."<sup>14</sup> Ramos retains the use of syllables, but introduces a solmization system based upon the octave, rather than the hexachord, employing the mnemonic vocables Psal-li-tur per vo-ces is-tas. Note that the new system is initiated on *c* rather than *F*, because "sound begins from the letter *c*."<sup>15</sup>

In Guido's hexachordal system, the semitone is always marked by the syllables *mi-fa*; in Ramos's octochordal system, the first semitone appears between the pitches *E* and *F*, but the second semitone may occur in one of three different locations: between *A-B $\flat$* , *B $\flat$ -B $\natural$* , or *B $\natural$ -C*. Thus, in Ramos's system of solmization, the vocable *is* may represent either *B $\flat$*  or *B $\natural$* . Recognizing that he would receive criticism for not using the same syllables to

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<sup>14</sup>Ibid., 16.

<sup>15</sup>Ibid. The meaning of this sentence becomes clear in Part 1, Treatise 2, Chapter 5 where Ramos points out that, in Spain, the ancient monochords and organs begin on *c* grave.

designate the position of the semitone, Ramos rationalizes that the position of the semitone remains evident to the singer by virtue of the fact that the syllables of all three semitones--*ces*, *is*, and *tas*--end with the letter *s*.

Alarmed by the number of mutations that were necessary to sing the chromatic compositions of his day, Ramos employs only one mutation in his solmization method on the pitch class *C*. Ramos notes that the syllable *tas* appears on the pitch  $c^1$  at the top of the octave scale. If the singer anticipates that he is going to ascend above  $c^1$ , then he is required to make a mutation by changing *tas* to *psal*, and thus ascend to the second octave scale. Typical of a fifteenth-century theorist, Ramos provides a lengthy explanation of why eight syllables are necessary to account for the seven different notes of the diatonic scale; his argument is based upon a desire to demonstrate the difference in range between two *C*'s an octave apart, with the syllables *psal* and *tas* demonstrating the opposites of high and low as well as similarity and diversity.

Nevertheless, someone may doubt--and not without reason--why we establish eight different [syllables], since there are only seven different [notes]; and will remember that it was submitted and taught by us in this way. It is necessary to say that although we have claimed the greatest conformity and similarity between the first [voice] and the eighth [voice], nevertheless, we have never denied them to differ in [regard to their] highness and lowness. Therefore, we have demonstrated both the difference and the similarity between them. We have shown similarity and conformity when we have set down the same vowel letter--namely *a* [for *psal* and *tas*]; however, with the other letters at the beginning [of the

syllable]--that is, s or t--we have revealed the difference of [their] highness and lowness, having recognized their dissimilarity. For when the breath is drawn from the depth of the chest [the sound] is low, but when it is emitted from the surface of the mouth [the sound] is high. The deeper the pronunciation is made in the region around the lung, the lower it sounds; the closer it comes to the mouth cavity, the higher it sounds. Therefore, in this way we know that the letter t united with [the letter] a is produced by the contact of the tongue and the closure of the teeth. And we do not doubt that [the letter] s united with [the letter] a is produced by the application of the tongue to the palette. Therefore, it is clear from what has been said that [p]sal is lower than tas. And if we consider the difference of highness and lowness in the pronunciation of [the letter] l and [the letter] s at the end of the syllable, it will be agreed that such a discussion was most suitably made by us. For the liquid letter l naturally emits a low sound; however, the density of the letter s rises into the high range as if [it were] whistling. And no voice is higher than whistling.<sup>16</sup>

#### The Guidonian Hand

The solmization syllables are used as an aural pedagogical/mnemonic device to assist the student in internalizing the consecutive steps of the gamut. Historically attributed to Guido, the *Guidonian hand* (*manus Guidonis*) is the visual manifestation of the gamut. The *manus Guidonis* places the various pitches and solmization syllables of the medieval gamut in the spaces that occur between the joints of the fingers. By pointing to the locations on the hand, a teacher can visually demonstrate the various intervals of the gamut and thereby reinforce the discussion of audible principles.

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<sup>16</sup>Ibid., 18.

The left hand is generally selected by the Medieval-Renaissance theorist to portray the Guidonian hand in musical treatises. Karol Berger discusses Johannes Tinctoris's observations, in his *Expositio manus*, as to why the left hand is generally chosen for this portrayal:

. . . the places in the left hand are more easily indicated by the index finger on the right, even though some people most aptly indicate the places on the thumb of the left hand with the index finger of the same hand and the places on the other fingers similarly by the thumb of the same hand; wherefore they may use only one hand, that is, the left, in the instruction of this particular kind of lesson.<sup>17</sup>

Although historical evidence affirms that the hand was primarily perceived as a pedagogical aid for the beginning singer, Margaret Bent suggests that the hand may have also served a function in Medieval-Renaissance performances. Bent proposes that the Guidonian hand might have been used as a visual signal to cue the performers to mutations or *ficta* alterations, and thus may have served to coordinate the actions of the choristers. Such a hypothesis may

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<sup>17</sup>"Indice manus dextrae loca in ipsa manu sinistra aptius indicantur, licet nonnulli loca pollicis sinistrae manus indice eiusdem et loca caeterorum digitorum pollice similiter eiusdem aptissime indicent. Quo fit ut unica manu, scilicet sinistra, in traditione huiusmodi doctrinae utantur." Johannes Tinctoris, *Expositio manus* in *Tinctoris, Opera theoretica*, ed. and trans. by Albert Seay, *Corpus Scriptorum de Musica* 22 (N.p.: American Institute of Musicology, 1975), 32. Quoted by Karol Berger. *Musica Ficta: Theories of Accidental Inflections*, 10.

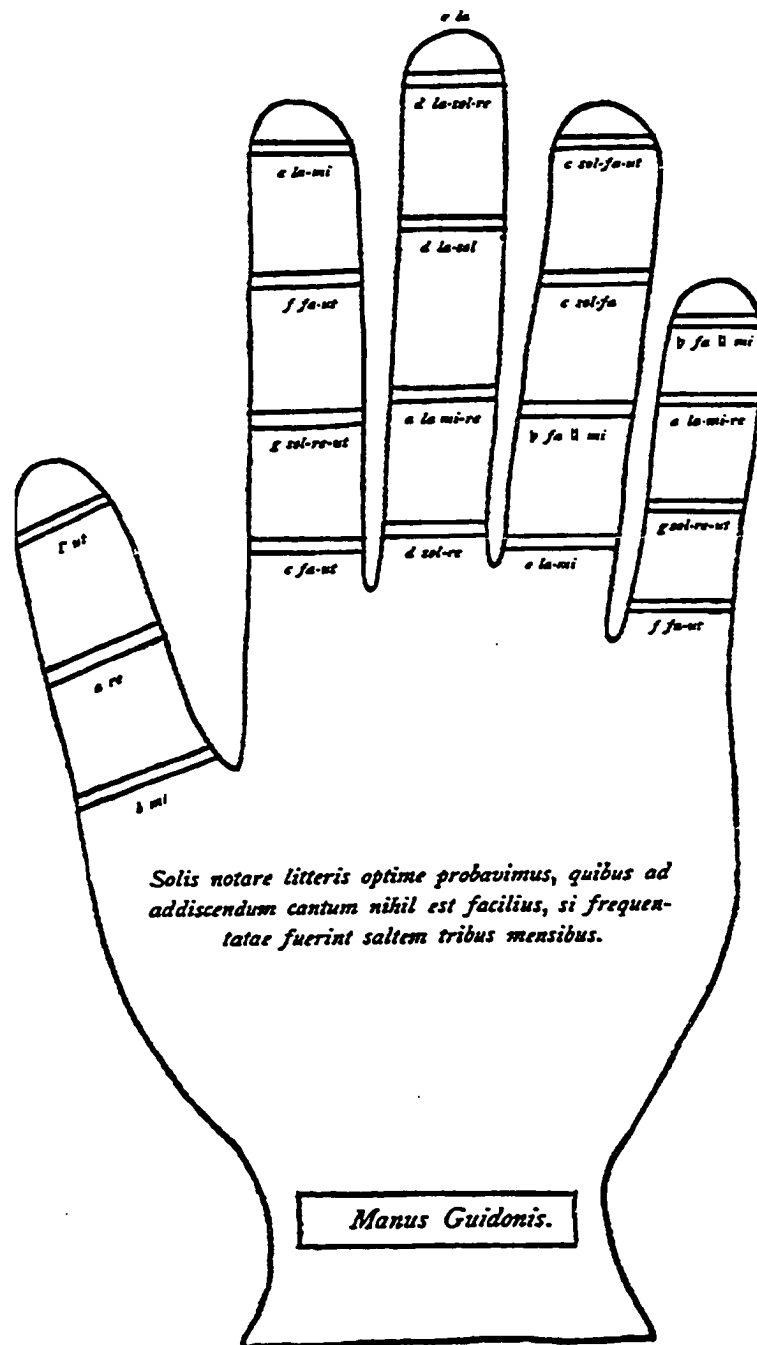


Figure 4. Figura 3 of the *Musica practica*, 11.  
 Source: Johannes Wolf, ed. *Musica practica*, 13.  
 © 1968, Breitkopf & Härtel, Wiesbaden. Used by permission.

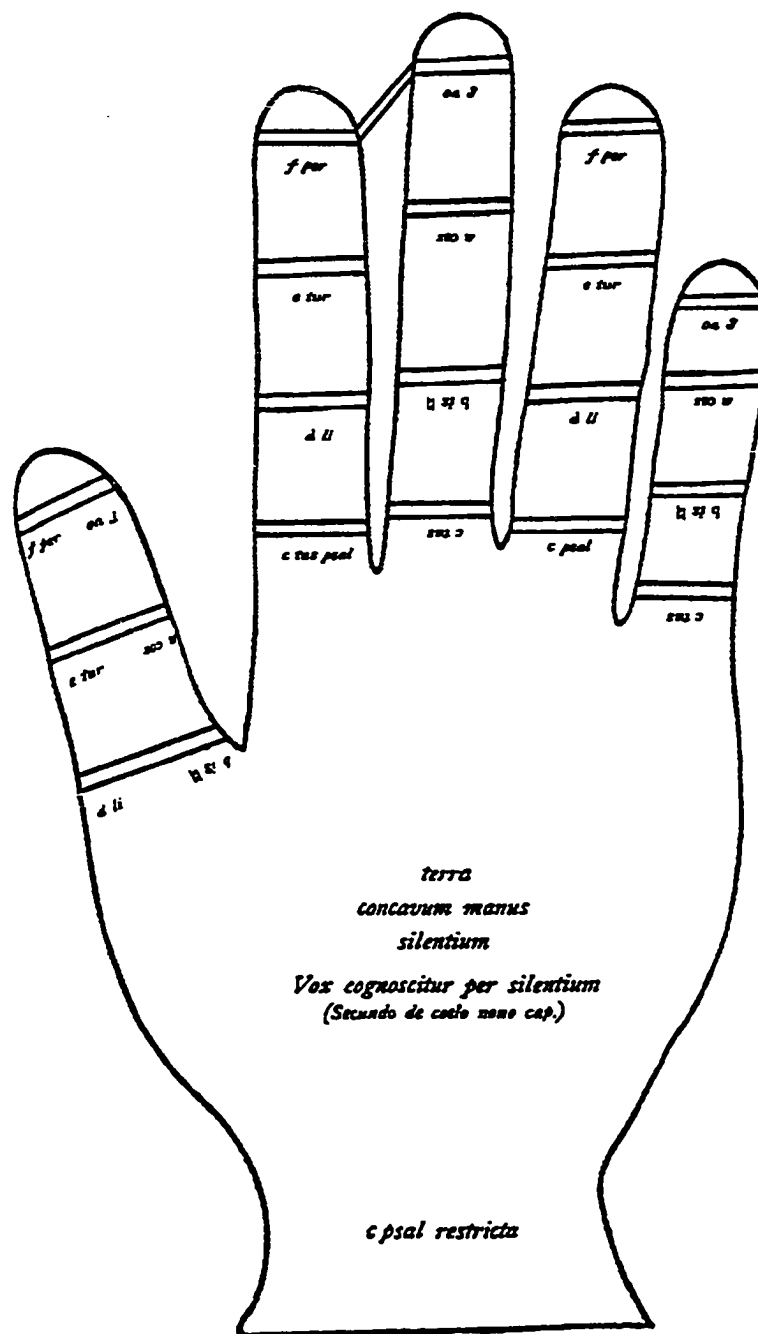


Figure 5. Figura 6 of the *Musica practica*, 36.  
 Source: Johannes Wolf, ed., *Musica practica*, 47.  
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provide an explanation for the raised hand that often appears in the illustrations of medieval choristers.<sup>18</sup>

In Part 1, Treatise 1, Chapter 4, Ramos includes an illustration of the traditional Guidonian hand (see Figure 4 above). Later, in Part 1, Treatise 2, Chapter 7, Ramos includes a revised version of the hand (see Figure 5 above) in which the pitch class C appears at the bottom of each finger (c at the base of the index finger, c<sup>1</sup> at the base of both the middle and ring fingers, and c<sup>2</sup> at the base of the little finger) and in which the seven notes of the lowest octave are applied to both sides of the thumb and wrist.

#### Conclusion

As in the case of the monochordal division, Ramos attempts to ease the task of the practicing musician by doing away with the complicated solmization systems of the past and introducing a method that recognizes and accounts for contemporary practice. With regard to a new order of solmization, Ramos attempts to shield the practicing musician from the complexities that result when one attempts to apply an antiquated diatonic solmization to music that is becoming increasingly chromatic.

Ramos did not escape criticism for his condemnation of the *auctoritas*. In the opening pages of the *Musices*

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<sup>18</sup>Margaret Bent, "Musica Recta and Musica Ficta," *Musica Disciplina* 26 (1972): 90-91.



*opusculum*, Nicolaus Burtius attacks Ramos both for his irreverence toward Guido and for his proposal of a new method of solmization;<sup>19</sup> in the *Excitatio quaedam musicae artis per refutationem*, John Hothby addresses Ramos's "errors" and reprimands him for proposing new syllables to designate the position of the semitones.<sup>20</sup>

It is obvious that Ramos recognized the unlikelihood that his solmization system would be accepted by his contemporaries, for he devotes a considerable portion of the *Musica practica* to a detailed discussion of the Guidonian system, focusing upon the aspects of *musica ficta* and mutation within the confines of such a system.

Although harshly criticized, Ramos's proposed octochordal method was an innovation that profoundly affected the practice of solmization.<sup>21</sup> Not only was Ramos the first to suggest an alternative to Guidonian solmization, but he was also the first musician to advocate the "fixed do" system of solmization.

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<sup>19</sup>See Burtius, *Musices opusculum*, a2r-a4r.

<sup>20</sup>See Seay, ed., *Johannis Octobi tres tractatuli contra Bartholomeum Ramum*, 43-46.

<sup>21</sup>Other octochordal solmization systems were subsequently proposed, e.g., Hubert Waelrant's *Bocedization* (16th century), Daniel Hitzler's *Bebization* (17th century), and Carl Heinrich Graun's *Damenization* (18th century). See Bettie Jean Harden, "Solmization," *The New Harvard Dictionary of Music*, 759-60.

## CHAPTER VI

### THE GAMUT, MUTATION, AND *MUSICA FICTA*

Ramos was fully aware that his contemporaries would not accept his proposed method of solmization. In a parallel discussion, Ramos addresses the topics of *musica ficta* and mutation within the context of the Guidonian hexachord system by employing, for the sake of practicality, the traditional Guidonian syllables rather than those of his own solmization system.

In the Guidonian system, the location of the semitone is indicated by the position of the syllables *mi-fa*. With the rise of chromaticism, however, a repositioning of the semitone--in order to effect accidentals--came to be an integral part of the system. Singers, then, became accustomed to associating the syllable *fa* with *b rotundum* (*b*) and *mi* with *b quadratum* (*♯*). The actual notation of the flat, sharp, or natural sign in the music itself was superfluous, for the syllables *mi* and *fa* served the same purpose.

In addition to the two most common signs of accidental inflection (i.e., *b* and *♯*), composers often used the sign of the *diesis* (*✱*)--the precursor to our modern sharp sign (*♯*). While many theorists treated the signs of *b quadratum* and

the *diesis* as if they carried an identical function, these signs were originally employed to effect two different procedures. Ramos acknowledges all three of these signs, but his discussion of *b quadratum* and the *diesis* reflects a view that, at least for the practicing musician, *b quadratum* and the *diesis* carry the same meaning:

Therefore, whenever *fa* should be made from *mi* they write [it] down with such a sign--that is, *round b*; but whenever *mi* should be made from *fa* they indicate [it] with this sign--that is, *square b*, or this [sign] ✱.<sup>1</sup>

The confusion surrounding the distinction between *b quadratum* and the *diesis* can be traced to the theoretical writings of Marchettus of Padua. In his *Lucidarium in arte musicae planae* (ca. 1317), Marchettus states that *b rotundum*, *b quadratum*, and the *diesis* each designate a specific type of music. Marchettus divides the whole tone into five parts, referring to each part as a *diesis*.

According to Marchettus, the signs of *b rotundum*, *b quadratum*, and the *diesis* represent three separate entities: an "enharmonic" semitone A to B $\flat$  consisting of two *dieses*; a "diatonic" semitone B $\flat$  to B $\sharp$  consisting of three *dieses*; and a "chromatic" semitone C to C $\sharp$  consisting of four *dieses*. Marchettus felt that the distinction of four *dieses* required the introduction of a new sign--the

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<sup>1</sup>Ramos de Pareia, *Musica practica*, 23.

*diesis* (✱).<sup>2</sup> Thus, for Marchettus, the flat sign denotes the enharmonic semitone (the minor semitone), the natural sign denotes the diatonic semitone (the major semitone), and the *diesis* (sharp) sign denotes the chromatic semitone.

One can easily trace the progression in fifteenth- and sixteenth-century theoretical writings with regard to the definition and use of these signs of inflection. In his *Lucidario in musica* (1545), Pietro Aaron refers to *b quadratum* as a "natural sign" (*segno naturale*) while *b rotundum* and the *diesis* are referred to as "accidental signs" (*segni accidentali*). Aaron notes that *b quadratum* is used to cancel the affect of *b rotundum*, while the *diesis* is used to raise the pitches *C*, *F*, or *G* by a semitone. Although Aaron represents a minority opinion, other fifteenth-century theorists, such as Giovanni Spataro and John Hothby, also embraced this doctrine for the application of accidental inflections.<sup>3</sup>

For Hothby, like most other theorists of the time, the definition of the term *semitone* does not reflect the present-day conception of "half of a whole tone," but rather that of an "imperfect tone." Thus, Hothby allows for semitones in a variety of sizes. He uses the three

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<sup>2</sup>Marchettus also referred to this sign as *falsa musica*. See Karol Berger, *Musica Ficta: Theories of Accidental Inflections*, 20-27.

<sup>3</sup>*Ibid.*

properties of the hexachords--*naturale*, *molle*, and *durum*--to denote the properties of the available semitones, with the *naturale* semitone falling between *E* and *F*, the *molle* between *A* and *B $\flat$* , and the *durum* between *B $\sharp$*  and *C*.

As an advocate of simplicity and practicality, Ramos attacks Hothby for his advancement of three different types of semitones. In his criticism of Hothby, Ramos quotes the polemic remarks of Johannes Carthusiensis, whose treatise *Ritus canendi vetustissimus et novus*<sup>4</sup> contains a lengthy criticism against Marchettus's differentiation of the semitones:

But Brother Johannes Hothby, the English Carmelite who arranges the hard, the soft, and the natural semitone, perceived [it] by far the worst [of all]. Certainly he properly adopted the numbers for his monochord, since they are the same ones that Boethius arranges on his [monochord]. Nevertheless, I do not think that the difference of a semitone was taken from him, but from someone untrained. And let me say about [Hothby] that which Brother Johannes Carthusiensis was accustomed to saying of Marchettus. For it has not been heard for a long time [that one may] arrange the semitone in three ways, namely: chromatic, enharmonic, and also diatonic, because as [Johannes Carthusiensis] says: "Who has ever heard from some well-grounded teacher that there are three ways [to arrange] a semitone if not from this little Marchettus?" I believe that Brother Johannes Hothby may have taken some [of his] foundation from him. But I do not marvel [at this], because he is a follower of Guido. Truly, I wish to destroy the head, so that this body [of knowledge] undertaken in errors may become a corpse, and not be able to live [any] longer.<sup>5</sup>

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<sup>4</sup>See Charles Edmond Henri de Coussemaker, *Scriptorum de musica medii aevi*, vol. IV, (Paris: A. Durand, 1864; repint, Milan: Bollettino bibliografico musicale, 1931), 328b.

<sup>5</sup>Ramos de Pareia, *Musica practica*, 32.

In the *Excitatio quaedam musicae artis per refutationem*, Hothby defends himself against Ramos's criticisms, claiming that Ramos misunderstands the intent. Hothby concurs that Marchettus's division of the whole tone into five *dieses* is an incorrect proposition; however, Hothby does not believe that a prohibition should be placed upon the use of Marchettus's categories for the semitone (i.e., *diatonic*, *enharmonic*, and *chromatic*), which, for Hothby, identify the size of a particular semitone. Hothby refers to the minor semitone as the *diatonic*, the major semitone as the *chromatic*, and the *diesis* as the *enharmonic*. Thus--unlike Ramos--Hothby, Spataro, and Aaron preserve the distinction between *b quadratum* and the *diesis* by preserving the differences between the semitones.<sup>6</sup>

Ramos's discussion of the employment of the signs of inflection within key signatures is similar to that of his contemporaries:

Nevertheless, they say that if the sign is placed at the beginning [of the song], such an order should be observed throughout the entire song. But if it is not placed at the beginning but rather, along its course, they say that only the note where it is placed is subject to the law of that sign. Whence also they make various considerations in the raising and lowering of the notes--that is, from their proper position.<sup>7</sup>

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<sup>6</sup>Franciscus de Brugis and Giovanni del Lago side with Ramos on this matter. See Karol Berger, *Musica Ficta: Theories of Accidental Inflections*, 20-26.

<sup>7</sup>Ramos de Pareia, *Musica practica*, 30.

The Manus Perfecta

Ramos proposes the addition of several irregular hexachords (*coniunctae*) to create a "Guidonian" hand that contains twenty-two, rather than twenty, positions. This hand, the *manus perfecta*, spans a gamut of three octaves and a semitone--from *F retropolis* ("behind the thumb") to *f#<sup>2</sup> above e la superacutae*. Ramos notes the error of those who propose that the three-octave *manus perfecta* holds the quality of divine tripartite perfection; the error of this misinterpretation rests upon the fact that the gamut is actually three diapasons plus a semitone (the distance from *e la sol superacutae* to *f la superacutae* being that of a tone rather than a semitone). Ramos notes that if the distance between *e la sol superacutae* and *f la superacutae* were the distance of a semitone, it would be contrary to the method of Guido because--according to Guido--the interval of *sol* to *la* is the distance of a tone.<sup>8</sup> Ramos explains that, in truth, the *manus perfecta* is "perfect" because the "entire hand has been correctly divided by means of the semitones."<sup>9</sup>

Ramos constructs the "perfect hand" by combining three separate hands, each comprised of seven hexachords (see Figure 6). Ramos combines the seven regular hexachords of

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<sup>8</sup>Ibid.

<sup>9</sup>Ibid., 24.

		La
	e la	t
	t	La-sol
La	d la-sol	t
t	t	sol-fa
La-sol	c sol-fa	mi
		b fa
		s
t	mi	La-mi-re
sol-fa-ut	b fa	t
s	s	
mi	a la-mi-re	sol-re-ut
b fa	t	t
La-mi-re	g sol-re-ut	fa-ut
		s
t	t	La-mi
sol-re-ut	f fa-ut	t
	s	
t	e la-mi	La-sol-re
fa-ut	t	t
s		
La-mi	d la-sol-re	sol-fa-ut
t	t	mi
La-sol-re	c sol-fa-ut	b fa
	s	s
t	mi	La-mi-re
sol-fa-ut	b fa	t
s		
mi	a la-mi-re	sol-re-ut
b fa	t	t
La-mi-re	g sol-re-ut	fa-ut
		s
t	t	La-mi
sol-re-ut	f fa-ut	t
	s	
t	e la-mi	sol-re
fa-ut	t	t
s		
La-mi	d sol-re	fa-ut
		s
t	t	mi
sol-re	c fa-ut	t
	s	
t	b mi	re
fa-ut	t	t
s		
mi	a re	ut
t	t	
re	f ut	
t		
ut	natura.	
	Obo	Obo
		fals
		soliter

Figure 6. Figura 4 of the *Musica practica*, 28.  
 Source: Johannes Wolf, ed., *Musica practica*, 35.  
 © 1968, Breitkopf & Härtel, Wiesbaden. Used by permission.



the Guidonian hand (the *ordo naturalis*) with a hand that contains seven irregular hexachords (the *ordo accidentalis dexter*, or "right accidental order") positioned a whole tone below those *deductiones* of the Guidonian hand (*F* below *G*, *bb*, *eb*, *f*, *bb<sup>1</sup>* *eb<sup>1</sup>*, *f<sup>1</sup>*); to these, Ramos adds a hand that contains seven irregular hexachords (the *ordo accidentalis sinister* or "left accidental order") a whole tone above those of the Guidonian hand (*A*, *d*, *g*, *a*, *d<sup>1</sup>*, *g<sup>1</sup>*, *a<sup>1</sup>*).<sup>10</sup>

#### Ramos's Discussion of Mutation

Ramos begins his discussion of mutation by providing a definition from Tinctoris's *Terminorum musicae diffinitorium*: "Mutation is the variation of one voice for another."<sup>11</sup> Later, for the sake of clarification, Ramos provides a second definition of mutation: "Mutation is the variation of two equal notes interchanged with one another by means of diverse properties on one sign and one note."<sup>12</sup> Thus, mutation is the means by which a performer can transfer from one hexachord to another by substituting a

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<sup>10</sup>The designations of "right" and "left" accidental orders may be somewhat confusing; whenever Ramos refers to "its right side," he is referring to the diagram from the teacher's perspective, as if the diagram were being handed to the student for examination. Thus, the "left accidental order" is actually located to the right of the reader.

<sup>11</sup>*Ibid.*, 25. See also Johannes Tinctoris, *Terminorum musicae diffinitorium*, s.v. "Mutatio," *Monuments of Music and Music Literature in Facsimile XXVI* (New York: Broude Brothers Limited, 1966), b2r.

<sup>12</sup>*Ibid.*

syllable of the new hexachord for one of the old hexachord. Ramos explains two situations in which a performer might choose to make a mutation: "either out of necessity for ascending or descending" or "for the purpose of placing a semitone before or after [a note]."<sup>13</sup> In the first case, the performer uses mutation to extend the range when the notes exceed the ambitus of a particular hexachord; in the second case, the performer uses mutation to perform an accidental inflection of *musica ficta*.

The subject of mutation received a great amount of consideration in fifteenth-century music literature. The practice itself is divided into two categories: *explicita* or *vocalis*, and *implicita* or *mentalis*.<sup>14</sup> The first type of mutation, "explicit" mutation, results when the singer pronounces the syllables of both hexachords. In the following phrase, an explicit mutation is made when both *sol* and *fa* are pronounced on *C*:



Figure 7. Explicit Mutation

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<sup>13</sup>Ibid.

<sup>14</sup>Karol Berger, *Musica Ficta: Theories of Accidental Inflections*, 7.

Thus, on the fifth pitch of this exercise, the singer pronounces the syllable *sol* of the *F* hexachord and then immediately changes to the syllable *fa* of the *G* hexachord in order to effect the necessary alteration required by the accidental that follows. In actual practice, the implementation of explicit mutation seems a bit cumbersome; in the classroom, however, it enables the student to demonstrate his comprehension of mutation.

"Implicit" mutation results when the singer casts aside the first syllable of the mutation and effects the procedure mentally, thereby pronouncing only the second syllable. In the following phrase, the singer would replace *sol* with *fa*, pronouncing only the *fa* of the *G* hexachord:



Figure 8. Implicit Mutation

The advantage of this type of mutation is obvious; it does not affect the rhythm of measured music, whereas the method of explicit mutation obstructs the rhythmic flow of the phrase.

Ramos implies that implicit mutation was customarily used by Guido and his followers to effect a mutation by

abandoning the first syllable and pronouncing only the second. Ramos advocates the method of explicit mutation during the initial instruction of students, yet demonstrates a degree of flexibility for those who are more advanced:

And yet, let not the students be forced to do this, since sometimes we permit [them] to say one in place of the other.<sup>15</sup>

Ramos reinforces his position against multiple mutations, advising his students to make the accidental inflections of the tones and semitones by following the rules of *musica ficta*:

But let them only become accustomed to noticing the rules mentioned above--that is, to observe the species of the tone or of the semitones, so that they do not perform one in place of another as it occurs in singing with solmization--as they say--according to the syllables of Guido.<sup>16</sup>

In Part 1, Treatise 2, Chapter 5, Ramos identifies *disiuncta*--the antithesis of *coniuncta*--as the process of an abrupt transition between two hexachords due to the absence of a pivotal note; in other words, a *disiuncta* occurs when no mutation can be made. Such a transition is necessary to sing certain melodic intervals such as the augmented second, the tritone, the minor sixth, and the somewhat rare major semitone, (e.g., *Bb* to *B♯*). According to Ramos, *disiuncta* must be employed only as a last resort, i.e., when it is absolutely impossible to effect a mutation.

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<sup>15</sup>Ramos de Pareia, *Musica practica*, 34.

<sup>16</sup>*Ibid.*

Ramos's Discussion of *Musica Ficta*

An all-encompassing definition for the term *musica ficta* continues to elude musicologists; due to the variety of musical ramifications, both melodic and harmonic, even the most general definition is apt to be flawed. The meaning of this term can be grasped only by examining theoretical evidence; even then it is a slippery grasp at best, since many inconsistencies arise among the authors of the various musical treatises.

Ramos's discussion of *musica ficta* is dependent upon an understanding of Guidonian practice. The pitches contained within the Guidonian hand are solmized with the syllables of the seven *deductiones* and are regarded as *musica recta* or *musica vera*. The pitches that fall outside the hand--pitches that are not normally a part of the *deductiones*--are regarded as *musica ficta* or *musica falsa*.<sup>17</sup>

The technique of *musica ficta* was incorporated by early musicians to effect an inflection of pitch during performance. This inflection was based upon various rules that were held in the mind of the singer, and may or may not have been explicitly indicated by the notation. Quite apart from the specificity of notation in the Common Practice

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<sup>17</sup>Other less frequently used synonyms for pitches that lie outside the hand include *musica acquisita* (acquired music), *musica colorata* (colored music), and *musica coniuncta* (conjunct music).

Period, the Medieval-Renaissance musician approached the inflections of sharp, natural, and flat as a mental/aural exercise.

In his proposed method of solmization, Ramos introduces the use of "*b is*" to signify the *b rotundum* of the conjunct tetrachord, and "*♯ is*" to signify the *b quadratum* of the disjunct tetrachord. Later, however, Ramos returns to the Guidonian syllables in order to provide the practicing musician with a definition of *musica ficta*:

With these signs the singers signal tones or semitones, not only on *paramesē*, but on other places as well. For they say: "Wherever *fa* is found without *mi*, *mi* should be made there, as in *b fa ♯ mi*"; likewise [this also holds true] where *mi* [is found] without *fa*, which many [people] call *musica ficta*.<sup>18</sup>

In Part 1, Treatise 2, Chapter 2--a chapter devoted to the topic of *musica ficta*--Ramos expresses his disagreement with Philipetus on the matters of *musica ficta*. Philipetus asserts that *musica ficta* is made in only one manner; Ramos demonstrates that *ficta* can occur by at least two means, because "a different method was [used] to make *fa* from *mi* than that which [was used] to make *mi* from *fa*."<sup>19</sup> Thus, Ramos refers to the use of *b rotundum* whenever *mi* is changed into *fa* and the use of *b quadratum* or the *diesis* whenever *fa* is changed into *mi*.

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<sup>18</sup>Ramos de Pareia, *Musica practica*, 23.

<sup>19</sup>*Ibid.*

Ramos's suggestion of replacing *mi* with *fa* and vice-versa demonstrates his desire to continue the long-held theoretical prohibition of singing *mi contra fa* in a vertical sonority.<sup>20</sup> To follow this rule, every hexachord position that contains *mi* would also be required to contain *fa*; likewise, every hexachord position that contains *fa* must contain *mi*. If *mi* is to be substituted at the locations of *fa*, then the pitches *C♯* and *F♯* are required; if *fa* is to be substituted at the locations of *mi*, the pitches *A♭* and *E♭* result. Due to the fact that *B♭* is already a part of *musica recta*, this expansion of the semitones would result in a gamut containing twelve pitches: *C*, *C♯*, *D*, *E♭*, *E*, *F*, *F♯*, *G*, *A♭*, *A*, *B♭*, and *B*. Thus, Ramos's system effects the use of *b rotundum* in five positions (*b mi*, *e la mi*, *a la mi re*, *e la mi acutae* and the second *a la mi re*), and the use of *b quadratum* or the *diesis* in an additional five positions (*c fa ut*, *f fa ut*, *c sol fa ut*, *f fa ut acutae*, and *c sol fa*).<sup>21</sup>

Ramos was not alone in his proposition of a gamut that incorporated more than six steps. In his *Calliopea legale*,

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<sup>20</sup>The *mi contra fa* rule was one of the most important principles of *musica ficta*. In order to avoid the prohibited harmonic intervals of augmented and diminished fourths, fifths, and octaves, the performer employed the inflections of *musica ficta*. The augmented fourth from *F* (*fa*) to *B♯* (*mi*) could be avoided by changing the *mi* to *fa*, resulting in the interval *F* to *B♭*; the *fa* could be changed to *mi*, resulting in the interval of *F♯* to *B♯*, etc.

<sup>21</sup>Ramos de Pareia, *Musica practica*, 23.

Hothby proposes a sixteen-step gamut containing the pitches *C, C#, Db, D, D#, Eb, E, F, F#, Gb, G, G#, Ab, A, Bb, and B*. Hothby's procedure, in which a specific designation is assigned to each sign of inflection, reflects the increasing tendency for theorists in the late fifteenth- and early sixteenth-centuries to relate the gamut to the keyboard. Hothby considers the white keys of the keyboard to be representative of the "natural" pitches and of the first *ordine* (order), whereas the black keys are divided into either the second or third order according to their employment as flat and sharp signs, respectively. Hothby permits the application of the flat or sharp sign on every note with five exceptions: the flat sign may not be attached to *C* and *F*, while the sharp sign may not be attached to *A, B* or *E*.<sup>22</sup>

Ramos takes issue with those who produce a sixteen-step gamut by placing *b rotundum* and *b quadratum* in positions where neither *fa* nor *mi* can be found. Such an arrangement was advocated by Hothby with the proposition of his three *ordines*, and it is likely that the person to whom Ramos refers to as "Johannes de Londonis" is none other than Hothby; throughout the rest of the treatise Ramos refers to Hothby as "Johannes Ottobi."

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<sup>22</sup>Karol Berger, *Musica Ficta: Theories of Accidental Inflections*, 36.



Ramos allows that such an arrangement of a sixteen-step gamut can be made in speculative theory, but dismisses its usefulness in practical application. Ramos reasons that the additional inflections of the sixteen-step gamut are superfluous, because the whole tone has already been divided into two semitones by means of the twelve-step gamut:

However, Johannes of London and others less experienced say: "Just as both signs can be placed on *b fa ♯ mi*, thus also [it may be done] on other positions where [there is] neither *fa* nor *mi*." By no means should it be denied that it can be done in such a manner, but I do not think that it should be resorted to.

Consequently, on that account and according to [that which] has already been said, if a tone remains divided into two semitones, by [this] error the rest of them become useless.<sup>23</sup>

Ramos sees no advantage in employing the additional four notes (*Db, D#, Gb, G#*) that are created by a sixteen-step gamut; for the sixteen-step gamut requires the employment of four split keys (*C#/Db, D#/Eb, F#/Gb, and G#/Ab*). Ramos firmly disapproves of split keys on keyboard instruments, and he intentionally avoids them in his own tuning method. His position on enharmonic strings and split keys is demonstrated in his explicit statements against the implementation of enharmonic equivalent pitches for *Ab, Eb, and F#* (see Chapter IV of this commentary).<sup>24</sup>

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<sup>23</sup>Ramos de Pareia, *Musica practica*, 31.

<sup>24</sup>It is quite possible that Ramos may have recognized that the acceptance of a sixteen-step gamut would have negated his own proposed division of the monochord and his new method of tuning.

Following his explanation of *ficta*, Ramos provides a discourse on the *coniuncta*:

They also call this *coniuncta*, because just as when *tritē synēmmenōn* is placed after *mesē*--for which reason the tone [between] *mesē* and *paramesē* must be divided into two semitones--thus also any other tone located elsewhere should be divided. And furthermore, they instruct us: "Any of these *coniunctae* is a hexachord, just as the others that were arranged previously," and therefore, just as after *f fa ut* (on which it is called *ut*), *g sol re ut* follows--where *ut* is placed again according to [those things which have] already been said; likewise also, in each one of the positions. And they define [it] in this way: "*Coniuncta* is [the method of] making a tone from a semitone and a semitone from a tone; thus also, making a ditone from a semiditone and a semiditone from a ditone, and similarly concerning the other species."

And thus they speak correctly, because these *coniuncta* hexachords behave in the same way as the *diezeugmenōn* and *synēmmenōn* tetrachords.<sup>25</sup>

Confusion may arise from Ramos's use of the word *coniuncta*, here employed in several capacities. The term *coniuncta* is used by Ramos to denote the conjunct *synēmmenōn* tetrachord; this use of the term is not unusual given that the *synēmmenōn* tetrachord contains the accidental *B♭*. The term is also used by Ramos in reference to the implementation of the *ficta* pitches themselves: "Nevertheless, they do not have the *coniunctae* notes of square *♯* or of soft *♭* below *proslambanomenos*. . . ." <sup>26</sup> And, finally, the term *coniunctae* is used by Ramos to represent the irregular hexachords that contain *ficta* pitches, such as those that

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<sup>25</sup>Ibid., 23.

<sup>26</sup>Ibid., 29.

appear in the *manus perfecta*: "Any of these *coniunctae* is a hexachord. . . ." <sup>27</sup>

The application of *coniuncta* as a chromatic inflection is defined by the new location of the semitone *mi-fa*; however, the point at which the *coniuncta* is executed may result in two different hexachords, depending upon which pitch of the selected interval is altered. A *coniuncta* of *mi-fa*, for example, could be executed between the pitches G-A to suggest either the semitone G $\sharp$ -A (which implies that the hexachord is built upon E), or the semitone G-A $\flat$  (which implies that the hexachord is built upon E $\flat$ ). According to Hothby's sixteen-step gamut, either of these procedures would be a viable option for the application of *coniuncta*; due to the fact that his twelve-step gamut does not contain G $\sharp$ , only the latter would be acceptable for Ramos.

Ramos opposes the definition of *coniuncta* that appears in Tinctoris's *Terminorum musicae diffinitorium*: "Coniuncta is the position of *b* or  $\flat$  in an irregular place."<sup>28</sup> Ramos notes that the application of *b rotundum* or *b quadratum* to a step that is already *fa* or *mi* does not affect the pitch and, therefore, Tinctoris's definition is faulty in that it may lead to the wrong conclusion:

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<sup>27</sup>Ibid., 23.

<sup>28</sup>Johannes Tinctoris, *Terminorum musicae diffinitorium*, s.v. "Coniuncta," a4v.

Johannes Tinctoris--far removed from the true knowledge--states thus: "Coniuncta is the position of *b* or *♯* in an irregular place." For if the soft *b* sign were placed on *c sol fa ut*, or in another position where *fa* was, it would be placed irregularly, and yet it would not be coniuncta; likewise, if square *♯* were placed where *mi* had been. But if *b* is placed on *b mi*, coniuncta is made, and in the end it is an irregular place for [*b*]*b*, since it is an octave to round *b*.<sup>29</sup>

### The Concept of the Subintellectus

To provide a clearer understanding of the application of *musica ficta*, Ramos offers several examples in which he demonstrates the accidental inflections that can be effected through the application of Guido's solmization syllables. In Part 1, Treatise 2, Chapter 7, Ramos draws attention to the remark by Johannes of Villanova that "the song prefers for the note to be made hard while ascending and to be made soft while descending."<sup>30</sup> Ramos clarifies the meaning of this remark through an illustration, suggesting that the song is "sweeter" when it is made to ascend as *F G A B♯ C*, rather than when it is made to ascend as *F G A B♭ C*.<sup>31</sup>

Ramos further demonstrates the applications of *musica ficta* through the implementation of the *subintellectus*. According to Ramos, the *ditonus subintellectus* (lit., "perceived ditone") is a notated semiditone that is perceived as a ditone. To illustrate the concept of the

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<sup>29</sup>Ramos de Pareia, *Musica practica*, 23-24.

<sup>30</sup>Ibid., 33.

<sup>31</sup>Ibid., 39.

*subintellectus*, Ramos discusses a phrase containing the pitches A C D. According to Guido's method of solmization, this phrase would be sung on the G hexachord with the syllables *re fa sol*; Ramos, however, suggests that if the singer does not return to the pitch C after he has sung D, then the C should be raised to C# and the syllables should be sung according to an A hexachord on *ut mi fa* (A C# D). Ramos also provides an alternative to this suggested approach by allowing the singer to perform the phrase A C# D with the syllables *re fa sol*, provided that the performer understands the theoretical justification for the transformation from a semitone to a ditone (here, A-C# instead of A-C) by means of the *subintellectus*.

Ramos likewise provides two examples for employing the *semitonus subintellectus* (lit., "perceived semitone"). First, he discusses the notated pitches G F G where the application of *musica ficta for causa pulchritudinis* results in the pitches being performed as G F# G. He explains that the use of the *semitonus subintellectus*, in this instance, will allow for the employment of the solmization syllables *sol fa sol* or *re ut re*; here is an example where an accidental inflection is made from F to F#, but the syllables themselves do not reveal the half-step movement. Ramos's approach is obviously contrary to that of Guido and his followers, who teach that the syllables *sol fa sol* or *re ut re* always indicate movement by whole steps; for the

Guidonians, only the syllables *mi-fa* may effect a half-step inflection.

In a second example, Ramos applies the *semitonus subintellectus* to the phrase *D B C D C D D*, resulting in a melodic transformation of *D B C# D C# D D*. Here again, the inflection of pitch is perceived by the ear without the traditional employment of the Guidonian syllables *mi-fa*. For those who wish to continue the Guidonian tradition of employing *mi-fa* at half-step locations, Ramos offers the alternative of substituting *re* for *mi* on the pitch *B*--effecting a hexachord on *A*--which allows for an accidental inflection on *C* with the Guidonian syllables *mi-fa*:

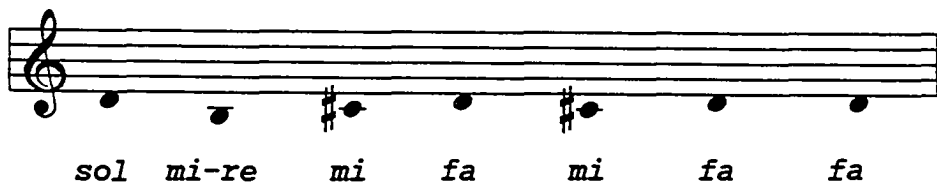


Figure 9. The *Semitonus Subintellectus*

Finally, Ramos provides an example of the *semiditonus subintellectus* (lit., "perceived semiditone") in a phrase where the singer performs the vocables *la fa sol sol*. Through the employment of the *semiditonus subintellectus*, his example on a *C* hexachord effects the pitches *A F# G G* (*la fa sol sol*). Here, *la* to *fa* is performed as a *semiditonus subintellectus*, whereas in Guidonian

solmization, the leap from *la* to *fa* represents the interval of a ditone. Alternatively, Ramos suggests that the singer could make an explicit mutation by pronouncing both *la* and *sol*, so that by means of a mutation from a hexachord on *C* to a hexachord on *D*, the phrase could be sung in the following manner:



Figure 10. The *Semiditonus Subintellectus*

### Conclusion

In the situations that call for the melodic application of the semitone by means of *musica ficta* Ramos remains a traditionalist; his concept of the *subintellectus*, however, allows him to deviate, when necessary, from the conventional applications of solmization espoused by Guido and his followers. Such a separation from Guidonian tradition is representative of Ramos's life-long struggle against Guido's mandate of *mi-fa* as the only position for the semitone's existence. Through the introduction of a perceptual understanding of accidental inflection, Ramos simplifies the task of mutation by allowing the semitone's existence at other syllabic positions.

In the concept of the *subintellectus* Ramos has discovered an ideal tool that may be applied to his own solmization system (where the performer is restricted to a single mutation at the octave) as well as to the Guidonian system with its multiple mutations. For Ramos, the employment of the perceptual concept of the *subintellectus* is preferred over the constant syllabic exchanges that accompany multiple mutations. By avoiding the unnecessary complications created by multiple mutations, Ramos offers the practicing musician a system of mutation that is directly applicable to the chromatic music of the fifteenth century.



## CHAPTER VII

### THE MODES

Part 1, Treatise 3 of the *Musica practica* is devoted to a traditional explanation of the modes and related issues. After a discussion of the various species of the diatessaron and the diapente, Ramos proceeds with a discussion of the eight species of the diapason from which he demonstrates the origin of the modes.

Although his contemporaries consider the modes to be eight in number, Ramos recalls the earlier tradition of numbering the modes from one to four, noting the combination of the Greek designations (*protus, deuterus, tritus, tetrardus*) with their authentic and plagal delineations.<sup>1</sup> In addition, Ramos discusses Boethius's distinctive names for the modes that were applied according to the particular groups of people who found pleasure in them (i.e., *Dorian, Phrygian, Lydian, and Mixolydian*). Table 17 illustrates the eight modes and their construction according to the various species combinations of the diatessaron and diapente.

In medieval physiology, the four natural dispositions of man were associated with the four fluids of the human

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<sup>1</sup>Ramos continues to advance the typical medieval explanation concerning the derivation of the plagal variants through the inversion of the diapente and the diatessaron species.

TABLE 17  
THE EIGHT MODES ACCORDING TO RAMOS<sup>2</sup>

<u>Mode</u>	<u>Range and String</u>	<u>Species</u>
Dorian	d-l 1st diapente	+ 1st diatessaron
	<i>lichanos hypatōn</i> (d-h)	+ (h-l)
Hypodorian	a-h 1st diatessaron	+ 1st diapente
	<i>proslambanomenos</i> (a-d)	+ (d-h)
Phrygian	e-m 2nd diapente	+ 2nd diatessaron
	<i>hypatē mesōn</i> (e- <i>h</i> )	+ ( <i>h</i> -m)
Hypophrygian	b- <i>h</i> 2nd diatessaron	+ 2nd diapente
	<i>hypatē hypatōn</i> (b-e)	+ (e- <i>h</i> )
Lydian	f-n 3rd diapente	+ 3rd diatessaron
	<i>parhypatē mesōn</i> (f-k)	+ (k-n)
Hypolydian	c-k 3rd diatessaron	+ 3rd diapente
	<i>parhypatē hypatōn</i> (c-f)	+ (f-k)
Mixolydian	g-o 4th diapente	+ 1st diatessaron
	<i>lichanos mesōn</i> (g-l)	+ (l-o)
Hypermixolydian	d-l 1st diatessaron	+ 4th diapente
	<i>mesē</i> (d-g)	+ (g-l)

<sup>2</sup>Ramos uses the letters a-q to delineate the octave designation of pitches in his monochord division; thus, h is simply the pitch a one octave higher.

body: phlegm, choler, blood, and black bile. Accordingly, the dominance of one of these fluids was thought to affect the character and general health of man. Thus, one's emotional disposition might be described as phlegmatic (slow and stolid), choleric (angry and irate), sanguineous (bitter and bloodthirsty), or melancholic (sad and depressed).

To demonstrate the correspondence between *musica instrumentalis* and *musica humana*,<sup>3</sup> Ramos discusses how the modes influence the character of man. He assigns a particular affection to each mode, along with a representative color. For the most part, the correlations between the modes and the bodily humors are taken directly from Chapter 1 of Boethius's *De institutione musica*, with occasional quotations concerning their qualities extracted from the writings of St. Augustine, Ambrose, and Lodovicus of Sanchez.

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<sup>3</sup>In Part 1, Treatise 1, Chapter 1 of the *Musica practica*, Ramos provides the traditional medieval three-fold delineation of music: *musica mundana*, *musica humana*, and *musica instrumentalis*. Ramos is referring to that which was discussed in greater depth by Boethius in the *De institutione musica* (see Book I, Chapter 3). Briefly, *musica mundana* refers to the "cosmic music" that is brought about by the celestial revolutions of the planets; *musica humana* refers to the "human music" that intermingles the elements of the body and holds the parts of the body in an established order; and *musica instrumentalis* refers to the sounds that are produced by means of various instruments. Ramos was mainly concerned with *musica instrumentalis* due to its ultimate end in his division of the monochord, but he also touches upon aspects of *musica humana* due to its connection with the modal affections.

TABLE 18

THE CORRESPONDENCE BETWEEN *MUSICA INSTRUMENTALIS* AND *MUSICA HUMANA*

Mode	Affection	Color	Characteristics
Dorian	phlegm	crystal	awakens the drowsing man; purges the stupor and confusion of sleep
Hypodorian	phlegm	crystal	induces drowsiness; used by the Pythagoreans to assist in falling asleep
Phrygian	cholera	fire	inspires anger; for men with arrogant and destructive temperaments
Hypophrygian	cholera	fire	licentious and flattering, but lacking any real beauty; sometimes exciting
Lydian	blood	blood	delightful, modest, and joyful; appropriate for leaping-style dances
Hypolydian	blood	blood	pious and lamentable; capable of bringing one to tears
Mixolydian	melancholy	yellow- crystal	frivolous and joyful; a reminiscence of adolescence
Hypermixolydian	melancholy	yellow- crystal	gentle, mannered, and slow; serving as a representative of distinguished men

As did many theorists, Ramos believed that the modes could induce a certain type of disposition as well as alter an existing one. As proof of this, Ramos recalls an ancient Greek myth related by Boethius in *De institutione musica*. (Supposedly, an intoxicated young man of Tauromenium became so enraged and excited upon hearing the Phrygian mode that he threatened to break down the doors to the house of a prostitute. The young man's disposition was eventually tempered when Pythagoras, having learned of the youth's state of mind, ordered the musicians to change the mode to the more calming affects of Hypodorian.)

Having demonstrated the relationship between *musica instrumentalis* and *musica humana*, Ramos proceeds to demonstrate the relationship between *musica instrumentalis* and *musica mundana* by establishing a correlation between the strings of the Greek lyre, the planets, the modes, and the Muses.<sup>4</sup>

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<sup>4</sup>Ramos specifically credits Marcus Tullius Cicero for this planet-string arrangement, having extracted it from the *De re publica* (Book VI, Chapter 18). A loyal disciple of Boethius, this is one of the few instances in which Ramos departs from Boethius's explanations of traditional concepts; in Book I, Chapter 27 of the *De institutione musica*, Boethius proposes a different arrangement of the Greek string names and their corresponding planets: *hypatē mesōn* is assigned to Saturn, *parhypatē mesōn* to Jupiter, *lichanos mesōn* to Mars, *mesē* to the sun, *tritē synēmmenōn* to Venus, *paranētē synēmmenōn* to Mercury, and *nētē synēmmenōn* to the orbit of the moon.

TABLE 19

THE CORRESPONDENCE BETWEEN MUSICA INSTRUMENTALIS AND MUSICA MUNDANA

String	Planet	Mode	Muse
Proslambanomenos	Moon	Hypodorian	Clio
Hypatē Hypatōn	Mercury	Hypophrygian	Calliope
Parhypatē Hypatōn	Venus	Hypolydian	Terpsichore
Lichanos Hypatōn	Sun	Dorian	Melpomene
Hypatē Mesōn	Mars	Phrygian	Erato
Parhypatē Mesōn	Jupiter	Lydian	Euterpe
Lichanos Mesōn	Saturn	Mixolydian	Polyhymnia
Mesē	Firmament	Hypermixolydian	Urania

Because Ramos clearly describes the eighth mode as a plagal mode brought about through the combination of the first species of the diatessaron and the fourth species of the diapente, one may question why Ramos calls the eighth mode *Hypermixolydian* rather than *Hypomixolydian*. Such an appellation of *Hypermixolydian* results from Ramos's desire to assign the names of the Greek strings to specific planets, and then to assign the names of the planets to specific modes. As is illustrated in Table 17, both the Dorian and the *Hypermixolydian* modes contain the outer range of *d-1*; the difference between these modes occurs in their species combinations. The fourth species of the diapason, i.e., the Dorian mode, has already been assigned to *lichanos hypatōn* (*d*). Ramos cannot use the normal *Hypo-* designation for the plagal counterpart of the *Mixolydian* mode because it would require him to place a second mode upon *lichanos hypatōn*.

In traditional chant theory, the range of the *Hypomixolydian* modal scale is situated one whole step above the *Hypolydian* and has the same range and register as the Dorian. Because the eighth mode is actually placed "above" the *Mixolydian*, Ramos prefers to call it by the name *Hypermixolydian*. This appellation of *Hyper-* allows him to place the eighth mode on *mesē*--that is, "above" the *Mixolydian*'s string assignment of *lichanos mesōn*.

In assigning the Hypermixolydian designation to the eighth mode, Ramos once again echoes the ideas of Boethius.<sup>5</sup> The use of the eighth mode not only serves to strengthen Ramos's defense of the number eight, the octave, and the octochord; but it is yet another validation for the correlations between the planets and the Muses.<sup>6</sup>

Ramos promises to continue his treatment of *musica humana* and *musica mundana* in the second and third volumes; unfortunately, these were never completed and his promise remained unfulfilled. Nevertheless, by means of an intricate illustration of interlocking spirals, Ramos demonstrates the correspondence between the Greek strings, the modes, the planets, and the Muses (see Figure 11). It is interesting to note that Franchinus Gaffurius offers a similar illustration as the frontispiece to the *Practica musicae* (see Figure 12). Although Gaffurius's woodcut does not include the spirals found in Ramos's illustration, the correspondence between the two illustrations appears significant. It is possible that Gaffurius "borrowed" this

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<sup>5</sup>See Boethius, *Fundamentals of Music*, 153-160. Also see the Friedlein edition of *De institutione musica*, 341-48.

<sup>6</sup>Ramos imitates Martianus Capella's analogy wherein one of the nine Muses is assigned to each mode. Because there are nine Muses and only eight modes, Ramos assigns one of the Muses--Thalia to the "Earth" and "silence." See W.T.H. Jackson, ed., *Martianus Capella and the Seven Liberal Arts*, (New York: Columbia University Press, 1977), vol. 2, *The Marriage of Philology and Mercury*, trans. by William Harris Stahl, Richard Johnson, and E.L. Burge, 16.



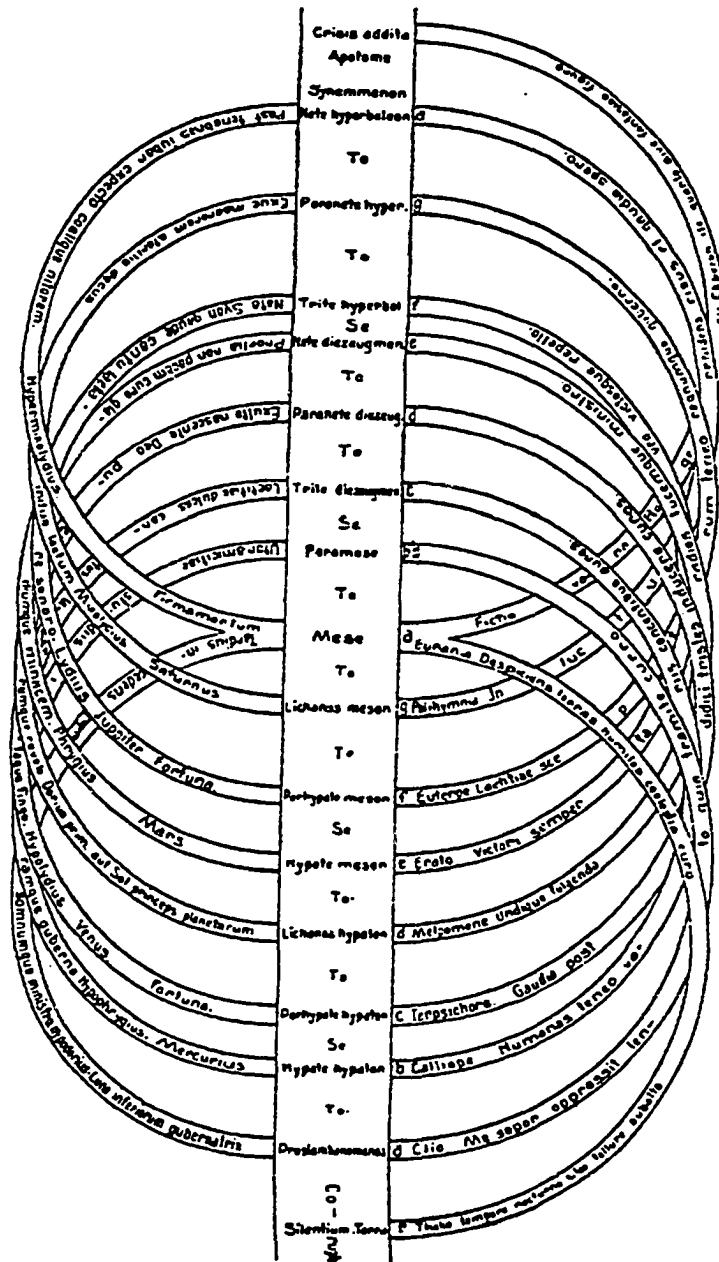


Figure 11. Figura 7 of the *Musica practica*.  
 Source: Johannes Wolf, ed., *Musica practica*, 61.  
 © 1968, Breitkopf & Härtel, Wiesbaden. Used by permission.

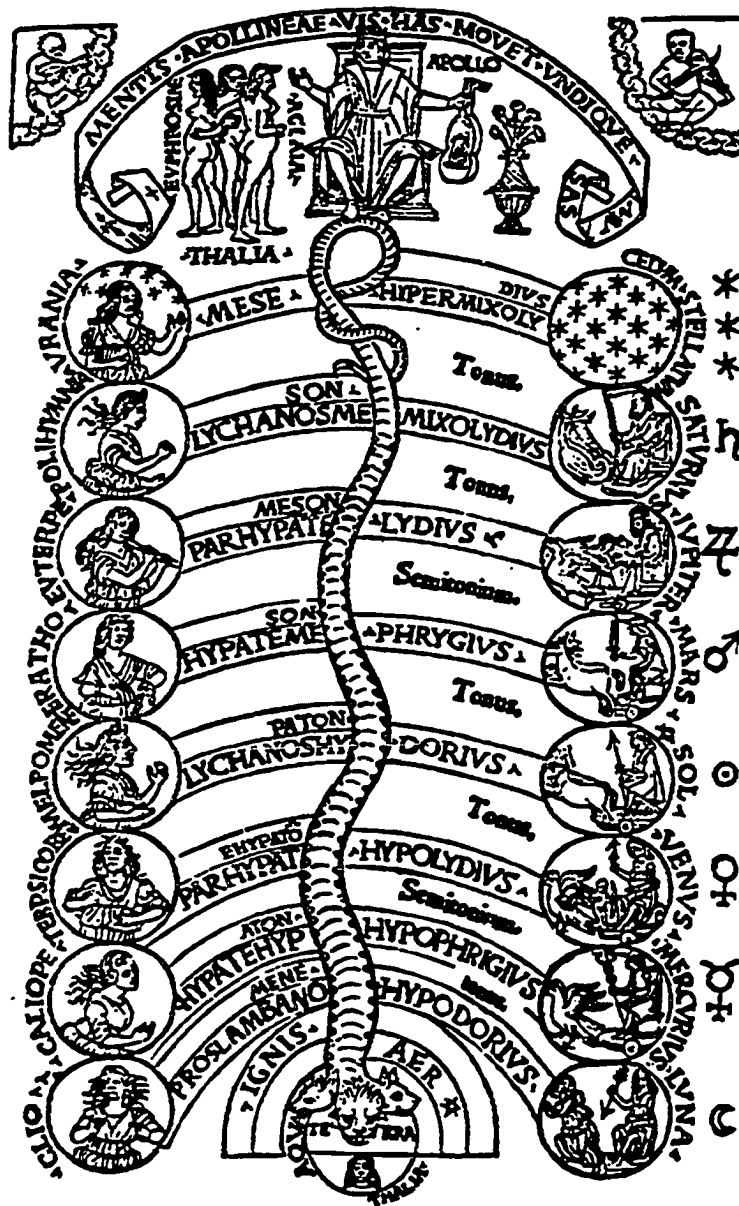


Figure 12. Frontispiece to Gaffurius's *Practica musicae*.

illustration from Ramos; Gaffurius's treatise was published in 1496, fourteen years after the publication of the *Musica practica* of Ramos. It is well-known that Gaffurius was acquainted with the *Musica practica*; he had returned a borrowed copy of Ramos's treatise to Spataro with numerous handwritten annotations in the margins. Gaffurius often fails to credit the sources of his ideas (e.g., Cicero's planetary-mode correlation or Martianus Capella's Muse-mode correlation), and thus it is not surprising that Gaffurius would fail to credit his greatest rival--Bartolomeo Ramos, who may have been the source of inspiration for this famous woodcut.<sup>7</sup>

### Conclusion

Ramos's traditional explanation of the modes demonstrates his propensity to follow the conventions established by the ancients; his correlations of the strings to the planets, modes, and Muses retain the traditional three-fold delineation of music: *musica instrumentalis*, *musica humana*, and *musica mundana*. Ramos's failure to follow Boethius's arrangement of the Greek string names with their corresponding planets, however, demonstrates that

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<sup>7</sup>For an in-depth discussion of Gaffurius's woodcut vis-à-vis Ramos's illustration, see James Haar, "The Frontispiece of Gaffurius's *Practica Musicae* (1496)," *Renaissance Quarterly* 27 (1974): 7-22 and Clement A. Miller's introduction to Franchinus Gaffurius's *De Harmonia Musicorum Instrumentorum Opus*, 18.

Ramos's loyalty to Boethius does not necessarily preclude independent thought. Further, his elaboration on Boethius's description of the modal affections provides the reader with some idea of how he may have lectured on Boethius while teaching at the University of Salamanca; such descriptions and embellishments of Boethian theory may have also been contained in the treatise written in Spanish, no longer extant. The citations in the *Musica practica* that have been extracted from the writings of Boethius, Cicero, Capella, Augustine, and Ambrose clearly demonstrate that Ramos was acquainted with the writings of the *auctoritas*; their inclusion may, in fact, be the manifestation of Ramos's intense personal struggle to establish himself as a learned man in the community of fifteenth-century scholars.

## CHAPTER VIII

### COUNTERPOINT

No music treatise of the Renaissance would be complete without a classification of the intervals and a discussion of their practical application to composition. From even a cursory glance at Part 2 of the *Musica practica*, it is evident that Ramos perpetuates many of the earlier traditions of contrapuntal composition; his discussion regarding the use of the tritone and imitative writing, however, exhibits rather progressive thought.

#### Consonance and Dissonance

In Part 2, Chapter 1, Ramos arranges the simple intervals into categories of consonance and dissonance. Following the typical fifteenth-century conventions, Ramos identifies the consonant intervals to be the perfect octave, the perfect fifth, the major and minor thirds, and the major and minor sixths. Intervals falling into the category of dissonance include the augmented fourth, the major and minor seconds, and the major and minor sevenths. The compound intervals extending from the ninth to the twenty-second are explained as replications of the intervals that fall within the first octave; thus, those intervals that are contained within the first octave are designated as *simple*, those

within the second octave as *compound*, and those within the third octave as *decompound*.

Ramos describes the unison as the "source and origin of consonance" but, unlike many of his predecessors, he excludes it from the category of consonance:

Moreover, there is no doubt for anyone concerning the unison, since the same does not differ from itself. For that reason, it is not reckoned among the consonances, because a consonance is not a concord of similar things but of dissimilar things made into one . . . .<sup>1</sup>

Ramos further divides the consonances into perfect and imperfect species. According to Ramos, the fifth and the octave are perfect because they become dissonant whenever they receive augmentation or diminution by a semitone; thirds and sixths are imperfect, however, because they retain their consonant quality even with the addition or subtraction of a semitone.

In his discussion of interval inversion, Ramos sidesteps the controversial issue of why the perfect fourth is considered a consonant interval when it serves as the upper constituent of a composite harmony, but is classified as a dissonant interval whenever it stands alone. Ramos further avoids the difficult issue of why thirds and sixths can be inverted and retain the quality of imperfect consonance, whereas the inverted perfect fourth and fifth are considered as consonant and dissonant intervals,

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<sup>1</sup>Ramos de Pareia, *Musica practica*, 49.

respectively, even though both are said to be "perfect." Although he promises to address both of these issues in forthcoming discussions, Ramos conveniently fails to return to these matters in the *Musica practica*.

#### The Rules of First Species Counterpoint

Ramos's six rules for note-against-note counterpoint represent no departure from late fifteenth-century practice.<sup>2</sup> An amplification of each rule is provided by way of a brief discussion and by musical examples that are stated in prose.<sup>3</sup>

A comparison of the teaching of Ramos with that of his archenemy, Gaffurius, demonstrates Ramos's conservative attitude with respect to counterpoint. In Book II of the *Practica musicae* (1496), Gaffurius provides "eight mandates" of counterpoint which, with some slight alterations, reiterate the six rules given by Ramos in the *Musica practica* (1482); however, Gaffurius's alterations point to Ramos as the conservative on matters of counterpoint (see Table 20).

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<sup>2</sup>See also Nicolaus Burtius's discussion of counterpoint in the *Musices opusculum* (1487). Burtius gives five precepts of counterpoint that resemble the six rules discussed by Ramos.

<sup>3</sup>Appendix A of this dissertation provides notated examples to illustrate Ramos's verbal explanations of first species counterpoint.

TABLE 20

A COMPARISON OF THE CONTRAPUNTAL RULES OF RAMOS AND GAFFURIUS<sup>4</sup>

Ramos	Gaffurius
Rule 1: Begin & end on a perfect species or unison.	Rule 1: Begin with a perfect interval. Rule 8: End with a perfect interval; ending on the unison is preferable according to the "Venetian style."
Rule 2: Avoid parallel octaves, fifths, and unisons.	Rule 2: Avoid parallel perfect intervals of the same kind.
Rule 3: Two or more imperfect consonances may follow one another.	Rule 3: Successive thirds and sixths should be limited to only four successions.

<sup>4</sup>See Ramos de Pareia, *Musica practica*, Part 2, Treatise 1, Chapter 1, 51, and Franchinus Gaffurius, *Practica musicae*, vol. XCIX, *Monuments of Music and Music Literature in Facsimile* (New York: Broude Brothers Limited, 1979), Book III, Chapter 3, ff. dd1r-dd3r. See also Franchinus Gaffurius, *Practica musicae*, trans. by Clement A. Miller, vol. XX, *Musicological Studies and Documents* (Rome: American Institute of Musicology, 1968), 124-29.



TABLE 20--continued

Ramos	Gaffurius
<p>Rule 4: If one voice remains on a pitch for two or more note values, the other voice must move.</p>	<p>Rule 4: Two perfect intervals of different kinds (e.g., the perfect octave and perfect fifth) may follow one another.<sup>5</sup></p>
<p>Rule 5: M6 resolves to P8; m6 and M3 resolve to P5; m3 resolves to unison.</p>	<p>Rule 5: Two perfect intervals of the same kind may follow one another provided that the voices cross.</p>
<p>Rule 6: If the tenor ascends, the counterpoint should descend, i.e., contrary motion should prevail.</p>	<p>Rule 6: If the tenor ascends, the counterpoint should descend; likewise, if the tenor descends, the counterpoint should ascend.</p> <p>Rule 7: Contrary motion should prevail when approaching perfect intervals and cadences.</p>

<sup>5</sup>Ramos omits this rule in his initial explanation, but addresses it in a subsequent discussion of the second rule.

In Part 2, Treatise 1, Chapter 2, Ramos examines the rules of counterpoint proposed by Ugolino of Orvieto in the *Declaratio musicae disciplinae*. Reiterating Ugolino's fourteen rules nearly word for word, Ramos discusses the validity of their application to every interval species from the unison to the fifteenth, notes subtle points of disagreement, and even provides the reader with specific musical examples of what he himself considers to be "good" and "bad" counterpoint.<sup>6</sup>

#### The Practical Use of the Tritone

A significant difference occurs between Gaffurius and Ramos in the handling of the tritone. In this respect, Ramos is clearly the more progressive theorist. In Part 1, Treatise 2, Chapter 8, Ramos makes an astonishing statement with regard to the tritone: "To make a tritone . . . is not a mortal sin as many believe."<sup>7</sup>

In a previous discourse on the divisions of the diapason, Ramos divides the octave by means of the tritone (i.e., the augmented fourth) and the semidiapente (i.e., the diminished fifth). He observes that, to the performer

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<sup>6</sup>Appendix C of this dissertation provides notated examples to illustrate Ramos's verbal explanations of "good" and "bad" counterpoint. The reader is urged to compare Ramos's contrapuntal rules and illustrations with those of Ugolino's *Declaratio musicae disciplinae*, Book II, Chapter 26, which are provided in Appendix D.

<sup>7</sup>Ramos de Pareia, *Musica practica*, 39.

interested only in sound, there appears to be no difference between the tritone and the semidiapente; to the theorist, concerned with the complicated speculations that result from the various sizes of the semitone, however, the difference between the tritone and the semidiapente is a matter of significance. Ramos elects to avoid an in-depth discussion of the difference between the augmented fourth and the diminished fifth because, from a practical point of view, the matter is irrelevant.

With respect to the use of the tritone in a melodic line, Ramos provides specific examples that demonstrate his preference for an outward resolution from the augmented fourth to the perfect fifth, and an inward resolution from the diminished fifth to the perfect fourth:

. . . it is gentle and expressive if it is advanced through intermediate notes in ascent as well as in descent, for example: *f e d c b* and in reverse *b c d e f*. Still, the song should not stop on *f* when it ascends, but [it should] be turned around toward *e*. Likewise also, in descent it should be turned around toward *c*.<sup>8</sup>

Such explanations of the tritone prepare the way for Ramos's admission of a contrapuntal progression from the diminished to the perfect fifth or vice-versa:

For as Tristan de Silva says, "It is not prohibited in such a manner on the fifth, since a fifth after a fifth can be made as long as one is a semidiapente and the

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<sup>8</sup>Ibid.

other is a diapente, as we find in the song *Sois emprantis* and in other more ancient [songs]."<sup>9</sup>

Ramos qualifies this admission by stating that successive fifths of uneven qualities should only be allowed when writing in "diminished note values."<sup>10</sup> Although it is not explicitly stated here, it is clear from Ramos's later discussion of rhythm that what is meant by writing in "diminished note values" is writing "in minims."

Gaffurius strongly opposes the use of consecutive fifths, even if one of them is a diminished fifth, because he believes that the semidiapente has no place whatsoever in practical composition. Nevertheless, even Gaffurius must acknowledge that the semidiapente is indeed found in series of successive fifths in the compositions of his time:<sup>11</sup>

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<sup>9</sup>Ibid., 51.

<sup>10</sup>Ibid.

<sup>11</sup>Other theorists confirm that Ramos's use of the diminished fifth was a prevalent part of common practice; in the *Lucidario in musica*, Pietro Aaron discusses the use of the diminished fifth on the minim and the semiminim, and like Ramos, Aaron cites Tristan de Silva's composition *Sois emprantis* as an illustration:

". . . che non fa la terza, ne la sesta, secondo il qual modo dice Bartolomeo Rami, che Tristano de Silva diceva, che egli si puo dar una quinta dopo un'altra quinta, cioè l'una perfetta, et l'altra imperfetta, come si [q]uede in quello antico canto chiamato Soys emprantis, et in uno di Verdelot, *Infirmitem nostram* etc pero che tal Quinta imperfetta non si concede nelle note intere, ma nelle parti minute del tempo, come [q]ui, cioè di Minima, et di Semiminima."

Aaron additionally provides a musical example that is taken from Verdelot's *Infirmitem nostram*. See Aaron,

The second rule constitutes that two perfect consonances of the same kind cannot follow immediately after one another when ascending or descending together in song--such as two unisons, or two octaves, or two fifteenths or, if you prefer, even two fifths or twelfths which, even though they are not perfect, are counted [among] the perfect [intervals] on account of the agreeableness that is assigned [to them in] preserving their rules and mandates. For this rule is not arbitrary but legal, completely rejecting every exception. Nevertheless, some have believed that two fifths can be sung [while] ascending or descending together, provided that they are altered by diverse quantities and intervals--that is, one [is] perfect and the other [is] diminished by the subtraction or the lack of a semitone (e.g., proceeding from *A re* to *E la mi* or, if you prefer, from *proslambanomenos* to *hypatē mesōn*, [and] after that subsequently and immediately ascending from  $\sharp$  *mi grave* to *F fa ut* or, if you prefer, from *hypatē hypatōn* to *parhypatē mesōn*). In my opinion, this is erroneous; for no one doubts that the fifth [which is] diminished by a semitone is unsuitable in song, because in this manner the diminution is exaggerated and may [easily] be observed [by the listener].<sup>12</sup>

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*Lucidario in musica*, fol. AA7v. See also Berger's discussion in *Musica Ficta: Theories of Accidental Inflections*, 103.

<sup>12</sup>"Secunda regula est quod duae perfectae species eiusdem generis non possunt consequenter et immediate simul ascendendo vel descendendo in cantilena constitui; puta duo unisoni, vel duae octavae, aut duae quintaedecimae, sive etiam duae quintae aut duodecimae, quae et si perfectae non sunt, perfectis tamen (ob quam sortiuntur suavitatem) connumerantur, ipsarum regulas atque mandata servantes. Haec enim regula non arbitraria est, sed legalis, omnem penitus exceptionem reiciens. Nonnulli tamen sunt arbitrati duas quintas simul ascendentes vel descendentes pronuntiare posse, modo diversis protensae sint quantitibus et intervalis, una scilicet perfecta, altera subtractione vel defectu semitonii diminuta; puta procedendo ab *A re* ad *E la mi*, sive a *proslambanomenos* ad *hypatenmeson*, inde subsequenter et immediate ascendendo a  $\sharp$  *mi gravi* ad *F fa ut*, sive ab *hypatehypaton* ad *parhypatenmeson*, quod mea sententia falsum est. Namque quintam semitonio diminutam quod maxima et nota sit huiusmodi diminutio, cantilena incongruam esse nemo dubitat." Gaffurius, *Practica musicae*, ff. dclr-v.

Successive Counterpoint and Fugue

An excellent model of fifteenth-century compositional practice is the *Musices opusculum* (1487) of Nicolaus Burtius. This particular treatise is celebrated as the first music theory treatise to contain a complete polyphonic composition in print. This famous woodcut is preceded with an informative discussion on the techniques of successive composition. Here, Burtius instructs the student on the manner in which the composer should construct the voices of a three-part composition, declaring that the soprano should be composed first, then the tenor, and finally the contrabass--which must be in agreement with the other two voices. Another discussion follows concerning the successive order of voices in mensural compositions containing a cantus firmus in the tenor. In this instance, Burtius declares the order of composition as tenor, soprano, and then contrabass.

Although Ramos does not discuss the compositional order of the voices, Burtius's discussion of counterpoint and imitation in the *Musices opusculum* clearly reveals the influence that Ramos had upon Burtius in regard to these issues. It is clear from the *Honesta defensio* of Spataro that Burtius had studied composition with Ramos. Spataro reminds Burtius of an occasion when the latter presented some of his contrapuntal compositions to Ramos; after examining them, Ramos advised Burtius to refrain from

performing his compositions until he had learned more about counterpoint.<sup>13</sup>

Despite Burtius's denials to the contrary, a careful examination of the *Musices opusculum* reveals that Burtius derived many of his theoretical concepts from his former teacher. Ramos's influence upon Burtius is especially evident in a comparison of their respective rules of counterpoint. Such a resemblance may, at first, appear to be insignificant, since these rules were quite common among the music theorists of the period. Burtius's fifth rule concerning contrary motion, however, contains an addendum explaining the procedure of imitation or *fuga* that is clearly extracted from the *Musica practica* of Ramos. Ramos's description of *fuga* in the *Musica practica* is the first known definition of the technique in a music theory treatise. Burtius's explanation of *fuga*--wherein the soprano imitates the tenor in its ascent and descent-- contains word-for-word extractions from the Latin text of the *Musica practica*, but Burtius makes no reference to Ramos as the source for his definition of this device:

Ramos: Nevertheless, there is an excellent way of making organum: when the organum imitates the tenor in ascent or descent it begins on the same note--not at the same time but after one or more notes--to make the same song or a similar [song] at the diatessaron or the diapente, or even at the diapason or its compound and decompound [octaves] above or below. Practicing

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<sup>13</sup>See Spataro, *Honesta defensio*, ff. 2v-3r or Chapter I of this commentary.

musicians call this method *fugue*, because one note follows another with a similar arsis or thesis . . . .<sup>14</sup>

Burtius: For the most excellent way of making organum or discanting is when the organum or the soprano (to use the common term) imitates the tenor in ascent or descent. It begins on the same note--not at the same moment but after one or two or more notes--to make the same melody on the same note. This is mostly observed in mensural song [where] it is called *fugue* by some practicing musicians.<sup>15</sup>

Whether or not Burtius directly extracted his definition of fugue from the published text of Ramos's *Musica practica* cannot be absolutely verified, but if this was not a conscious extraction on his part, then we can only postulate that Burtius unconsciously transmitted the definition of fugue that was given to him during his composition lessons with Ramos.

In addition to providing the first definition of fugue, Ramos provides three musical examples to demonstrate this type of imitation at the fourth below, at the fifth

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<sup>14</sup>"Est tamen modus organizandi optimus, quando organum imitatur tenorem in ascensu aut descensu; non in eodem tempore, sed post unam notulam vel plures incipit in eadem voce eundem cantum facere aut similem in diatessaron vel diapente aut etiam diapason vel in suis compositis ac decompositis sub aut supra. Quem modum practici fugam appellant, propterea quod una vox aliam sequitur simili arsi aut thesi . . . ." Ramos de Pareia, *Musica practica*, 53.

<sup>15</sup>"Optime enim organizatur sive discantatur, quando organum sive supranus ut vulgi utar vocabulo imitatur tenorem in ascensu aut descensu non eodem momento, sed post unam aut duas notulas vel plures incipiet in eadem voce eandem melodiam organizando; quod maxie cantu mensurato observandum est, et a nonnullis practicis fuga nuncupatur." Burtius, *Musices opusculum*, ff. e5v-e6r.



above, and at the octave above. Although he does not give specific musical examples for replication at various octaves, Ramos indicates that these examples may also be performed at the octave above or below, as well as at the unison. Figures 13, 14, and 15 illustrate Ramos's verbal explanations of fugue in modern notation.



Figure 13. Imitation at the Fourth Below



Figure 14. Imitation at the Fifth Above

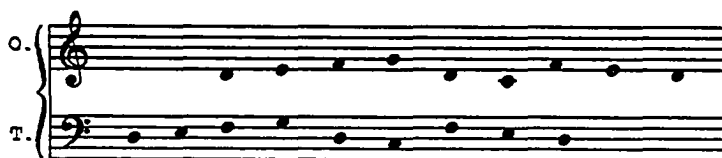


Figure 15. Imitation at the Octave Above

### Conclusion

Ramos's discussion of counterpoint in the *Musica practica* reveals the typical attitudes of the fifteenth-century musician toward aspects of consonance and dissonance. It is evident that Ramos possessed an exhaustive speculative knowledge of contrapuntal practices both past and present, as well as a thorough understanding of how these rules applied to the art of practical composition. Ramos's transmission of the standard contrapuntal rules of the fifteenth century demonstrate a conservative side of his character, and yet, his enthusiastic endorsement of the tritone in contrapuntal composition reveals a willingness to depart from those conservative traditions. Many of Ramos's ideas regarding counterpoint were espoused by musicians in the sixteenth century; the introduction of these concepts at the end of the fifteenth century, however, reveals a bold and dauntless character, who refused to be intimidated by the conservative dispositions of his contemporaries.

## CHAPTER IX

### THE *MUNDUS ET MUSICA ET TOTUS CONCENTUS*: AN EXAMINATION OF *SIVE LIDIUM IN SYNEMMENON*

The only extant composition by Bartolomeo Ramos de Pareia is a perpetual four-voice puzzle canon that serves as the frontispiece for Florence, Biblioteca Nazionale Centrale MS Banco Rari 229. The attribution to Ramos is based upon the motto *Mundus et musica et totus concentus--Bartolomeus Rami* printed at the center of the manuscript in a clockwise fashion. While it is true that only the motto itself may have emanated from Ramos, several arguments strongly support the notion that Ramos could have been the composer of this canon: (1) Ramos identifies himself as a practicing composer with references to three of his own compositions in the *Musica practica*; (2) Ramos exalts the puzzle canon as an ingenious compositional device to be used to demonstrate one's teaching and intelligence (and thus it would be logical that he would demonstrate his own teaching and intelligence by this means); (3) the canon adheres to the contrapuntal practices proposed by Ramos in the *Musica practica*; and (4) the motto subscribes to Ramos's basic musical philosophy and employs his idiosyncratic terminology. Because there are no other extant compositions

attributed to Ramos, a stylistic comparison is, of course, impossible.

This single surviving composition, attributed to Bartolomeo Ramos de Pareia, has received considerable attention by twentieth-century musicologists. Albert Seay, in *Florence: The City of Hothby and Ramos*, proposes that the inclusion of Ramos's canon in the Florentine codex 229 is a confirmation of Ramos's status as an acclaimed musician in Florentine musical circles before his residence in Bologna. Although the appearance of this composition in a Florentine manuscript provides circumstantial evidence for Seay's premise, the fact that Ramos fails to mention this composition in the *Musica practica* among the citations of his other puzzle canons suggests that this work was written by Ramos after the publication of the *Musica practica* in 1482. A unique and very illusive puzzle in its own right, it is highly unlikely that Ramos would have failed to mention this work if it had already been composed by the time that the *Musica practica* was published in 1482.<sup>1</sup>

In the introduction to *A Florentine Chansonnier From the Time of Lorenzo the Magnificent: Florence, Biblioteca Nazionale Centrale MS Banco Rari 229*,<sup>2</sup> Howard Mayer Brown

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<sup>1</sup>See Chapter II of this commentary for a more thorough discussion of Ramos's residence in Florence.

<sup>2</sup>See Howard Mayer Brown, ed., *A Florentine Chansonnier From the Time of Lorenzo the Magnificent: Florence, Biblioteca Nazionale Centrale MS Banco Rari 229*, vol. VII,

examines the manuscript itself and discusses the multiple transcriptional possibilities that are suggested by Ramos's canonic inscription. Although the investigative research of Seay and Brown is quite thorough and still available for study, a discussion of Ramos's ideas on counterpoint would be lacking without an examination of one of his own contrapuntal compositions. An examination of the only extant composition by Ramos provides insight into the application of the contrapuntal rules that are contained in the *Musica practica*, and sheds light upon the reasons why Ramos was so attracted to the puzzle canon.

Based upon its musical content, text script, illuminations, and binding, it is believed that the undated manuscript Florence 229 is a product of the late fifteenth century. The canon inscribed on the frontispiece is one of three, full-page illuminations that appear on the initial folios of the manuscript. The intricate illuminations--masterpieces in their own right--have been attributed to the famous Italian artists, Gherardo and Monte di Giovanni--two brothers known to have operated a workshop in Florence during the second half of the fifteenth century. The manuscript itself measures 24 by 17 centimeters with the music inscribed in white mensural notation by a single, scribal hand. In addition to the canon by Ramos, the

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*Monuments of Renaissance Music* (Chicago: The University of Chicago Press, 1983), 16-22.

manuscript contains musical compositions by Johannes Martini, Heinrich Issac, Antoine Busnois, and Alexander Agricola.<sup>3</sup>

The illumination of Ramos's canon on folio IIIv demonstrates the technique of *grisaille*--a style of monochromatic painting in shades of grey that was often employed by the Giovanni brothers. The musical notation is depicted in gold on a circular staff against a bright blue background. There are four figures, also depicted in gold, which represent the four winds--*Oriens* (east), *Meridion* (south), *Occidens* (west), and *Septentrion* (north). By blowing at a specific note within the canon, the four winds identify the four canonic entrances; the East Wind at the top of the page, blowing his note through a conch shell, indicates where the canon is to begin. Within the circle, in gold lettering, appears the motto *Mundus et musica et totus concentus*--*Bartolomeus Rami* and the canonic inscription *Sive lidium in sinemenon sive ypolidium diazeugmenon per quatuor quartas ducas renovando dulcem harmoniam intra diapason senties melodiam bene modulando.*

Howard Mayer Brown notes that the motto *Mundus et musica et totus concentus* ("The world and music and complete harmony") is wholly consistent with Ramos's attempt to associate the art of music with the harmony of the world and

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<sup>3</sup>Brown, *A Florentine Chansonnier*, 5-11.

proposes that the character of this motto and its link with the music itself gives us little reason to doubt that Ramos was the composer of both the motto and the music.<sup>4</sup> Ramos not only addressed the concept of *musica mundana* in his *Musica practica*, but he also introduced the special term "*totus concentus*" as an idiosyncratic part of his terminology.<sup>5</sup> The music of Ramos's canon achieves the quality of the *totus concentus* in that the canon requires all eight solmization syllables through the appearance of all eight pitches of the modal scale, and in that the total range of the composition (in its simplest transcription) does not exceed the octave.<sup>6</sup>

At the bottom of the illumination, between two cherubs with green wings, a bright red panel holds the third satire of Horace in gold lettering: *Omnibus hoc vitium est*

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<sup>4</sup>Chapter VII of this commentary has demonstrated how Ramos tried to establish a relationship between *musica instrumentalis* and *musica mundana* with his discussion of the correspondence between the musical modes and the planets, the Muses, and Greek string names.

<sup>5</sup>In Part 1, Treatise 1, Chapter 1, Ramos provides a diagram that includes the term *totus concentus* above each octave (see Figura 2). Later on in Chapter 7, Ramos states that the *totus concentus* is created from the eight syllables of his solmization system: ". . . et sic erit conclusio syllabarum: psallitur per voces istas, quoniam octo vocibus fit totus concentus." Translation: "Thus, the conclusion of the syllables will be: psallitur per voces istas, since the entire *concentus* is created from [these] eight voices." Both of these citations demonstrate the correlation of the term *totus concentus* with the "complete harmony" of the octave and the eight pitches that are contained therein.

<sup>6</sup>Brown, *The Florentine Chansonnier*, 17.

*cantoribus inter amicos ut numquam inducant animum cantare rogati, iniussi numquam desistant.*<sup>7</sup> A translation of this satire illustrates the tongue-in-cheek humor that is reminiscent of Ramos's literary style:

The trouble with all singers is this: when they are asked to sing among their friends, they can never be persuaded; but when they are unbidden, they never stop.

The purpose of this quotation is, of course, to alert the performer to the perpetual form of this canon. Because the perpetual canon may continue on forever, Ramos provides this cryptic warning to the performers, cautioning them to select a predetermined point of conclusion. Figure 16 displays a monochromatic copy of this intricate masterpiece.

#### Possible Solutions to the Canon

The most difficult problem presented by this composition is determining the solution to the canonic inscription within the circle:

Whether you proceed with either the Lydian into the *synēmmenōn* or the Hypolydian into the *diezeugmenōn*, you will hear a properly measured melody by means of four quarters [and] by renewing the sweet harmony within the limits of the diapason.

Due to the enigmatic character of this inscription, scholars have proposed more than one solution to this puzzle. The most obvious solutions to this canon are (1) a rendering in the Lydian mode, beginning on the pitch *F* with the employment of *Bb*'s to represent the *synēmmenōn*

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<sup>7</sup>Ibid., 16-17.





Figure 16. Frontispiece to Florence, Biblioteca Nazionale Centrale MS Banco Rari 229, fol. IIIv. Source: Howard Mayer Brown, ed., *The Florentine Chansonnier*, plate II.

tetrachord, or (2) a rendering in the Hypolydian mode, beginning on the pitch C with the employment of B♭'s to represent the *diezeugmenōn* tetrachord (see Figures 17 and 18). Ramos's canonic inscription provides the singer with the option of choosing between the authentic-plagal counterparts of the Lydian mode, but the dualistic nature of the inscription results more in a transpositional advantage in matters of tessitura rather than a clear modal shift from authentic to plagal.<sup>8</sup>



Figure 17. Perpetual canon, 1st version; Lydian mode.  
Source: Howard Mayer Brown, ed., *The Florentine Chansonnier*, 18.

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<sup>8</sup>*Ibid.*, 18.



with its own statement on *Bb*. If this transposition is carried out in the statements of the remaining two canonic entrances, the canon will have undergone a transposition of four perfect fourths by the time the first voice returns to the first phrase of the canon (see Figure 19).

One could argue that such a transcription would contradict the meaning of the phrase "*renovando dulcem harmoniam intra diapason*"; Brown, however, notes that the phrase "by renewing the sweet harmony within the limits of the diapason" can be interpreted so that the transpositions of a fourth are perceived as a renewing of the melody that had previously been presented within one octave.<sup>9</sup>

Theoretically, the perpetual nature of the canon allows it to continue indefinitely or at least to proceed through twelve complete statements of the melody by means of the circle of fifths (whereupon there would be a return to the starting pitch).<sup>10</sup> The drawback to Brown's proposed solution is the extraordinary range that results when the canon is performed in this manner, far exceeding the gamut that was recommended by Ramos in the *Musica practica*. Although the range is excessive, Brown's solution cannot be considered as inconceivable; Ramos himself declares that,

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<sup>9</sup>Ibid., 19.

<sup>10</sup>Ibid.

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Figure 19. Perpetual canon, 3rd version; beginning in the Lydian mode. Source: Howard Mayer Brown, ed., *The Florentine Chansonnier*, 20.

This musical score is divided into three systems, each containing four staves. The first system begins at measure 18, the second at measure 21, and the third at measure 23. The notation is complex, featuring various note values, rests, and accidentals. The key signature consists of two flats (B-flat and E-flat). The first system (measures 18-20) shows a melodic line in the top staff and a bass line in the bottom staff. The second system (measures 21-22) continues the melodic and bass lines. The third system (measures 23-24) concludes with the word 'etc.' written above the final notes in each of the four staves, indicating that the music continues beyond the shown measures.

Figure 19. --continued--

theoretically, hexachords could be multiplied *ad infinitum*.<sup>11</sup> Moreover, as Brown aptly notes, a performance of the canon--using this solution--could reach a successful conclusion where the first voice completes the transposition through four fourths (measure 17).<sup>12</sup>

Brown suggests that this Lydian solution, with multiple transpositions, could also be performed in the Hypolydian mode by beginning on the pitch C and continuing through the circle of fifths. Brown fails to mention, however, that such a solution requires "through the *diezeugmenōn*," to be interpreted more freely to signify merely the implementation of the pitch B $\sharp$ , rather than the former connotation of singing "into" and "through" the tetrachord. A transference of this chromatic solution to the Hypolydian mode could not possibly hold the same interpretation with regard to the implementation of the tetrachord that it did in the Lydian mode. In the Lydian-chromatic solution, Brown interprets the phrase "through the *synēmmenōn*" to represent the point at which the transposition is to take place, and the transposition is achieved through the actual "working out" of the *synēmmenōn* tetrachord; in the Hypolydian-chromatic solution, no such stepwise "working out" of the *diezeugmenōn* tetrachord

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<sup>11</sup>Ramos de Pareia, *Musica practica*, 10.

<sup>12</sup>Brown, *A Florentine Chansonier*, 19.

occurs. This is not to suggest, however, that Brown's Hypolydian-chromatic solution should be discarded; it calls attention only to the fact that one must be willing to accept a much freer interpretation of the Latin inscription.

Brown offers a fourth solution to the canonic puzzle, by far the most unlikely. Due to the fact that the Hypolydian version of this canon does not contain a step-wise statement of the *diezeugmenōn* tetrachord (*B♯ C D E*), Brown must resort to an interpretation of the term *diezeugmenōn* in the basic Greek sense of "disjunction."

Similar to the Lydian solution in Figure 19, Brown's fourth solution proposes transpositions at a perfect fourth, but with chromatic shifts that occur at a much slower pace (see Figure 20). In the Hypolydian solution, Brown places the first transposition in measure 16 of the initial melody--where three of the four notes of the *diezeugmenōn* tetrachord appear (i.e., the notes *C D E*). In the Lydian-chromatic version, Brown proposes that the transpositions be made conjunctly at the point of elision where the last note of the conjunct tetrachord (the *synēmmenōn*) becomes the first note of the new section. Conversely, in the Hypolydian-chromatic version, Brown proposes that the transpositions be made disjunctly, with the transposition of the new section beginning a step higher than the highest pitch of the *diezeugmenōn* tetrachord.



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Figure 20. Perpetual canon, 4th version; beginning in the Hypolydian mode. Source: Howard Mayer Brown, ed., *The Florentine Chansonnier*, 21.

The image displays three systems of musical notation, each consisting of four staves. The notation is in bass clef and includes various musical symbols such as notes, rests, and dynamic markings.

- System 1 (Measures 19-23):** The first staff begins with a measure rest and a fermata over the first measure. The second staff has a measure rest followed by notes. The third staff has a measure rest followed by notes. The fourth staff has a measure rest followed by notes.
- System 2 (Measures 24-28):** The first staff has a measure rest followed by notes. The second staff has a measure rest followed by notes. The third staff has a measure rest followed by notes. The fourth staff has a measure rest followed by notes.
- System 3 (Measures 29-33):** The first staff has a measure rest followed by notes and ends with a fermata and the text "etc.". The second staff has a measure rest followed by notes and ends with a fermata and the text "etc.". The third staff has a measure rest followed by notes and ends with a fermata and the text "etc.". The fourth staff has a measure rest followed by notes and ends with a fermata and the text "etc.".

Figure 20. --continued--

Brown appears to favor his last solution, suggesting that this fourth version is less abrupt due to the slower pace of the chromatic transpositions. He also submits this version as an example of "sweeter and smoother" harmony. In reality, however, Ramos's comparison of the Lydian and Hypolydian modes demonstrates that the preferred mode for "sweeter, smoother" harmony is the Lydian mode; for Ramos clearly states that "the lower sound [the Hypolydian mode] is not as sweet nor as gentle as the higher sound [the Lydian mode]."<sup>13</sup>

### Conclusion

Perhaps the strongest argument for the resolution of *Sive lidium in synēmmenōn* can be made in favor of the third solution, albeit a highly chromatic solution. First, the phrase *senties melodiam bene modulando* that appears in the inscription may be interpreted as "you will hear a well-modulated melody"; and thus, the third solution with its multiple transpositions could easily be perceived as a manifestation of "well-modulated melody." Second, the occurrence of such chromaticism is not unusual; composers of the time were experimenting with the full gamut of chromatic possibilities, and Ramos himself promotes the use of the chromatic and enharmonic genera in the *Musica practica*. Truly, as Brown notes, if the third version is the "proper"

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<sup>13</sup>Ramos de Pareia, *Musica practica*, 45.

solution to Ramos's canonic inscription, then Ramos is far ahead of his successors;<sup>14</sup> for Josquin's chromatic chanson, *Fortuna d'un gran tempo*, does not appear until 1501<sup>15</sup> while Adrian Willaert's *Quid non ebrietas* does not appear until some twenty years after Josquin's master-piece.<sup>16</sup> Such experimentation with chromaticism would not have been feasible within the tradition of Pythagorean tuning, but with the increasing acceptance of other types of tuning, composers were able to employ the possibilities of chromaticism to greater degrees. As an innovator in matters of tuning and solmization, it is not unreasonable to presume that Ramos stood at the forefront of the chromatic tradition which dominated musical practice in the sixteenth century.

Ramos was severely criticized by Hothby for his delight in the obscurities of the puzzle canon. Hothby claims that the puzzle canon's enigmatic directions hide the true intention of the composer and ultimately confuse the performer. Hothby contends that the canonic subscriptions should help, rather than hinder, the musician, and if the theorist truly desires to fulfill his destiny as a teacher,

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<sup>14</sup>See Brown, *The Florentine Chansonnier*, 22.

<sup>15</sup>See Edward E. Lowinsky, "The Goddess Fortuna in Music," *The Musical Quarterly* 29 (1943): 45-77.

<sup>16</sup>See Edward E. Lowinsky, "Echoes of Adrian Willaert's Chromatic 'Duo' in Sixteenth- and Seventeenth-Century Compositions," *Studies in Music History: Essays for Oliver Strunk*, Harold Powers, ed. (Princeton, 1968) 183-238.

he should promote practices that reveal, rather than conceal, the composer's wishes.<sup>17</sup>

For once, Hothby may have a valid argument, since even today, we are perplexed by what Ramos intended as the one true solution to this enigmatic inscription. As the only extant composition from which we can deduce Ramos's own ability as a composer, we are left with a canon so expertly devised that any one of at least four solutions are permitted by his enigmatic inscription without the need to break even a single contrapuntal rule of the *Musica practica*; even in regard to occurrences of augmented fourths and diminished fifths the canon has been composed with such skill that the former resolve outwardly and the latter inwardly.

In the final analysis, it is impossible to determine Ramos's intended solution for this canon; if, indeed, a single solution was even intended. From our understanding of Ramos's personality, it is likely that the composer would have taken great delight in the frustrations of twentieth-century musicologists.

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<sup>17</sup>See Seay, "The *Dialogus Johannis Ottobi Anglici in arte musica*," Section VI, 98-99.

**PART II**

**THE TRANSCRIPTION AND TRANSLATION**

NOTES ON THE EDITIONS, TRANSCRIPTIONS, AND  
TRANSLATIONS OF THE *MUSICA PRACTICA*

The Editions

Although the original, handwritten manuscript of the *Musica practica* appears to have been lost, three printings of the *Musica practica* remain extant. Two printings, labeled A-80 and A-81, are currently held by the Civico Museo Biblioteca del Conservatorio Liceo Musicale (Bologna); these printings were, for many years, believed to be the only extant printings of the *Musica practica*. In 1935 Federico Ghisi discovered a third printing in Florence at the Biblioteca Nazionale Centrale, now identified as A-7-35.<sup>1</sup> Microfilms of all three printings were consulted in the preparation of this translation.

Each printing consists of 42 folios (84 pages), containing between 36 to 38 lines on each leaf.<sup>2</sup> The folios themselves are arranged in eight layers within two

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<sup>1</sup>See Federico Ghisi, "Un terzo esemplare della *Musica Practica* di Bartolomeo Ramis de Pareia alla biblioteca nazionale centrale di Firenze," *Note d'Archivio* xii (1935): 223-27.

<sup>2</sup>It was customary for treatises of this period to use folio numbers with the designations of *recto* and *verso* for the front and back of the folio, respectively. The *Musica practica* has not been thoroughly numerated with folio numbers; only a few signatures of a2, b3, etc. appear at scattered locations. Therefore, this dissertation's numeration of the *Musica practica* employs page numbers rather than folio numbers.

quarto volumes measuring 23.6 x 16.8 centimeters. The frontispiece of all three editions is missing, but each edition includes the title, the location of publication, and the publication dates in the summary at the end of the epilogue.<sup>3</sup>

The first printing, A-80, is dated 11 May 1482 and is thought to be the work of the typographer Enrico de Colonia. This copy originally belonged to Ramos's student, Giovanni Spataro, and is of special interest due to the abundance of annotations. In a letter to Pietro Aaron dated 27 November 1531, Spataro indicates that he sent this particular copy of the *Musica practica* to Franchinus Gaffurius in Milan. Gaffurius returned the copy with numerous annotations; these annotations not only provided the provocation for Spataro's reply to Gaffurius--the *Utile e breve regule di canto*--but provide invaluable insight concerning the reception of Ramos's theoretical concepts by his contemporaries.<sup>4</sup> In addition to Spataro, Ercolo Bottrigari and Padre Giovanni Battista Martini are also believed to

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<sup>3</sup>Ghisi points to this lack of a frontispiece as further evidence for his hypothesis that the *Musica practica* was published hastily; Wolf, however, indicates that the lack of a frontispiece was typical in the printed editions of this time period. See Ghisi, "Un terzo esemplare della *Musica practica*," 225-26 and Wolf, ed., *Musica practica*, viii.

<sup>4</sup>See Chapter II of this commentary for a discussion of Gaffurius's marginal comments. Gaffurius's annotations, with English translation, appear in the endnotes of this dissertation.



have possessed the A-80 edition and it is possible that some of the annotations (in a different hand) may have been added by the latter two Italian writers.

One complication in the preparation of this translation is the quality of typography in the A-80 edition. In his *Trimerone*, Bottrigari refers to the *Musica practica* as one of the poorest prints he has ever seen:

The first treatise, the third part, of the Isagogue of Bartolomeo Ramos's *Musica practica* is so badly printed [that it is] like no other book I have ever seen. Truly, if up to now I had only seen those books that belong to the collection that was gathered by S.C.H.B and covers all the sciences except medicine and law, I still would have seen so many thousands [of books] that I can [feel confident to] express this true evaluation in this manner.<sup>5</sup>

The Italian musicologist Albano Sorbelli relates that Ramos endured numerous problems in retaining a typographer for the A-80 edition. The original printer of the *Musica practica*, Baldassare Rubiera, soon became discouraged by Ramos's lack of funds and his plummeting reputation in Bologna. Rubiera fled the city with his printing tools, leaving the project without a typographer. Enrico di Colonia eventually assumed

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<sup>5</sup>"Bartolomeo Ramo nel primo Tratt. della 3a Parte della sua Isag. Mus. Prat. cosi male stampata, come io mi habbia veduto altro libro stampato, che quando io non ne havessi mai veduto altri che quei della Raccolta sin ad hora fattane dal S. C. H. B. in tutte le scentie fuorche di Medicina, et di leggi, io ne havrei perciò veduto tante e tali migliaia, che io ne potrei fare, come faccio, questo vero giudicio." See Gaetano Gaspari, *Catalogo Della Biblioteca Musicale G.B. Martini di Bologna*, vol. I, (Bologna, 1890; reprint, Bologna: Arnaldo Forni Editore, 1961), 69a.

the position of typographer but refrained from accepting credit. Given Rubiera's earlier efforts, perhaps di Colonia thought it unethical to place his name as the sole typographer;<sup>6</sup> it is equally plausible that di Colonia may have been embarrassed by the poor type-setting and did not want his name associated with such an inferior printing.

The second printing of the *Musica practica* was completed by means of "the labor, diligence, and expense of Maestro Baltasar de Hiriberia."<sup>7</sup> This copy, A-81, is dated 5 June 1482. Essentially, the A-81 edition is a reprint of A-80 with the absence of folio 22 and some minor modifications.

Both A-80 and A-81 were printed with blank spaces for elaborate colored initials and miniatures. The initials were subsequently inserted in bright red and blue ink, with the exception of the initial "H" on the word *Harmoniam* at the beginning of the first chapter; this initial is elaborately outlined with foliage and arabesques in green, white, black, and gold. The graphics of notes, clefs, and

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<sup>6</sup>The last folio of A-80 contains typographical fonts that are much larger in size than those of the rest of the treatise. It is possible that Rubiera had completed the entire treatise except for this last folio by the time di Colonia assumed the position as typographer or, as Wolf suggests, the change in type-face could have been due to some problems with the press itself. See Albano Sorbelli, "Le due edizioni della *Musica Practica* di Bartolomeo Ramis de Pareia," *Gutenberg Jahrbuch* V (1930): 112-13 and Wolf, ed., *Musica practica*, viii.

<sup>7</sup>Ramos de Pareia, *Musica practica*, 82.

time signatures were also to be added by hand. A-80 contains these graphics but blank spaces remain in A-81.<sup>8</sup>

The edition held in Florence at the Biblioteca Nazionale Centrale, labelled A-7-35, is essentially a reprint of the A-81 edition and contains most of the features of the second Bologna manuscript. That A-80 was consulted in the preparation of this third edition can be confirmed by the fact that it contains folio 22 (which is missing from the A-81 edition), and by the fact that the last page of A-7-35 is a reprint of the final page of A-80.<sup>9</sup> The only distinguishing feature of the A-7-35 edition is the cover sheet, upon which is printed the words *Hic liber est Abbatie florentine 67*.<sup>10</sup>

The numeration of the folios in the three editions are sparse and sporadic to say the least. Folios a2, a3, b2, b3, c, c2 are clearly marked in both editions, but the numerations for folios a, a4, a5, b, b4, b5, c3, c4, and c5 are missing and there are no more numerations of the folios after c5.

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<sup>8</sup>Wolf, ed., *Musica practica*, ix.

<sup>9</sup>Ghisi believes that the discovery of A-7-35 confirms Gaspari's hypothesis that the edition dated 5 June is actually the original edition of the *Musica practica*. This assertion is largely based upon the similarity of the typographical characters in A-81 and A-7-35. Gaspari proposes that A-80 was given the date of 11 May by mistake, and that this edition is actually the second printing rather than the first. See Ghisi, "Un terzo esemplare della *Musica practica*, 224.

<sup>10</sup>Terni, *Música Práctica*, 55.

The most significant difference between the three editions is found in the last chapter (before the epilogue) after the words *repperisse testabatur*, where A-81 has almost an entire paragraph that does not appear in A-80 or A-7-35:

Credimus enim error illi sic emergerit, ut gama, vox quae addita fuit a nostris, fore crediderit proslambanomenon. Neque igitur hoc neque illud in diatonico genere nostro admittendum esse arbitramur. Nam tunc in illum incidere errorem, in quem Timotheum Milesium teste Boetio incidisse legimus genus scilicet diatonicum in chromaticum, quod melius est, convertentem, propter quod illum Lacedaemonii de Laconica exegere civitate, quoniam puerorum animos, quos acceperat erudiendos, officiebat et a virtutis modestia ad mollitiem declinantes effeminatos efficiebat. Non igitur tantum utilitatem illa tertia media nobis adducit, quantam discrepantiam atque discordiam in toto ordine provenit, cum neque secundum naturalem neque secundum aliquem accidentalem ordinem illo modo, ut isti dicunt, collocetur. Sed de his hactenus.<sup>11</sup>

In Part 3, Treatise 2, Chapter 4, a sentence appears in the A-7-35 and A-80 editions that does not appear at all in the A-81 edition. This sentence is inserted after the words *repperisse testabatur* and reads as follows: "Melius tamen primi senserunt, cuius veritatem in sequenti volumine firmissimis numerorum rationibus enucleabimus."<sup>12</sup> The final sentence of Chapter 4 is the same in all three editions: "Nunc autem epilogando supradicta huic operi finem imponamus."<sup>13</sup>

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<sup>11</sup>Ramos de Pareia, *Musica practica*, 82.

<sup>12</sup>Ibid.

<sup>13</sup>Ibid.

Another difference between the three editions appears on page 18, Part 1, Treatise 1, beginning with the words *Si autem de numero arguatur quia non tanti valoris*. In A-80 these words are the beginning of a new chapter--Chapter 8, but in the A-81 and A-7-35 editions this phrase appears directly after a large blank space, without any indication that a new chapter begins at this point. Thus in Part 1, Treatise 1, these two editions are lacking the intended chapter heading for Chapter 8, and all the text which continues on through the next folio appears to be a part of Chapter 7.

The explicit at the end of A-80 and A-7-35 is different from that of the A-81 edition; it reads as follows:

Explicit musica practica Bartolomei Rami de Pareia Hispani ex Betica provincia et civitate Baecza Gienna dioecesi vel suffragana oriundi, almae urbis Bononiae, dum eam ibidem publice legeret, impressa anno Domini millesimo quadringentesimo octogesimo secundo quarto idus Maii.<sup>14</sup>

The explicit of the A-81 edition not only has a different publication date, but contains entirely different text from the other two editions; it reads as follows:

Explicit feliciter prima pars musicae egregii et famosi musici Bartholomei Pareia Hispani, cum publice musicam Bononiae legeret, in qua tota practica cantorum pertractatur, impressa vero opere et industria ac

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<sup>14</sup>Ramos de Pareia, *Musica practica*, 82.

expensis magistri Baltasaris de Hiriberia anno domini 1482 die 5<sup>o</sup> Junii.<sup>15</sup>

Editorial problems are rampant in the three editions of the *Musica practica*. Ghisi proposes that these problems were a result of Ramos's failure to obtain the public lectureship at the University of Bologna. This failure, undoubtedly, affected Ramos's credibility, and would have had a direct impact upon his ability to secure funding for the publication of the *Musica practica*. Spataro relates that Ramos left Bologna rather hastily, taking the manuscript with him in the hope of having it printed in Rome.<sup>16</sup> Wolf notes that some of the editorial problems--including the changes in type-face--may have been due to problems with the press itself, since some of the pages have been totally reset.<sup>17</sup> Another explanation for the lack of corrections and editing in the printed editions may have been that Ramos originally intended to publish three volumes--the *Musica practica*, *Musica theórica*, and *Musica semimathematica*. The extant copies of the *Musica practica* may have merely been perceived as proof copies; the editor may have been waiting for the completion and

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<sup>15</sup>Ibid.

<sup>16</sup>Ghisi, "Un terzo esemplare della *Musica Practica*," 224-25.

<sup>17</sup>Wolf, ed., *Musica practica*, viii.

setting of the second and third volumes before making corrections to the final copy.

The Transcriptions and Translations

A reprint in modern type of the Baltasar printing--complete with Gaffurius's annotations that appear in A-80--was released in 1901 by the *Internationalen Musik-Gesellschaft, Beihefte II* (ed. by Johannes Wolf); the work was reissued in 1968 by Breitkopf and Härtel. Contrary to the statement by Gustave Reese in *Music in the Renaissance* (1954),<sup>18</sup> this edition is not a German translation; the Wolf edition is merely a reprint of the original Latin to which a German-language introduction and critical footnotes have been added. A second reissue of the Baltasar edition was released in 1969 by Forni Editore Bologna. This edition includes a brief preface in Italian by Giuseppe Vecchi, but there are no annotations of any kind.

The *Musica practica* exists only in the original Latin and in two twentieth-century Spanish translations. The first of these translations, published in 1977, is a Latin-Spanish translation of the Baltasar de Hiriberia printing; the second, published in 1983, expands upon

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<sup>18</sup>Gustave Reese, *Music in the Renaissance*, (New York: W.W. Norton and Company, Inc., 1954), 931.

the first translation by way of appendices that include a biography of Ramos, a reprint of Spataro's defense of Ramos (*Honesta defensio in Nicolas Burtii parmensis opusculum* taken from the Vecchi edition), an errata, and a glossary of fifteenth-century terminology.

### The Procedures for the Translation

An understanding of the *Musica practica* is requisite for a comprehension of the musical climate of the fifteenth century. Because of the inherent problems related to its translation (i.e., the illegibility of the treatise itself and the difficulty imposed by the author's unusual usage of the Latin language), the *Musica practica* of Bartolomeo Ramos de Pareia has remained largely unavailable to Western scholars.<sup>19</sup>

Indeed, the foremost obstacle in the translation of the *Musica practica* was the illegibility of the

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<sup>19</sup>In *Source Readings in Music History*, Strunk provides translations of the two most important chapters that pertain to Ramos's division of the monochord--that is, Part 1, Treatise 1, Chapter 2 and Part 3, Treatise 2, Chapter 3. Lindley, in "Fifteenth-Century Evidence for Meantone Temperament," translates selected portions from Part 3, Treatise 2, Chapter 4 of the *Musica practica*. Lindley's translation should be avoided, however, because the selected sections appear out-of-context and portions of text have been omitted without explanation. It appears that Lindley's omissions are an intentional attempt to build a case for his hypothesis that Ramos's tuning was actually a form of meantone temperament (see Chapter IV of this commentary).



text.<sup>20</sup> An indispensable tool for the completion of the English translation was the Marstek 800 DPI Hand Scanner, which was employed for computer-enhanced examinations of contrast in the more illegible passages. This computer enhancement was especially useful for deciphering Gaffurius's marginal annotations in A-80. Gaffurius's Latin annotations appear in the footnotes of Wolf's edition, but this dissertation is the first document to contain a translation of these comments into English. These annotations provide the reader with a broader understanding of the great divergency inherent in the theoretical concepts espoused by Gaffurius and Ramos.

Due to the illegibility of the original treatises, the figures, symbols, and musical examples of the *Musica practica* have been reprinted here from the Wolf edition; again, these figures, symbols, and musical examples have been computer-enhanced to increase their legibility.

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<sup>20</sup>Riemann relates in a footnote to his comprehensive study, the *History of Music Theory*, that, despite all his efforts, he was not able to secure a legible copy of the *Musica practica* from the Liceo filarmonico of Bologna. Riemann claims that the Latin script of this treatise was so difficult to read that the librarian of Bologna, Luigi Torchi, could not find a copyist that was willing to make him a copy. In the meantime--while Riemann was completing his *History of Music Theory*--Wolf published his modern-print edition of the Latin script. See Riemann, *History of Music Theory*, 280, 1n.

In addition to the problem of illegibility, Ramos's use of the Latin language presents a significant challenge to the translator. This is especially true of the Prologue, which is written in erudite, formal Latin with the obligatory interjections of Greek terminology and references to Greek mythological personae. Ramos's text includes many abbreviations and, at times, suggests the cursory style of a professor's lecture notes. It is possible that Ramos had written a large portion of the *Musica practica* while serving on the faculty at the University of Salamanca and may have delivered some of its contents in classes there; it is equally possible that he secretly reserved the manuscript with the intention of revealing its contents when he received the anticipated public lectureship from the University of Bologna.

Although he desired to present himself as a learned man to the musical community, Ramos commits numerous errors in grammar and syntax. These errors remain in the Latin transcription, although every attempt has been made in the English translation to convey the intent of Ramos's prose, and yet, retain his unique personal style as closely as possible. Explanatory remarks are provided in brackets--whenever necessary--to facilitate comprehension of the English text.

In the *Ars musicorum*, Ramos's contemporary Guillermo Despuig (fl. 1495) speaks against "other music theorists" who maim the Latin language with their inelegant Latin style, performing such blunders as assigning the words *diatessaron*, *diapente*, and *diapason* to the feminine gender. Stevenson notes that this error of gender is exactly the type of error that Ramos repeatedly commits in the *Musica practica* of 1482. Due to the proximity of the publication dates of the *Musica practica* and the *Ars musicorum*, it seems plausible that Despuig may have been directing these criticisms toward Ramos.<sup>21</sup>

To assist the reader in a comparison of the Latin and English text, this translation has been arranged in side-by-side columns with page numbers of the original treatise bracketed between the columns of text. I have elected to follow Wolf in correcting the orthographical inconsistencies and inaccuracies that are due to the carelessness of the printer, and have substituted the spellings of Medieval-Renaissance Latin with modern spellings.<sup>22</sup> Brackets within the columns of the Latin

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<sup>21</sup>Stevenson, *Spanish Music in the Age of Columbus*, 74-75.

<sup>22</sup>See Charlton T. Lewis and Charles Short, *A Latin Dictionary Founded on Andrew's Edition of Freund's Latin Dictionary* (New York: Oxford University Press, 1879; reprint, 1991).

text indicate such spelling corrections, and a compilation of these corrections appears in Appendix E. In addition, I have employed the indention and capitalization rules of modern English grammar; punctuation of the Latin text, for the most part, adheres to Wolf's edition.

Because it is the most complete of the original editions, my translation is based upon the A-80 edition of the *Musica practica*.<sup>23</sup> The A-81 and A-7-35 editions as well as the Latin-Spanish translations of José Luis Moralejo and Clemente Terni, and the Wolf edition of the *Musica practica*, were all consulted in the preparation of this translation with significant differences so noted.

Due to the illegibility of all three editions of the *Musica practica*, as well as their general availability in facsimile and on microfilm, a facsimile has not been appended to this dissertation.

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<sup>23</sup>The A-80 edition is the only edition complete with musical examples and symbols; it is also the only edition that contains the handwritten annotations attributed to Gaffurius, Bottrigari, and Martini.

THE *MUSICA PRACTICA*  
OF  
BARTOLOMEO RAMOS DE PAREIA

PRIMA PARS

PROLOGUS

Boetii musices  
disciplina quinque  
voluminibus comprehensa  
quoniam profundissimis  
arithmeticae  
philosophiaeque  
fundamentis innititur nec  
passim ab omnibus  
intelligi potest, solet a  
semidoctis nostri temporis  
cantoribus quo obscurior  
est eo sterilior, doctis  
vero et altius intuentibus  
quo subtilior  
probabiliorque est eo  
firmior meliorque videri,  
quo fit, ut, sicut ab  
indoctis neglecta semper  
fuerit et sit, ita apud  
peritiores in magno pretio  
semper habita sit et  
habeatur.

Unde nos, qui omnibus  
prodesse et aliquid in  
communem utilitatem  
conferre studemus, hoc  
breui compendio tribus  
libellis distincto  
prolixitatem eius in  
angustum, asperitatem in  
planum, obscuritatem in  
lucem reducentes nihilque  
quod ad artem usumque  
faciat praetermittentes et  
cantoribus quos practicos  
et speculantibus quos  
theoricos graece dicimus  
opus admodum utile  
construximus, ex quo, ubi

FIRST PART

PROLOGUE

[1] The musical instruction  
of Boethius--contained in  
five volumes--is based  
upon the most profound  
foundations of arithmetic  
and philosophy.<sup>1</sup> Since it  
cannot be grasped by  
everyone far and wide, it  
usually seems that the  
more obscure it is, the  
more unprofitable it is to  
the poorly educated  
musicians of our time;  
however, to the educated  
[musicians] and to those  
with deeper insight, it  
seems that the more  
detailed and credible it  
is, the more useful and  
lasting it becomes. Thus,  
just as it is neglected  
and always has been by the  
untrained, so among the  
more experienced it is  
regarded and always has  
been with great esteem.

Wherefore, with this  
short compendium divided  
into three little books,  
we, who desire to [be of]  
benefit [to] everyone and  
to contribute something  
toward the common good,  
are reducing its  
generalities into  
specifics, its difficulty  
into clarity, and its  
darkness into light  
without overlooking  
anything that is necessary  
to art and practice. We  
have constructed a very  
useful work both for the

id legerint  
 intellexerintque, plurimum  
 et honoris et voluptatis  
 se consecuturos esse  
 perspicient fatebunturque  
 hac nostra nova  
 speciosissimae artis forma  
 mirifice delectati nos ad  
 communem omnium  
 eruditionem praesenti hoc  
 labore plurimum adiumenti  
 contulisse.

Hinc quasi ex quodam  
 redundantibus publicoque  
 fonte quicquid ego longo  
 tempore multis vigiliis et  
 assiduis lucubrationibus  
 ex probatissimorum  
 auctorum lectione et  
 clarissimorum praeceptorum  
 disciplina colligere  
 potui, perquam celerrimo  
 facillimoque studio  
 licebit haurire et ad  
 summum musicae culmen  
 placidissimo gressu  
 pervenire.

Nemo philosophiae  
 maiestatem, nemo  
 arithmeticae  
 perplexitatem, nemo  
 proportionum formidet  
 anfractus. Hic enim  
 quilibet, etsi usquequaque  
 sit rudis, modo  
 disciplinae accommodare  
 velit auditum et rationis

singers--whom in Greek we  
 call *praktikos*--and for  
 the speculative musicians  
 --whom in Greek we call  
*theorikos*. When they have  
 read and understood [our  
 three little books] they  
 will realize that they are  
 going to attain a great  
 amount of honor and  
 pleasure from this [work],  
 and they will acknowledge  
 --having been wonderfully  
 delighted by this our new  
 form of [that] most  
 beautiful art--that with  
 this present work we have  
 contributed a great deal  
 of aid toward the common  
 instruction of everyone.

After a long period of  
 many sleepless nights and  
 continual nocturnal  
 studies, I have been able  
 to collect [information]  
 from the readings of the  
 most esteemed authors and  
 from the instruction of  
 the most famous teachers.  
 From this [effort]--as if  
 from some overflowing and  
 general source--one will  
 be permitted with  
 extremely quick and easy  
 study to absorb all [these  
 things] and reach the  
 highest pinnacle of music  
 by the most tranquil  
 course.

Let no one fear the  
 majesty of philosophy, nor  
 the complexity of  
 arithmetic, nor the  
 digressions of  
 proportions. For here,  
 anyone is able to become a  
 most outstanding and  
 skillful musician--even if  
 he is unskilled in

omnino non sit expertus, in  
 praestantissimum  
 peritissimumque musicum  
 potest evadere. Usque adeo  
 namque intelligentiae  
 servire studuimus, eam  
 orationis temperiem  
 stilique moderantiam  
 servavimus, ut in his  
 legendis peritiores abunde  
 recreari, semidocti  
 plurimum proficere, omnino  
 indocti blandissime queant  
 erudiri. Non philosophos  
 tantum aut mathematicos  
 instituendos hic  
 suscipimus; quilibet modo  
 prima grammaticae  
 rudimenta sit edoctus,  
 nostra haec intelliget.  
 Hic mus et elephas pariter  
 natate, Daedalus et Icarus  
 pariter volare possunt.

everything--provided that  
 he is willing to devote  
 attention to learning and  
 is not completely  
 destitute of reasoning.  
 For indeed, inasmuch as we  
 have desired to serve  
 intelligence, we have  
 retained the blending of  
 expression and the control  
 of style, so that in these  
 readings the experts will  
 be able to be amply  
 refreshed, the poorly  
 educated will be able to  
 make great progress, and  
 the altogether untrained  
 may be able to be  
 instructed with the  
 greatest of pleasure. We  
 undertake [this work] not  
 so much for the purpose of  
 preparing philosophers or  
 mathematicians here;  
 anyone instructed only  
 with the first rudiments  
 of grammar may understand  
 this our [discourse].  
 Here, the mouse and the  
 elephant alike can float  
 side by side; Daedalus and  
 Icarus can fly away  
 together.<sup>2</sup>

Praeterea prudentis et  
 grati lectoris officium  
 erit veniam dare, si  
 nostro hoc in opere non  
 eum, qui apud Ciceronem et  
 Salustium est, orationis  
 fastum inveniet, si  
 paucioribus phaleris  
 minorique cultu sermo  
 noster incedit. [Liceat]  
 enim mihi de musica  
 dicere, quod Marcus  
 Manlius de astronomia  
 dixisse legimus: "Ornari  
 res ipsa negat, contenta  
 doceri."

[2]

Moreover, it will be the  
 duty of the experienced  
 and attentive reader to  
 grant forgiveness if he  
 does not find in our work  
 one who writes with the  
 eloquence of Cicero<sup>3</sup> and  
 Sallust,<sup>4</sup> and if our  
 discourse proceeds with  
 fewer ornamentations and  
 less refinement. Now  
 permit me to say about  
 music what we have read  
 that Marcus Manlius said  
 about astronomy: "The  
 truth itself refuses to be



embellished, it is content [just] to be taught."

Verum ad hanc egregiam  
philosophiae partem,  
musicam scilicet, si quis  
eius vim, naturam,  
pulcritudinem  
generositatemque  
consideret, non  
exhortationibus meis  
attractus sed ultro et  
sponte convolabit  
sequeturque Orphei  
Thracii, Amphionis  
Thebani, Arionis Lesbi,  
Mercurii, Lini, Salomonis,  
Pythagorae, Aristoxeni,  
Ptolemaei, Chorebi,  
Lycaonis, Prophrasti,  
Timothei ceterorumque  
adoranda vestigia, qui hac  
disciplina freti immortale  
nomen adepti sunt.

Hi fuere, quos  
venerabilis antiquitas  
adeo mirata est, ut eos  
dixerit carminis dulcedine  
movisse feras, corda  
hominum possedissee, animas  
in corpora revocasse,  
manes ad misericordiam  
inflexisse et duras  
traxisse e montibus ornos.  
Quae licet fabulosa et  
fidem excedentia  
videantur, mirabilium  
tamen operum effectricem  
esse musicam non dubium  
est. Constat Saulem  
Solymorum regem, cum a  
malo daemonio vexaretur,  
adhibita citharae  
modulatione solitum  
curari, David ad  
vaticinandum psalterii  
cantu quasi quodam  
vehiculo mentem elevante  
usum fuisse, [Eliseum],  
magni [Eliae] carmelitarum

Truly, if one considers  
this excellent part of  
philosophy--that is,  
music--its power, nature,  
beauty, and nobility (not  
being influenced by my  
exhortations but rather,  
spontaneously of his [own]  
accord), he will quickly  
come to follow the revered  
footsteps of Orpheus from  
Thrace, Amphion from  
Thebes, Arion from Lesbos,  
Mercury, Linus, Solomon,  
Pythagorus, Aristoxenus,  
Ptolemy, Chorebus, Lycaon,  
Prophrastus, Timotheus,  
and of the rest, who have  
obtained an immortal name  
by relying upon this  
teaching.<sup>5</sup>

These were the men whom  
the venerable ancients so  
admired that it was said  
that they stirred the wild  
beasts, possessed the  
hearts of men, recalled  
souls back into [their]  
bodies, influenced the  
souls of the dead toward  
compassion, and lured the  
strong mountain ash trees  
from the mountains with  
the sweetness of [their]  
song. Although these  
fabulous deeds seem to go  
beyond belief, still there  
is no doubt that music is  
capable of producing  
amazing achievements. It  
is well known that Saul--  
the king of the people of  
Jerusalem--was accustomed  
to being cured by  
summoning the playing of  
the lyre when he was  
harassed by an evil

patris discipulum, cum  
 prophetare vellet, psalten  
 advocasse. Quis nescit  
 plorantes infantulos  
 nutricum cantilenis  
 placari et accensi  
 sanguinis ardorem numeris  
 extingui, equos ad tubae  
 clangorem micare auribus,  
 tremere [artubus],  
 hinnitus edere, largius  
 exultare, stare loco  
 nescire, pugnam Martemque  
 sitire? Priscianus auctor  
 est apud Siculos fontem  
 esse, qui ad lyrae sonitum  
 saltare videatur. Habet  
 igitur procul dubio  
 maximam musica energiam et  
 ingentem in humanos  
 animos, seu mulcere seu  
 tollere velit,  
 auctoritatem. Quod si hac  
 nostra tempestate tot  
 miracula per musicam  
 minime fiant, non arti,  
 quae supra naturam  
 perfectissima est, sed  
 arte male utentibus  
 imputandum est. Si enim  
 illi, quorum supra  
 meminimus, probatissimi  
 musici ad vitam  
 revocarentur, musicam  
 nostri temporis a se  
 inventam negarent: usque  
 adeo inepta, inconcinna  
 dissipataque quorundam  
 cantorum depravatione  
 reddita est.

demon.<sup>6</sup> David used the  
 song of the psalter for  
 prophesying, as if it were  
 an instrument for a kind  
 of lifting of the  
 intellect. Elisha, a  
 disciple of the great  
 Elijah--the father of the  
 Carmelites--called a  
 lutist when he wished to  
 prophesy. Who does not  
 know that crying infants  
 are quieted by the songs  
 of the wet nurse, and that  
 the ardor of boiling blood  
 is extinguished with  
 melodies; that horses with  
 [their] ears quivering to  
 the clang of the bugle are  
 unable to stand in place?  
 With trembling limbs they  
 neigh [and] rear up on  
 their hind legs much more  
 frequently, thirsting for  
 battle and Mars, [the god  
 of war]. The author  
 Priscianus asserts that  
 among the Sicilians there  
 was a fountain that seemed  
 to dance to the sound of  
 the lyre.<sup>7</sup> Thus, music  
 possesses, beyond doubt,  
 an enormous energy and a  
 powerful influence upon  
 human souls, whether one  
 may wish to soothe or  
 excite. But if in this  
 time of ours, so few  
 miracles are happening by  
 means of music, it is not  
 the fault of art, which,  
 besides the laws of  
 nature, is [considered to  
 be] the most perfect;  
 rather, it should be  
 charged to those using  
 poor art. For if those  
 [men]--the most esteemed  
 musicians whom we  
 mentioned above--were  
 called back to life, they

would say that the music of our time was not invented by them, [for] it has been rendered thoroughly unsuitable, absurd, and disconnected by the depravation of certain singers.

His igitur rationibus  
moti praesens opus  
edidimus sperantes, etsi  
sint fortasse aliqui nunc  
viventes, qui livore  
stimulati detrahere quam  
proficere malint, futuros  
etiam apud posteritatem  
quam plures, qui sepulto  
invidiae veneno nostrum  
laborem laudent et operi  
nostro virtutis amore  
compulsi favorem  
adhibeant.

Therefore, moved by these reasons, we have published the present work. Although there may be some living at the present time who, stimulated by malice, prefer to detract rather than be helpful, we hope that with posterity there will be even more who, having buried the poison of envy, will praise our labor and, driven by the love of virtue, will bring favor to our work.

Operis igitur sit ista  
partitio. In primo libro  
subtilem practicam  
ponemus, in secundo  
theoricam accurate  
discutiemus, in tertio  
musicam semimathematicam,  
semiphysicam congrua  
ratione probabimus.  
Primum igitur, quid musica  
sit quidve harmonia,  
disseramus.

Therefore, let the division of this work be as follows: in the first book we will consider practice in great detail; in the second book we will accurately discuss theory; [and] in the third book we will examine music with a corresponding ratio of equal proportions devoted to mathematics and physics. But first of all, let us discuss what is music and what is harmony.

Finito prologo incipit  
tractatus, ubi primo quid  
sit musica quidve harmonia  
disputatur.

[3] The prologue ends [and] the treatise begins, whereby in the first [chapter] it is discussed what is music and what is harmony.

TRACTATUS PRIMUS

CAPITULUM PRIMUM

Harmoniam atque musicam idem esse multi credunt, verum nos longe aliter sentimus. Ex quorundam enim musicorum sententiis longa investigatione collegimus harmoniam concordium vocum esse commixtionem, musicam vero ipsius concordiae rationem sive perpensam et subtilem cum ratione indaginem. Musica autem triplex est; nam alia mundana, alia humana, alia vero dicitur instrumentalis. Mundanam atque humanam, quoniam speculativae theoricaeque sunt, in secundo libro tertioque pertractabimus; tertia autem, quae tota circa instrumenta versatur, consideratio priorem sibi vendicabit locum.

Instrumentum duplex est: aliud enim natura, aliud vero arte constat. Naturale instrumentum vox hominis est, quod naturaliter vocem elevare deprimereque possumus. Artis instrumentum dicitur, quod arte fiat non natura, ut monochordum et cithara et cetera, quae

FIRST TREATISE

FIRST CHAPTER

Many people believe harmony and music to be the same thing but we feel very differently. For after a long investigation, we have concluded from the opinions of certain musicians that harmony is the union of concordant voices, but music is the theory of the concord itself, or if you prefer, a thorough consideration and minute investigation accompanied by reason.<sup>8</sup> Furthermore, music is three-fold: for one type of music is called *mundana*; another type is called *humana*; but yet still another type is called *instrumentalis*. Since *mundana* and *humana* are speculative and theoretical, we will treat them in the second and third book, but the third aspect of music which deals entirely with the instruments will demand our first consideration.

The instrument is two-fold: one type consists of natural qualities, but the other type consists of artistic principles. The natural instrument is the voice of man, because man is able to raise and lower the voice naturally. An instrument is said to be of art because it is made

cantilenae famulantur.  
 Circa quorum  
 accuratissimam practicae  
 considerationem tria  
 perscrutanda nobis  
 occurrunt: vox scilicet,  
 sonus atque numerus sive  
 mensura. Vox in proposito  
 abusive pro hominum et  
 instrumentorum sono  
 sumitur, ut Aristotelis  
 sententia est in libro *De*  
*Anima*: vox est sonus  
 animati tantum. Sed vox  
 etiam inanimatorum est, ut  
 instrumentorum musicorum,  
 solum secundum  
 similitudinem, quia  
 discrete sonant. Sonus  
 vero non simpliciter sed  
 pro sono duarum aut  
 plurium chordarum simul  
 percussarum aut hominum  
 duorum pluriumve simul  
 canentium in praesentiarum  
 accipitur. Numerus vero  
 similiter non simplex, sed  
 cum habitudine ad  
 passiones consideratur.

Prima autem consideratio  
 a neotericis cantus  
 firmus, a quibusdam vero  
 cantus planus dicitur,  
 secunda contrapunctus,  
 quam ab antiquis  
 organizationem dictam

by art rather than by  
 nature, such as the  
 monochord, the cithara,  
 and others that are  
 subservient to the song.  
 In respect to the most  
 precise consideration of  
 the practice of these  
 instruments, there are  
 three aspects which we  
 should examine: namely,  
 voice, sound, and rhythm,  
 or if you prefer  
 measurement.<sup>9</sup> The term  
 "voice," is too often  
 taken to represent both  
 the sound of men and the  
 sound of instruments.  
 Thus, it is the opinion of  
 Aristotle in the book *De*  
*Anima* that "the voice is  
 the sound of the animate  
 being alone."<sup>10</sup> But the  
 voice is also the sound of  
 inanimate beings such as  
 musical instruments;  
 [however], only according  
 to analogy, since they  
 sound differently.  
 However, the term "sound"  
 in the present circum-  
 stances is not taken in  
 its simplest form, but as  
 the sound of two or more  
 strings being struck at  
 the same time, or of two  
 or more people singing at  
 the same time.<sup>11</sup>  
 Similarly, rhythm is not  
 considered in a simple  
 fashion, but with a  
 condition toward the  
 proportions.

The first consideration  
 is called *cantus firmus* by  
 the new theorists; indeed,  
 by some it is called  
*cantus planus*.<sup>12</sup> The  
 second consideration is  
 called *contrapunctus*,<sup>13</sup> a

fuisse constat; at tertia cantus figuratus, quae a plerisque organi cantus appellatur. Secundum hanc igitur triplicem considerationem compendium hoc nostrum dividemus.

In prima consideratione tria praecipue procurabimus. Primo instrumento per artem composito rectas eius divisiones erudiendis ad sensum monstrabimus et chordarum secundum divisiones percussarum sonitum, ut memoriae mandent, admonebimus. Secundo organum naturale per [arsim] et thesim idest per elevationem et depositionem sive per intensionem et remissionem cum artis instrumento copulantes psallere concorditer assuefaciemus, quousque sine eo legitime psallere didicerint. Tertio vero odas vel notulas, per quas omnis cantus dignosci, cantari componique possit, in plano designabimus.

structure that is known to have been named by the ancients. Finally, the third consideration is called *cantus figuratus*,<sup>14</sup> which is [also] commonly called *organi cantus*.<sup>15</sup> Consequently, we will divide this compendium of ours according to these three considerations.

In the first consideration we will attend to three aspects in particular. Firstly, we will show the correct divisions with the artificial instrument<sup>16</sup> in order to instruct the students toward a proper understanding, and we will admonish them to commit to memory the sound of the striking strings according to the divisions. Secondly, we will become accustomed to singing harmoniously, uniting the natural instrument with the artificial instrument through *arsis* and *thesis*; that is, through the raising and lowering or, if you prefer, the stretching and relaxing [of the pitch],<sup>17</sup> for however long it takes them to learn how to sing properly without it. Thirdly, as a matter of course we will allude to the points or notes in plainsong through which every song is able to be distinguished, sung, and composed.

[4]

Verum quia  
instrumentorum arte  
constantium diversa sunt  
genera, ne varietate  
disciplina fiat obscurior,  
unam chordam dividendi  
modum et regulam dabimus,  
unde monochordi a Graecis  
nomen assumptum est.  
Postea vero per alia  
transeuntes ad intentum  
finem deveniemus.

Since the types of  
harmonious artificial  
instruments are diverse,  
[and] lest the teaching  
becomes unintelligible due  
to [this] variety, we will  
give the manner and rule  
of dividing one string;  
whence it has received the  
name *monochord* from the  
Greeks. Thereafter, while  
touching upon other  
matters, we will arrive at  
our intended purpose.

CAPITULUM SECUNDUM  
MONOCHORDI ELEMENTARIS  
DIVISIO SEU COMPOSITIO

Regulare monochordum  
numeris et mensura  
subtiliter a Boetio  
dividitur. Sed illud,  
sicut theoreticis utile  
iocundumque est, ita  
cantoribus laboriosum  
intellectuque difficile.  
Verum quia utrisque  
satisfacere polliciti  
sumus, facillimam  
regularis monochordi  
divisionem reddemus, quam  
non modico labore nemo nos  
arbitretur invenisse,  
quippe qui illam multis  
vigiliis antiquorum  
praecepta lectitantes et  
neotericorum vitantes  
errorem cum sudore  
repperimus. Et eam  
quilibet vix dum etiam  
mediocriter eruditus  
facile intelligere  
poterit.

Sumatur itaque cuiusvis  
longitudinis nervus sive  
chorda, quae super lignum  
aliquid habens  
concavitate extendatur;  
locus autem extremus, cui  
nervus alligatur, puncto a  
signetur. Alius locus e  
regione procul positus,  
quo nervus trahitur et  
torquetur, puncto q  
signetur. Quantitas autem  
q a, idest totius chordae  
longitudo, in duas partes

SECOND CHAPTER  
THE DIVISION OR  
ARRANGEMENT OF THE  
ELEMENTARY MONOCHORD

The regular<sup>18</sup> monochord  
is accurately divided by  
Boethius with numbers and  
measurement. Although it  
is agreeable and useful  
for theorists, it is  
laborious and difficult  
for singers to understand.  
Truly, since we have  
promised to satisfy both  
[the theorists and the  
singers], we will render  
an extremely easy division  
of the regular monochord.  
Let no one think that we  
came upon it with ordinary  
labor, inasmuch as we  
devised it with hard work  
during many sleepless  
nights, reading and re-  
reading the precepts of  
the ancients and avoiding  
the error of the modern  
theorists. Anyone even  
moderately educated will  
be able to easily  
understand it.

Therefore, let a string  
or, if you prefer, a cord,  
of any length be taken--  
which is stretched over  
wood having some degree of  
concavity--and let the  
furthest place to which  
the string is bound be  
marked by the point a.  
Let another place,  
positioned in a straight  
line at a distance from  
which the string is drawn  
and stretched, be marked



dividatur aequales et  
 aequae distantiae punctus  
*h* littera notetur.  
 Dividemus iterum per  
 medium quantitatem chordae  
*h a* et in medio divisionis  
*d* constituemus. Quantitas  
*h d* iterato secabitur et  
 in sectionis medio *f*  
 collocabitur.

Idem quoque de alia  
 chordae medietate  
 faciendum intellige  
 scilicet *h q*, quoniam in  
 prima divisione loco medio  
*p* figurabitur; et in  
 divisione *h p* aequaliter  
 ab utraque distans ponatur  
 littera *l* et inter *l* et *p*  
 servata eadem  
 intervallorum regula *n*  
 immittatur. Quod si *f n*  
 per medium diviserimus,  
 litteram *i* signabimus.

Per hanc autem mediam  
 divisionem ulterius ad  
 partes minutiores,  
 quousque alias divisiones  
 fecerimus, non deveniemus.  
 Sed totum *a q* per tria  
 dividemus et a littera *q*  
 mensurantes in fine  
 trientis ponetur *m* et in  
 besse *e*. Deinde *e q* per  
 tria iterum dividatur et a  
 littera *q* versus *e*  
 venientes in besse signum  
 $\frac{1}{4}$  quadrum configetur et

by the point *q*. Now let  
 the quantity *q-a*--that is,  
 the length of the entire  
 string--be divided into  
 two equal parts, and let  
 the point of equal  
 distance be marked by the  
 letter *h*. Then we will  
 divide the quantity of the  
 string *h-a* in half, and in  
 the middle of the division  
 we will place [the letter]  
*d*. Again, the quantity  
*h-d* will be divided and *f*  
 will be placed in the  
 middle of the section.

Understand that the same  
 also should be done in  
 respect to the other half  
 of the string--that is,  
*h-q*--since [the letter] *p*  
 will be formed midpoint in  
 the first division. And  
 in the division *h-p*, let  
 the letter *l* be placed at  
 an equal distance from  
 both, and with the same  
 rule of the intervals  
 having been maintained  
 between *l* and *p*, let *n* be  
 inserted. But if we will  
 divide *f-n* in half, we  
 will inscribe the  
 letter *i*.

However, we will not  
 proceed any further to the  
 smaller parts of this  
 half-division until we  
 have made other divisions.  
 Thus, we will divide the  
 whole *a-q* by three parts:  
 measuring from the letter  
*q*, we will place [the  
 letter] *m* at the end of a  
 third part and [the  
 letter] *e* at the end of  
 the two-thirds part.

[5] Then, let *e-q* be divided

quantitate  $\frac{1}{2}$  quadri et  $q$   
 duplicata signetur  $b$ .

Sed iterum  $m$   $h$  per  
 medium secabimus et medium  
 sectionis punctum  $k$   
 littera colorabimus. Quod  
 si quantitatem  $k$   $q$   
 duplicemus, in fine  
 duplicationis  $c$  ponemus;  
 sed inter  $e$  et  $\frac{1}{2}$  quadrum  
 aequalibus utrimque  
 spatiis  $g$  situetur. Si  
 autem  $g$   $q$  in duo aequalia  
 partiamur,  $o$  littera  
 signabitur sicque totum  
 monochordum legitima  
 partitione divisum est, ut  
 in subiecta figura  
 cognoscis [figura 1].

again by three, and coming  
 from the letter  $q$  toward  
 $e$ , the square  $\frac{1}{2}$  sign will  
 be transfixed at the two-  
 thirds point, and round  $b$   
 will be inscribed with the  
 quantity of square  $\frac{1}{2}$  and  $q$   
 doubled.<sup>19</sup>

Now again we will divide  
 $m-h$  in half and we will  
 mark the middle point of  
 the section with the  
 letter  $k$ . But if we  
 double the quantity  $k-q$ ,  
 we will place  $c$  at the end  
 of the duplication;  
 however, let  $g$  be placed  
 between  $e$  and square  $\frac{1}{2}$   
 with equal lengths on both  
 sides. And if we divide  
 $g-q$  into two equal parts,  
 it will be marked with the  
 letter  $o$ . Thus, the whole  
 monochord has been divided  
 by a legitimate partition  
 as you [may] examine [for  
 yourself] in the figure  
 below [see Figura 1].

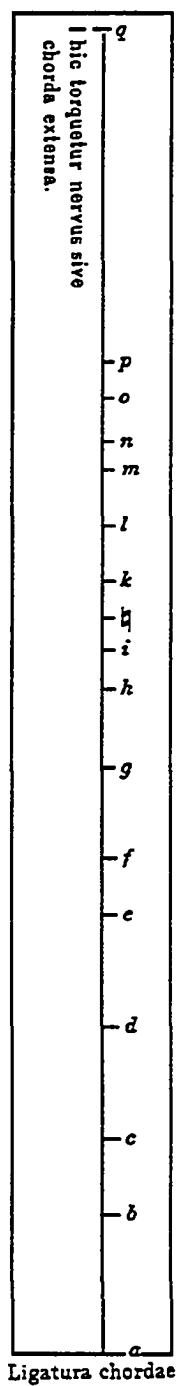


Figure 21. Figura 1 of the *Musica practica*, 5.  
 Source: Johannes Wolf, ed., *Musica practica*, 5.  
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### CAPITULUM TERTIUM

#### DATARUM DIVISIONUM RECTA COGNITIO

Taliter autem monochordo  
diviso superest  
quantitates illas altius  
limatiusque considerare.  
Sciendum igitur totam  
illam inter *a* et *b*  
intercapedinem tonum  
vocari et a Graecis  
*phtongon*, quod apud nos  
sonus interpretatur. At  
hoc tali exemplo facilius  
intelligetur: Percutiatur  
nervus in tota sui  
longitudine extensus  
noteturque sonus. Deinde  
supponatur digitus vel  
quidpiam aliud subtilius  
et non magna latitudine  
sparsum iterumque chorda  
percutiatur; fiet, ut  
aliquanto altiorem sonum  
emittat. Cumque sonum  
acutiorem sono gravi sive  
graviorem acuto comparare  
volueris, toni esse  
distantiam deprehendes.  
Sin vero sonum *b* sono *c*  
comparabis, semitonium  
fiet; non quod toni sit  
dimidium, sed quod ad  
integritatem toni vox non  
ascendit, imperfectus  
tonus appellatur. De hac  
tamen semitonii  
imperfectione practicus  
non supra modum  
sollicitetur, quoniam est  
maxime speculativa et a  
cantoribus practicis  
aliena. Sed quod non sit  
perfectus tonus, practicus  
cognoscat oportet.  
Subtiles enim huiusmodi

### THIRD CHAPTER

#### A CORRECT UNDERSTANDING OF THE GIVEN DIVISIONS

With the monochord  
having been divided in  
such a manner, there  
remains to be considered  
in a more profound and  
refined manner those  
quantities [that lie]  
within such a monochord  
division. Therefore, it  
is necessary to know that  
the whole interval between  
*a* and *b* is called *tonus*,  
([or] *phtongon* by the  
Greeks), which is  
interpreted in our work as  
*sonus*. But this will be  
more easily understood  
with the following  
example: Let the  
stretched string be struck  
in its entire length and  
let the sound be noted.  
Then, let the finger, or  
something else more  
accurate and indeed not  
very wide, be placed above  
[the string] and again let  
the string be struck: the  
result will be that it  
emits a considerably  
higher sound. And when  
you will have considered a  
comparison of the higher  
sound with the low sound  
or, if you prefer, the  
lower sound with the high  
sound, you will perceive  
the distance to be that of  
a tone. But if, on the  
other hand, you will  
compare the sound *b* with  
the sound *c*, the result  
will be that of *a*

disputationes in secundum  
librum differemus.

semitone. [And] it is not called an *imperfect tone* because it is half of a tone, but because the note does not rise toward the completeness of a tone. Nevertheless, in regard to this imperfection of the semitone, it is not practical [for us] to tamper with it beyond moderation, since it is very speculative and unrelated to practicing singers. However, because the tone may not be perfect, the practicing musician should become acquainted [with it]. Truly, we will postpone in-depth discussions of this matter until the second book.

Illa autem quantitas sive intercapedo, quae inter *c* et *d* extenditur, tonus est et inter *d* et *e* similiter tonus, sed inter *e* et *f* semitonium, inter *f* et *g* tonus, inter *g* et *h* tonus, inter *h* et *i* semitonium, inter *i* et *k* quadrum semitonium, inter *k* et *l* quadratum semitonium, inter *l* et *m* tonus, inter *m* et *n* semitonium. Fit *n* et *o* tonus, *o* et *p* tonus; et ita soni, qui ex percussione affinium vicinarumque divisionum proveniunt, ad se invicem comparati tonum aut semitonium emittunt. Sed distantium comparatio tonorum plures aut semitoniorum species efficit. Unde inter *c* et *e* spatium, quoniam ex tonis duobus constat, ditonus sive bitonus

Now that quantity or, if you prefer, interval extended between *c* and *d* is a tone, and likewise there is a tone between *d* and *e*, but there is a semitone between *e* and *f*, a tone between *f* and *g*, a tone between *g* and *h*, a semitone between *h* and *i*, a semitone between *i* and *k*, a semitone between *k* and *l*, a tone between *l* and *m*, [and] a semitone between *m* and *n*.<sup>20</sup> A tone is produced [between] *n* and *o* and [between] *o* and *p*; likewise the sounds which come forth from the striking of the adjoining and neighboring divisions--having been paired together in turn--emit a tone or a semitone.<sup>21</sup> But a comparison of the

dicitur. Sed a c distantia semiditonus est appellata, quoniam imperfectus ditonus toni medietate sublata conficitur. Sed b e diatessaron, quia quatuor vocum est capax, sive tetrachordum dicitur, quod quatuor chordarum divisio est et intercapedo. Est enim una chorda sive vox b, alia c, tertia d, quarta e, inter quas tria clauduntur intervalla, duo scilicet toni et unum semitonium.

Boetius per tetrachorda monochordum dividit hoc modo: b e primum tetrachordum, secundum e h, ita quod e finis primi et secundi principium est; et simili modo h l. Sed quando praecedentis finis pro sequentis tetrachordi principio sumitur, tetrachordum coniunctum dicitur, quod Graeci synemmenon appellant. Quando autem h idest primi sive praecedentis finis pro secundi sive sequentis principio non sumitur, sed sequens tetrachordum a k quadrato sumit initium et per k l procedendo in m sistitur, disiunctum latine, graece vero

distances of the tones or semitones produces several species. Whence, the distance between c and e is called a *ditone* or, if you prefer, a *bitone*, since it consists of two tones. But the distance [from] a to c is called a *semiditone*, since an incomplete ditone is constructed by taking away half of the tone.<sup>22</sup> But [the distance from] b to e is called a *diatessaron*, because it is capable of four notes or, if you prefer, it is called *tetrachord*, because it is the division and interval of four strings. For there is one string or, if you prefer, one note--b, another c, a third d, [and] a fourth e, among which three intervals are confined--that is, two tones and one semitone.

Boethius, by means of tetrachords, divided the monochord in this manner: the first tetrachord is b-e; the second [tetrachord] is e-h.<sup>23</sup> Thus, e is the final of the first [tetrachord] and the beginning of the second [tetrachord]; and likewise h-l. But when the final of the preceding tetrachord is selected for the beginning of the following tetrachord, the tetrachord is called *coniunctum*,<sup>24</sup> which the Greeks call *synēmmenōn*. However, when h--that is, the final of the first or, if you prefer, the preceding [tetrachord]--is

diezeugmenon nuncupatur,  
 quod illa [contermina]  
 tetrachorda communi fine  
 non [copulantur], sed  
 principium secundi a primi  
 fine per toni distantiam  
 dirimitur. Estque quintum  
 tetrachordum *m p*, quod  
 hyperboleon, hoc est  
 excellentium, dicitur.  
 Omnes enim illius chordae  
 omnes aliorum  
 tetrachordorum chordas  
 acumine sublimitateque  
 superant.

Primum autem  
 tetrachordum graece  
 hypaton, quod est  
 principalium sive  
 inferiorum latine,  
 secundum tetrachordum  
 graece meson, romane  
 mediarum. Sic autem  
 divisa est harmonia,  
 quoniam natura docente sic  
 regitur, ut post duos  
 tonos semitonia  
 temperetur. Chordae  
 autem, quarum nomina sunt  
 diversa, octo numero sunt,  
 hoc est: hypate,  
 parhypate, lichanos, mese,  
 paramese, trite, paranete,  
 nete. Hypate principalis  
 dicitur; unde Graeci  
 consulem hypaten vocant.

not selected for the  
 beginning of the second  
 or, if you prefer, the  
 following [tetrachord],  
 but rather, the following  
 tetrachord selects the  
 initial from square *h* and  
 in proceeding through *k-l*  
 is stopped at *m*, it is  
 called *disiunctum*<sup>25</sup> in  
 Latin but *diezeugmenōn* in  
 Greek, because those  
 tetrachords are not joined  
 at the end with a common  
 final, but the beginning  
 of the second [tetrachord]  
 is separated by the  
 distance of a tone from  
 the final of the first  
 [tetrachord]. And there  
 is a fifth tetrachord  
*m-p*--called *hyperbolaiōn*--  
 that is the highest, for  
 all [the notes] of that  
 string surpass all the  
 strings of the other  
 tetrachords in highness  
 [of pitch] and in  
 sublimity.<sup>26</sup>

The first tetrachord [is  
 called] *hypatōn* in Greek,  
 which is *principalium* or  
*inferiorum*<sup>27</sup> in Latin; the  
 second tetrachord [is  
 called] *mesōn* in Greek,  
 [and] *mediarum*<sup>28</sup> in the  
 Roman manner. Thus,  
 harmony has been  
 arranged --since it is  
 governed in this manner  
 with nature being the  
 teacher--so that after two  
 tones it may be tempered  
 with a semitone. Now the  
 strings, whose names are  
 diverse, are eight in  
 number--that is: *hypatē*,  
*parhypatē*, *lichanos*, *mesē*,  
*paramesē*, *tritē*, *paranētē*,  
 and *nētē*. The first

Parhypate hoc est iuxta [principalem]; lichanos dicta est, quoniam iuxta Boetii sententiam indice, qui lichanos graece dicitur, percutiebatur vel tangebatur primo digito hypaten feriente; mese idest media, quod in heptachordo medio loco ponatur; paramese idest iuxta mediam; sed trite dicitur, quod ante neten sit tertia; paranete hoc est prope neten et nete inferior non quidem sono, sed locutione.

Secundum vero, quod hae chordae in diversis tetrachordis aptantur, diversa cum quodam addimento nomina sortiuntur. Dicitur enim: hypate hypaton, parhypate hypaton, lichanos hypaton; et sequitur: hypate meson, parhypate meson, lichanos meson, mese, trite synemmenon, paranete synemmenon, nete synemmenon coniunctim. Sed a mese disiungitur per tonum paramese et

string is called *hypatē*; whence the Greeks call the consul the *hypatēn*. [The second string is called] *parhypatē*, for this is next to the first. [The third string] has been named *lichanos*--according to the opinion of Boethius--because it will be struck or plucked with the first finger striking *hypatē*--that is, by the forefinger--which is called *lichanos* in Greek. [The fourth string] is called *mesē*--that is, *media*,<sup>29</sup> because it is placed at midpoint in the heptachord. [The fifth string] is called *paramesē*--that is, next to the middle,<sup>30</sup> but the [sixth string is called] *tritē* because it is a third before *nētē*. The [seventh string], which is next to *nētē*, [is called] *paranētē*;<sup>31</sup> and [finally] the [eighth string is called] *nētē*--certainly not lower in sound but rather, [last] in [this] discourse.

In addition, due to the fact that these strings are appropriated in the different tetrachords, diverse names are selected with a certain addition, namely: *hypatē hypatōn*, *parhypatē hypatōn*, *lichanos hypatōn*, and accordingly: *hypatē mesōn*, *parhypatē mesōn*, *lichanos mesōn*, *mesē*, *tritē synēmmenōn*, *paranētē synēmmenōn*, [and] *nētē synēmmenōn* are conjunct. But *paramesē* is separated



sequitur: trite  
 diezeugmenon, paranete  
 diezeugmenon, nete  
 diezeugmenon, trite  
 hyperboleon, paranete  
 hyperboleon, nete  
 hyperboleon. Sed quoniam  
 mese non erat medio loco  
 posita, cum quatuordecim  
 essent nervi, superadditus  
 est nervus, qui a Graecis  
 proslambanomenos vel  
 prosodos dicitur, a  
 nostris vero acquisitus  
 vel assumptus vel accessus  
 nuncupatur.

Cuilibet enim  
 tetrachordo si tonus  
 addatur, species  
 efficitur, quae diapente,  
 quia vocum quinque est,  
 vocatur aut pentachordum,  
 quia chordarum quinque,  
 intervallorum quatuor,  
 tonorum trium cum  
 semitonio est, ut a e.  
 Sed a diapente semitonio  
 subtracto tritonus  
 efficitur, ut f ♯. Post  
 diapente priores usque ad  
 diatessaron replicantur  
 hoc modo: diapente cum  
 semitonio, ut a f,  
 diapente cum tono ut c h,  
 diapente cum [semiditono]  
 ut a g, diapente cum  
 ditono ut c ♯ quadrum.  
 Sed diapente iuncta cum  
 diatessaron componit  
 speciem, quae diapason  
 dicitur, quod est per  
 totum vel de toto latine,  
 quoniam omnis concentus,  
 quam symphoniam Graeci  
 dicunt, et omnes harmoniae  
 differentiae intra ipsam  
 continentur. Propterea ab

from *mesē* by a tone, and  
 then the following  
 [strings ensue]: *tritē*  
*diezeugmenōn*, *paranētē*  
*diezeugmenōn*, *nētē*  
*diezeugmenōn*, *tritē*  
*hyperbolaiōn*, *paranētē*  
*hyperbolaiōn*, [and] *nētē*  
*hyperbolaiōn*. But since  
*mesē* was not placed in the  
 middle position when there  
 were fourteen strings, a  
 string is added above,  
 which is called  
*proslambanomenos* or  
*prosodos* by the Greeks;  
 however, we have named it  
*acquisitus*, *assumptus*, or  
*accessus*.

For if a tone is added  
 to any tetrachord, a  
 species is produced which  
 is called *diapente*--due to  
 the fact that it contains  
 five tones--or *pentachord*  
 because it contains five  
 strings [and] four  
 intervals--[that is,]  
 three tones with a  
 semitone such as a-e. But  
 a tritone is produced when  
 a semitone is subtracted  
 from the diapente such as  
 f-♯. [The intervals]  
 after the diapente all the  
 way to the diatessaron are  
 replicated by the ancients  
 in this manner: the  
*diapente with a semitone*  
 such as a-f, the *diapente*  
 with a tone such as c-h,  
 the *diapente with a*  
*semiditone* such as a-g,  
 [and] the *diapente with a*  
*ditone* such as c-♯. But  
 the diapente united with  
 the diatessaron forms the  
 species which is called  
*diapason*; in Latin [it is  
 referred to as] *per totum*

antiquis recte dictum est  
post diapason  
reiterationem semper esse.  
Septem autem intermedia  
discrimen aliquod habent;  
unde illud sapienter a  
Virgilio in VI<sup>o</sup> Aeneidos  
positum est: *Nec non  
Threicius longa cum veste  
sacerdos / Obloquitur  
numeris septem discrimina  
vocum.*

Octava vero similis est  
[primae]; ideo Gregorius  
differentes litteras  
septem et non amplius  
posuit, sed easdem repetit  
ac iterum ponit. Quoniam  
inter primam et octavam  
maxima conformitatis  
affinitas similitudoque  
reperitur, adeo ut  
differre non sentiantur  
nisi penes acuminis  
gravitatisque  
diversitatem, ideo  
diapason a *h* vocabatur  
gravis, sed *h p* acuta.  
Sed eisdem litteris,  
quibus gravis signabatur,  
acuta quoque diapason  
notabatur. Sed notandum,  
quod *phtongi* inter se sono  
quidem sunt aequales,  
quantitate autem figurae,  
secundum quod plus minusve  
gravitatis habent, maiora  
minorave spatia continent.

or *de toto*,<sup>32</sup> since every  
concord--which the Greeks  
call *symphonia*--and all  
the different harmonies  
are contained within it.  
Therefore, it was  
correctly stated by the  
ancients that there is  
always a reiteration after  
the diapason. However,  
the seven [intervals] in  
between [the prime and the  
diapason] have some  
distinction; whence that  
which Virgil wisely stated  
in Book VI of the *Aeneid*:  
*The Thracian priest with  
the long garment plays the  
seven differences of the  
tones to [the strains of  
their] melodies.*<sup>33</sup>

The octave is similar to  
the prime; therefore [St.]  
Gregory has established  
[only] seven different  
letters and nothing more,  
for he repeats the same  
[letters] and sets them  
down again. Since the  
greatest affinity and  
similitude of conformity  
is found between the prime  
and the octave, they are  
not perceived differently  
except in the diversity of  
highness and lowness.  
Therefore, the diapason  
*a-h* was called *gravis*, but  
the diapason *h-p* [was  
called] *acuta*; however,  
the high diapason was  
marked with the same  
letters by which the low  
[diapason] was designated.  
And it should be noted  
that the *phtongi*<sup>34</sup> are  
certainly equal in sound  
to one another; in  
quantity, however, the  
figures contain larger or

Quo fit, ut tonus *a b* duplum intervallum habeat tono *h ♯* quadro comparatus et *c d* similiter ad *k l*. Et pariter de semitoniiis aliisque maioribus speciebus dicendum, ut in figura monstratur. At deinceps non ita ponendum, ne inchoantium offuscetur intelligentia; sed quemadmodum toni inter se sono sunt aequales, ita intercapedines ponemus aequales. Semitoniorum vero minuemus intervalla, ut manifeste constet tono minus esse semitonium. Omnia autem praedicta subiecta figura patefaciet [figura 2].

[8]

Videsne dispositionem figurae, ubi graeca chordarum nomina et latinas litteras impressimus? Licet igitur tota musicae differentia unica diapason continetur, duas tamen posuimus, quas [dicimus] bisdiapason, ut Boetii ac Graecorum doctrinam imitaremur, *Enchiridion* vero disdiapason appellat. Ex his manifestatur illorum error, qui male ordiuntur--inchoant

[9]

smaller spaces [on the monochord] according to how much they hold, more or less, in terms of lowness [of pitch].

Thus, it results that the tone *a-b* contains twice as much space as the tone *h-♯*; and likewise [when] *c-d* [is compared] to *k-l*.<sup>35</sup> And it should be said--as it is shown in the figure--in regard to the semitones and the other larger species as well. But it should not be discussed immediately lest the knowledge of the fundamentals are obscured; for indeed, just as the tones are equal to one another in sound, thus we will arrange the equal intervals. Truly, we will diminish the intervals of the semitones, so that it is clearly ascertained that the semitone is less than the tone. The figure below will reveal everything that has been mentioned [see Figura 2].

Do you see the arrangement of the figure where we have marked the Greek string names and the Latin letters? Although all the diversity of music is contained within a single diapason, nevertheless, we have established two [diapasons] which we call *bisdiapason* in order to imitate the teaching of Boethius and the Greeks; but the *Enchiridion*<sup>36</sup> calls it *disdiapason*.

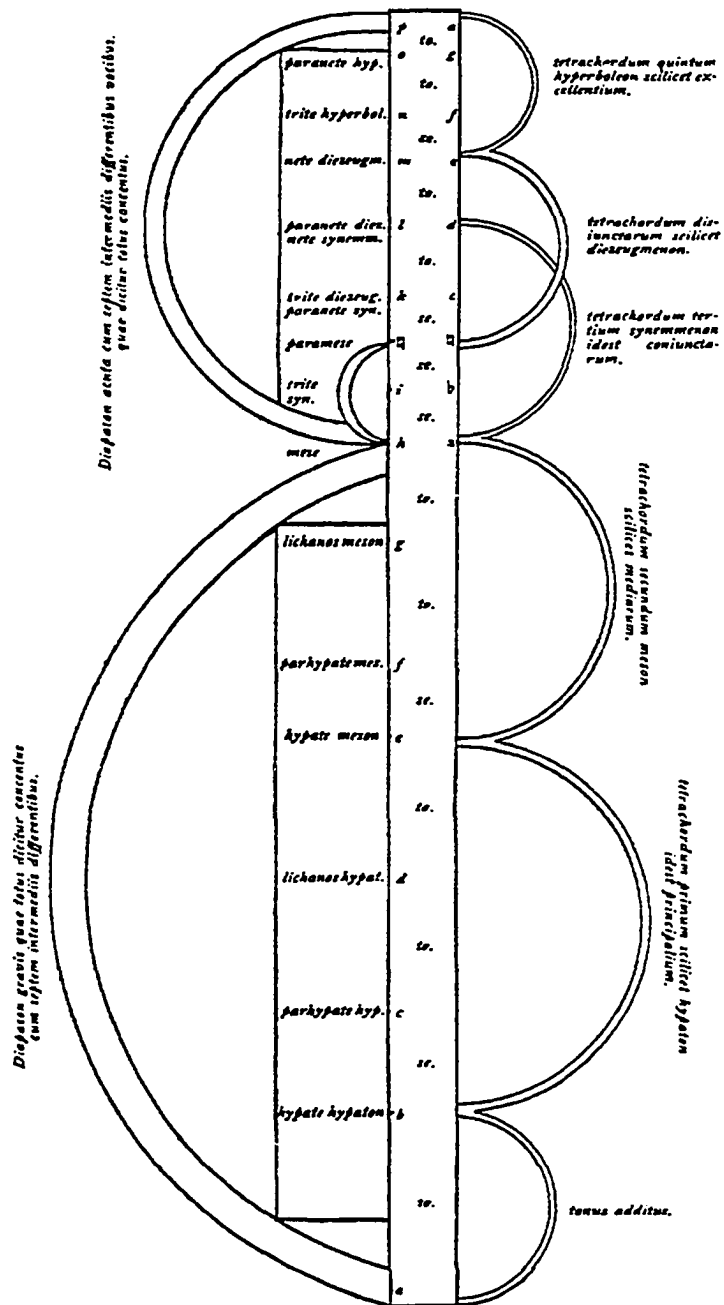


Figure 22. Figura 2 of the *Musica practica*, 8.  
 Source: Johannes Wolf, ed., *Musica practica*, 10.  
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namque sic: Viginti sunt  
 litterae: Γ A B C D E F G  
 a b c d e f g a b c d e--  
 quoniam non viginti sed  
 septem tantum sunt  
 diversae, post quas non  
 aliae, sed eaedem quasi  
 iterum renascuntur.

Sed hi a littera G  
 incipiunt finiuntque in  
 tertia e, quoniam primam  
 sui nominis litteram  
 Gregorium ponere voluisse  
 fabulantur eamque graeca  
 appellatione Γ nominasse,  
 quoniam a Graecis musicae  
 documenta tradita sunt.  
 Sed etsi hoc illis sit  
 permissum, in divisione  
 tamen a veritate maxime  
 aberrant, cum octo graves,  
 septem acutas et  
 superacutas quinque  
 dicant; nam octavam  
 litteram et primam in  
 acumine tantum et  
 [gravitate] differre  
 monstratum est.

Sed ulterius Boetii  
 auctoritate, ut aiunt,  
 munire se conantur.  
 Dicunt namque primam  
 acutarum mesen, quae est h  
 et littera a secunda.  
 Colligitur ergo inter  
 graves ab ipsis G  
 collocari. Etsi a Boetio  
 dicatur G inter graves, a  
 Gregorio non bene dictum  
 propter additionem  
 litterae Γ, quoniam

Their error is revealed  
 from these things, which  
 are badly arranged, for  
 they begin in this manner:  
 There are twenty letters:  
 Γ A B C D E F G a b c d e  
 f g a b c d e.<sup>37</sup> Whereas,  
 there are not twenty  
 different [letters] but  
 only seven, after which  
 not others but the same  
 [notes]--as it were--are  
 reborn again.

These [men] begin from  
 the letter G and end on  
 the third e, because they  
 say that Gregory wished to  
 set down the first letter  
 of his own name and name  
 it with the Greek  
 appellation Γ [gamma],  
 since the documents of  
 music were handed down  
 from the Greeks. But  
 although this may have  
 been permitted to them,  
 nevertheless, in [their]  
 division they deviate  
 greatly from the truth,  
 since they speak of eight  
 graves, seven acutae, and  
 five superacutae, for the  
 eighth and the first  
 letter are shown to differ  
 only in respect to [their]  
 highness and lowness.

Further on, they attempt  
 to justify themselves--so  
 they say--with the  
 authority of Boethius.  
 For they call the first  
 [note] of the acutae--  
 mesē--which is the letter  
 h and the second a.  
 Therefore, they conclude  
 that G is to be placed  
 among graves. Although it  
 may be that G was named  
 among graves by Boethius,

quemadmodum a primum ad h  
 vel ad a secundum, ita F  
 ad G se habet. Sed h (a)  
 ab a primo in acumine  
 tantum differt, ergo et G  
 a F in acumine tantum  
 differet. Datis ergo  
 viginti litteris sic  
 divisio fieri deberet, ut  
 septem graves, septem  
 acutae et sex fierent  
 superacutae. Sed nec  
 Gregorio placuit litterae  
 additio, quoniam quindecim  
 tantum usus est.  
 Tinctoris vero ab hac  
 ratione alienus primum  
 scilicet F dicit  
 gravissimum; secundum est  
 grave, tertium acutum.  
 Verum unde hic error  
 cantores invaserit, paulo  
 post ostendemus. Nunc ad  
 aliorum doctrinam  
 declarandam accedamus.

it is not properly named  
 by Gregory on account of  
 the addition of the letter  
 F, since just as the first  
 a is held with respect to  
 h or with respect to the  
 second a, thus F is held  
 with respect to G. But h  
 (a) differs from the first  
 a only in highness [of  
 pitch]; therefore, G also  
 differs from F only in  
 highness [of pitch].  
 Consequently, the division  
 with the twenty given  
 letters should be created  
 in this manner: there are  
 seven graves, seven  
 acutae, and six  
 superacutae. [Obviously]  
 the addition of a letter  
 was not accepted by  
 Gregory, since he only  
 used fifteen [letters].  
 But Tinctoris--contrary to  
 this opinion--calls the  
 first [division]--that is,  
 gamma--gravissimum, the  
 second [division] graves,  
 and the third [division]  
 acutae.<sup>38</sup> Truly, we will  
 make known a little later  
 how this error was spread  
 among the singers. Now  
 let us undertake to  
 explain the teaching of  
 others.

CAPITULUM QUARTUM

FIGURAE [PRAECEDENTIS] AD  
USUM CANTORUM SUBTILIS  
APPLICATIO

Omnes quidem has  
litteras viginti Guido,  
monachus fortasse melior  
quam musicus, tetrachordo  
utens, dum hexachordum  
componit, amplexus est.  
Et ad huiusmodi  
hexachordum hac ratione  
compulsus est, quoniam  
senarius numerus a  
mathematicis perfectus  
dicitur, quia partes eius  
aliquotae simul sumptae  
ipsum senarium simul  
constituunt, scilicet 1.  
2. 3, quae simul sex  
componunt, et quaelibet  
huius hexachordi chorda a  
sex primis syllabis sex  
dictionum hymni sancti  
Johannis Baptistae nomen  
accepit, scilicet:

Ut queant laxis.  
Resonare fibris.  
Mira gestorum.  
Famuli tuorum.  
Solve polluti.  
Labbii reatum.  
Sancte Johannes.

Unde si recte post  
quemlibet punctum primam  
syllabam inspexerimus, has  
voces sex extrahemus: *ut*,  
*re*, *mi*, *fa*, *sol*, *la*; et  
unaquaeque a sibi  
propinqua omnibus seriatim  
positis per tonum distat  
praeter *fa*, quod a *mi* per

FOURTH CHAPTER

A DETAILED APPLICATION  
OF THE PRECEDING FIGURE  
FOR THE SINGERS'S USE

Certainly, Guido  
(perhaps a better monk  
than a musician), embraced  
all twenty of these  
letters, using the  
tetrachord up to the time  
that he composed the  
hexachord. And he was  
compelled to a hexachord  
of this kind, since the  
number six is called  
*perfect* by mathematicians,  
because its aliquot parts  
taken together constitute  
the *senaria* itself, namely  
1-2-3, which [added]  
together make up the  
[number] six.<sup>39</sup> And each  
string of this hexachord  
receives [its] name from  
the first six syllables of  
the six phrases of the  
hymn of Saint John the  
Baptist:

[10]

*UT* queant laxis.  
*RE*sonare fibris.  
*MIR*a gestorum.  
*FAM*uli tuorum.  
*SOL*ve polluti.  
*LAB*ii reatum.  
Sancte Johannes.

Whence, if we properly  
observe the first syllable  
after any period, we will  
acquire these six notes:  
*ut*, *re*, *mi*, *fa*, *sol*, *la*;  
and each and everyone is  
arranged next to each  
other in a series, distant  
from one another by a tone

semitonii spatium discedit. Habebit igitur duos tonos sub se duosque supra. Et cum prima littera *g*, quae *Γ* dicitur, ut syllaba posita fit totum, quod *Gamaut* nuncupatur; et ex *a* littera et *re* syllaba fit, quod dicitur *a re*. Similiter ex *b* littera et *mi* syllaba *b mi*, ex *c* littera et *fa* syllaba *c fa*, ex *d* et *sol* *d sol*, ex *e* et *la* *e la*.

with the exception of *fa*, which is separated from *mi* by the interval of a semitone. Therefore, [the series] will contain two tones below [*mi*] and two [tones] above [*fa*]. And when the first letter *g* --which is called *Γ*--is placed with the syllable *ut*, a unit is produced which is named *Gamaut* [*Γ ut*]; and that which is called *a re* is produced from the letter *a* and the syllable *re*. Similarly, *b mi* [is produced] from the letter *b* and the syllable *mi*; *c fa* [is produced] from the letter *c* and the syllable *fa*; *d sol* [is produced] from the [letter] *d* and the [syllable] *sol*; [and] *e la* [is produced] from the [letter] *e* and the [syllable] *la*.<sup>40</sup>

Et ut Boetii doctrinam imitaretur, quae per tetrachorda totam dividit harmoniam, cum ad quartum locum pervenit videlicet *c fa*, iterum hexachordum quasi propagine facta aliud emittit. Si autem cum *c fa ut* syllaba ponatur, totum compositum *c fa ut* appellatur et continuatur cum *d sol re* et cum *e la mi*, ubi primum finitur hexachordum. Sed cum ex litteris *f* sequatur, cum *fa* tetrachordi secundi syllaba *ut* iterum collocatur, quae secundi tetrachordi quarta vox est. Itaque cum sit *f fa*, ut sibi iuncta tale nomen accipiet; et sequitur cum

In order to imitate the teaching of Boethius-- which divides all harmony by means of the tetrachord--[Guido], upon arriving at the fourth position--namely *c fa*-- produces another hexachord again as if a descendant had been born. However, if the syllable *ut* is placed with *c fa*, the entire unit is called *c fa ut* and it unites with *d sol re* and *e la mi*, whereupon the first hexachord is completed. But since *f* follows after [these] letters, the syllable *ut* is placed with *fa* of the second tetrachord--which is the fourth note of the second



*g sol re et cum a la mi*  
 et, ne se ignorasse  
 similitudinem extremarum  
 diapason includentium  
 videretur, rursus  
 hexachordum collocare  
 incipit.

Et cum ex praeteritis  
 tetrachordis duobus  
 secundo videlicet et  
 tertio duas voces habeamus  
 ibi locatas, scilicet cum  
 littera *g sol re*, ut sibi  
 addita tali nomine  
 nuncupatur scilicet *g sol*  
*re ut* et continuatur cum *a*  
*la mi re*, ubi [secundum]  
 consumatur hexachordum  
 duoque simul coniunctim  
 copulantur, scilicet *fa*,  
*mi*: cum primo scilicet *b*  
*fa*, cum secundo  $\sharp$  quadrum  
*mi*, quarum quidem vocum,  
 sicut litterae monstratae  
 sunt inaequales esse, unam  
 altiore alia cognoscimus.  
 Et sic tonus ille in duo  
 semitonia dividitur, et  
 sequitur cum *c sol fa ut*,  
 quia, sicut secundum  
 hexachordum ad primum in  
 eo loco coniungitur, et  
 totum compositum sic  
 appellatur, scilicet *c sol*  
*fa ut*. Continuaturque cum  
*d la sol re* et sic  
 deinceps *e la mi*, *f fa ut*,  
*g sol re ut*, *a la mi re*, *b*  
*fa*,  $\sharp$  quadrum *mi* sicut  
 prius et possent  
 hexachorda in infinitum  
 multiplicari iuxta  
 instrumenti sufficientiam.

tetrachord. Therefore,  
 since it is *f fa*, it will  
 receive such a name [as  
*f fa ut* when] *ut* is joined  
 with it; likewise he  
 continues with *g sol re*  
 and *a la mi*, and lest it  
 seem that he has ignored  
 the similarity of the  
 extremes embraced within  
 the diapason [that is,  
*f-g*], he begins to arrange  
 a hexachord [once] again.

And then with respect to  
 the two preceding  
 tetrachords--that is,  
 after the second and the  
 third [tetrachord]--we  
 have placed two notes  
 there; that is, *ut* is  
 added to the letter  
*g sol re* [and] named with  
 the following name,  
*g sol re ut*, and it unites  
 with *a la mi re* where the  
 second hexachord is  
 completed and the two  
 [notes]--that is, *fa mi*  
 are joined together--  
 namely *b fa* with the first  
 [and] *square*  $\sharp$  *mi* with the  
 second.<sup>41</sup> Indeed, we  
 recognize that just as  
 [these] letters have been  
 shown to be unequal, one  
 of these notes is higher  
 than the other. And thus,  
 that tone is divided into  
 two semitones and is  
 followed with *c sol fa ut*,  
 because as the second  
 hexachord is joined to the  
 first at this point, thus  
 also the whole unit is  
 named--that is, *c sol fa*  
*ut*. And it unites with  
*d la sol re*, and likewise  
*e la mi*, *f fa ut*, *g sol re*  
*ut*, *a la mi re*, *b fa*,  
 [and] *square*  $\sharp$  *mi* in

succession just as [it did] before; for the hexachords can be multiplied up to infinity according to the capacity of the instrument.

Sed cum in omni scientia quandoque ad finem perveniendum sit, iterari hexachorda iam desinunt et propterea in *c sol fa* non ponitur amplius *ut*. Sed procedimus ad *d la sol*, ubi sextum hexachordum relinquimus. Septimum vero in *e* syllaba *la* perficitur.

But since in every science a conclusion should be reached at some time, the hexachords cease to be repeated [any] further and therefore, *ut* is no longer placed on *c sol fa*. However, we proceed to *d la sol* where we conclude the sixth hexachord; and the seventh [hexachord] is completed on *e* with the syllable *la*.

Itaque posuit septem hexachorda propter septem voces differentes, ut sibi visum fuit, quod subiecta patefaciet figura. Videsne rectam Guidionis figuram? Ipse vero no sic, sed per iuncturas ponit digitorum hoc modo: [figura 3]

And thus, [Guido] established seven hexachords for the seven different notes as it seemed [fitting] to him, which the figure below will reveal. Do you see the *recta* figure of Guido's [hand]? Truly, [Guido] himself did not [establish the gamut] in this way, but by means of the joints of the fingers he arranges [it] thus: [see Figura 3].

[11]

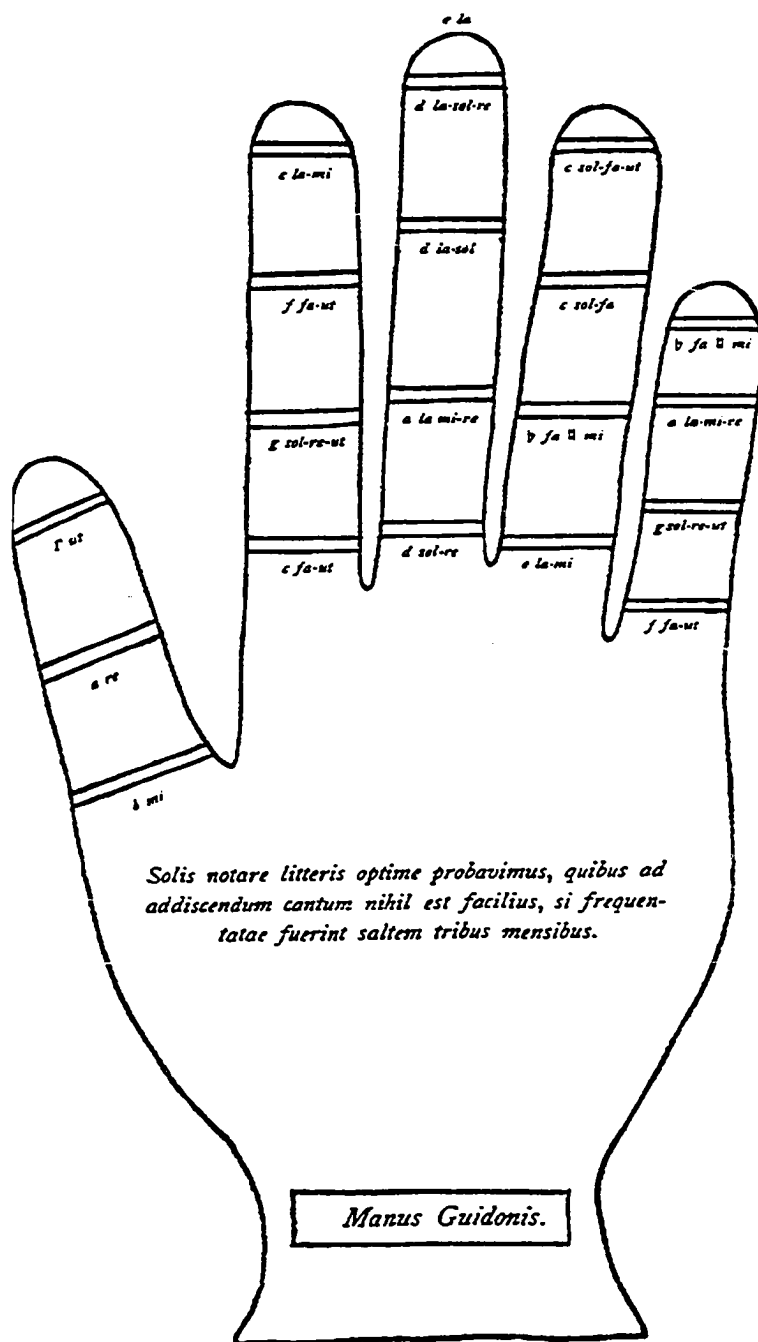


Figure 23. Figura 3 of the *Musica practica*, 11.  
 Source: Johannes Wolf, ed., *Musica practica*, 13.  
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CAPITULUM QUINTUM

QUORUNDAM ERRORIS CIRCA  
PRAEDICTAM CLARA OSTENSIO

Licet non omnia, quae circa haec ab ipso ponuntur, sint a nobis propalata, non tamen propterea lectorem arbitraturum reor, id nos temere fecisse; et profecto, si votis conatibusque nostris faverit deus, suis in locis eorum, quae ab ipso et ab aliis inordinata [indigestaque] ponuntur, ne unum quidem iota ad rem necessarium relinquatur intactum. Sed et alia quidem, quae minus ipsi cognoverunt et in quibus illis error illusit, mox edocebimus.

Dictum quippe est supra et demonstratum tetrachordum synemmenon esse coniunctum, diezeugmenon autem disiunctum. Quidam vero ista nescientes, ut longa cum Tristano de Silva Hispano familiarissimo nostro et acerrimi ingenii viro disputatione investigavimus, cum ad mesen perveniunt, diezeugmenon ponunt, post

FIFTH CHAPTER

A CLEAR EXPLANATION OF THE  
ERROR OF SOME IN RESPECT  
TO THE AFOREMENTIONED

[12] Although not everything that is established by [Guido] in regard to these matters may be uncovered by us, nevertheless, I do not believe on that account that the reader will think that we acted without a purpose. Truly, if God will favor our desires and efforts, [these things]--which are established by [Guido] and others in a disorderly and confused manner--[will be presented] at their own proper time and at their proper places; [and] not even one iota will be left untouched that is necessary for [this] undertaking. Indeed, soon we will also teach other things, which they themselves knew less about and in which [their] error has mocked them.

Truly, it was discussed and demonstrated above that the *synēmmenōn* tetrachord is conjunct but the *diezeugmenōn* [tetrachord] is disjunct. However, some [people], being ignorant of this (as we have found in a long dispute with the Spaniard Tristan de Silva--our dearest friend, and a man with the most sagacious talent) establish the

hoc synemmenon, deinde hyperboleon. Et sic distare faciunt [neten] hyperboleon a proslambanomeno per tres chordas ultra bisdiapason, quod esse contra veritatem et Boetii doctrinam manifestum est. Ipse namque Boetius accuratissime istud declarat primo libro capitulo, quod incipit: Sed quoniam rursus mese . . . . Ponit insuper evidenter declaratum numeris et mensurata figura quarto libro capitulo, quod incipit: Duo quidem tetrachorda, quae sibimet coniuncta sunt, a mese vero disiuncta . . . .

Sed de his in theoreticis nostris neque hic aliquid allegassem, nisi quod multorum circa hoc error ostenditur et istorum ipsorum, quorum multi facile credentes sequuntur disciplinam. Marchetus vero non sic, sed a mese ponit disiunctum, post quod hyperboleon, deinde synemmenon et sic chordas decem et octo collocat; quibus una inferius scilicet gamma et alia superius scilicet e superaddita ad viginti chordas numerus excrescit.

diezeugmenōn [tetrachord] after they reach *mesē*.<sup>42</sup> After this, they place the *synēmmenōn* [tetrachord], [and] then the *hyperbolaiōn*. And thus, they cause the *nētē hyperbolaiōn* to stand apart from the *proslambanomenos* by [the distance of] three strings beyond a bisdiapason, which is clearly contrary to the truth and the teaching of Boethius. For Boethius himself declares this very accurately in [his] first book, in the chapter that begins: "Sed quoniam rursus *mesē* . . . ." <sup>43</sup> Moreover, he clearly makes the statement with numbers and a measured figure in [his] fourth book, in the chapter that begins: "Duo quidem tetrachorda, quae sibimet coniuncta sunt, a *mesē* vero disiuncta . . . ." <sup>44</sup>

I would not have mentioned anything about these things in our theories, nor here, except that the error of many [people] is shown in regard to this, and of those very ones whose method of teaching many [people] follow, believing [it] with ease. Truly, Marchettus,<sup>45</sup> [does not arrange them] in this way; rather, he places a disjunct [tetrachord] from *mesē* after which he sets down the *hyperbolaiōn*, then the *synēmmenōn*, and thus he employs eighteen strings.<sup>46</sup> This number

increases to twenty strings when a [string] is added below--namely *gamma*--and another [string] is added above--namely *e*.

Sed si quis sano modo velit ipsum intelligere, posset iudicio meo dicere, quod subtracto synemmenon tetrachordo illo modo reliqua disponuntur; deinde post [neten] hyperboleon, quoniam similis est mese, ponitur tetrachordum synemmenon eo modo, quo post mesen sequi deberet. Et ne impediret diezeugmenon, ita disposuit. Multis etiam aliis modis posset salvari; ego equidem illum salvum esse non dubito, quoniam Christus in cruce pro his oravit, qui nesciunt, quid faciunt. Quidam frater Johannes Carthusiensis Gallus salvat eum dicens et indoctum et ferula indigentem. Ego autem Marchetum hunc tanti existimo, ut marchetos quatuor Rogerio Caperon Gallo simul uno potu deglutiri posse non dubitem.

[13]

In my opinion, if anyone wishes to understand [this] in a sound manner, one can say that the remaining [strings] are arranged in such a way with the *synēmmenōn* tetrachord removed. Then the *synēmmenōn* tetrachord--which ought to follow after *mesē*--is placed after the *nētē hyperbolaiōn*, since it is similar to *mesē*. And thus, it has been arranged so that it does not hinder the *diezeugmenōn*. Yet, it may be preserved in many other ways. Indeed, I do not doubt that [Marchettus] may be saved, since Christ on the cross prayed for those who know not what they do. A certain brother--the Frenchman Johannes Carthusiensis<sup>47</sup>--saves him by saying that he is "both untrained and deserving of chastisement."<sup>48</sup> However, I value this Marchettus so much that I have no doubt that four *marchetti*<sup>49</sup> could be swallowed down together in one gulp by the Frenchman Roger Caperon.<sup>50</sup>

Iste enim Rogerius Caperon sic ait: Quatuor sunt figurae, quae additae sunt in cantu, scilicet: coruph, synemmenon, apotome et crisis. Coruph appellat Gamma, quia

For this Roger Caperon said thus: "There are four figures that are added in the song, namely: *coruph*, *synēmmenōn*, *apotome*, and *crisis*. He calls *gamma coruph* because

addita, synemmenon *b*,  
 apotome vero *h*; sed *crisim*  
 appellat *e* superacutam, in  
 qua sequaces Guidonis  
 ponunt *la*.

Synemmenon bene dicit  
 esse *b*, si intelligat  
 distantiam semitonii ab *a*  
 in *b*, quoniam ipse non  
 declarat; bene etiam dicit  
 apotomen, si intelligat  
 distantiam *b* et *h*, quoniam  
 sic a Boetio et a Philolao  
 appellatur, quod maius  
 semitonium dicimus. Et  
 sic viginti chordas ponit  
 in errorem decidens  
 aliorum.

it is added; *b* [is called]  
*synēmmenōn*, *h* [is called]  
*apotome*, (and) *e*  
*superacuta*--where the  
 followers of Guido place  
*la*--[is called] *crisis*.<sup>51</sup>

The *b* is properly named  
*synēmmenōn* if one  
 considers that there is  
 the distance of a semitone  
 from *a* to *b*, (although he  
 does not state this  
 himself). The *apotome* is  
 also properly named if one  
 considers the distance  
 between *b* and *h*, since it  
 is named thus by Boethius  
 and Philolaus;<sup>52</sup> we call  
 this the *major semitone*.  
 And thus, sinking into the  
 error of others, [Roger  
 Caperon also] establishes  
 [a total of] twenty  
 strings.

## CAPITULUM SEXTUM

### DIVERSORUM INSTRUMENTORUM BREVIS NOTITIA

Ostensa mediocriter regularis monochordi divisione reliquum est, ut ad huius regulam vocem humanam redigentes alternatim elevare deprimereque doceamus. Hoc autem melius assequemur, si prius nobis diversorum instrumentorum, dum summa sequimur vestigia rerum, notitia declaretur, ut cum aliis etiam instrumentis organum naturale contemperare sciamus. Horum autem aliae sunt, quae extensione nimia voces extenuant aut laxatione easdem [obtundunt] et ad gravitatem remittunt. Sunt etiam chordae diversae et in longitudine et in grossitie, ut in cithara et lyra, polychordo, clavichordo, clavicimbalo, psalterio et in aliis pluribus instrumentis, quibus a posteritate nova sunt imposita vocabula et quorum in secundo libro planam faciemus mentionem.

Omnia tamen haec nostram divisionem fugere non possunt. Etenim chordae monochordi, quae eiusdem sunt grossitiei,

## SIXTH CHAPTER

### A BRIEF NOTE CONCERNING VARIOUS INSTRUMENTS

With the division of the regular monochord having briefly been shown, it remains [for us] to teach how to alternately raise and lower the human voice, in accordance with the rule of this [monochord]. However, we will better understand this if the knowledge of the various instruments is made clear to us first while we follow the most excellent footsteps of the truth, in order that we may also know how to combine the natural organ with other instruments. However, some of these instruments make the pitches higher with excessive tension, or lower the same with relaxation and produce low [pitches]. There are also strings that differ both in length and thickness, as on the cithara, the lyre, the polychord, the clavichord, the clavicembalo, the psalter, and many other instruments, to which new names have been assigned by posterity, and of which we will make clear mention of in the second book.

Nevertheless, none of these things are able to escape from our [monochord] division. Indeed, the strings of the



longitudinis et  
 extensionis, si in eadem  
 distantia fuerint  
 percussae, eundem  
 necessario sonum emittent,  
 quemadmodum monochorda  
 repperimus antiqua. Sed  
 secundum quod propinquius  
 vel distantius a loco, ubi  
 torquentur, unaquaeque  
 percutitur, graviorem  
 acutioremve secundum  
 proportionem divisionis  
 superius datam sonum  
 emittit.

Nunc autem non omnes  
 chordae eiusdem grossitiei  
 nec eadem extensione sunt  
 temperatae. Ideo si a  
 memoria caderet  
 creberrimus musicae usus,  
 consonantiarum veritatem  
 per ista monochorda minime  
 invenire possemus, sed ad  
 priorem divisionem  
 recurrentes sonos  
 connotaremus. Si quis  
 enim istud concorditer  
 aptare voluerit, ad nostri  
 instrumenti sonum  
 convertatur, et illo  
 perpenso istud cognoscet.

Sunt tamen aliqua ex  
 novis monochorda unam  
 habentia diapason ad  
 partem acutiorem isto modo  
 divisam; quoniam sex  
 saltem chordae illo modo  
 sunt temperatae et eiusdem  
 sunt grossitiei, et tunc

monochord<sup>53</sup>--which are of  
 the same thickness,  
 length, and tension--will  
 emit the same sound by  
 necessity, if they have  
 been struck from the same  
 distance, just as we have  
 discovered with the  
 ancient monochord. But  
 [the string] emits a lower  
 or higher sound according  
 to how each is struck--  
 either closer or farther  
 from the place where it is  
 wound, in accordance with  
 the proportion of the  
 division given above.

Now not all of the  
 strings are of the same  
 thickness, nor are they  
 tuned with the same  
 tension. Therefore, if  
 the most frequent use of  
 music were to fall from  
 [our] memory, we would not  
 be able to find the truth  
 of the consonants through  
 those monochords, but we  
 would make note of the  
 sounds [by] reverting to  
 the previous divisions.  
 For if anyone should wish  
 to adapt such a division  
 concordantly, he would  
 turn to the sound of our  
 instrument [i.e., the  
 monochord], and he would  
 become acquainted with the  
 former by a careful  
 consideration of the  
 latter.

Nevertheless, among the  
 new monochords there are  
 some, containing a single  
 diapason, that are divided  
 in the higher part in this  
 manner--since at least six  
 strings are tuned in that  
 manner and are of the same

acumen aut gravitatem  
parva vel magna chordarum  
intercapedo tonorum aut  
aliarum specierum secundum  
commensurationem  
proportionis efficit. Sed  
quae ita sunt facta,  
facillime temperantur,  
quoniam unicuique sono  
eiusdem diapason sua  
octava facillime  
concordatur.

Sunt et alia, quorum  
chordae sunt contrario  
modo dispositae, quoniam  
quanto digitus  
superpositus ad locum, in  
quo torquetur,  
appropinquat, tanto sonos  
reddunt graviore et e  
contra, ut lyra. Sed hoc  
nostrae divisioni non  
obstat, quoniam chordarum  
impulsio non fit ex parte  
mediae chordae--a loco  
scilicet, a quo torquetur,  
ad *h*--, sed a loco  
ligaturae ad *h*. Sic ergo  
quanto digitus  
superpositus magis  
appropinquat ligaturae  
chordae, tanto sonus  
acutior erit, quoniam  
chorda brevior; et quanto  
magis ad locum, in quo  
torquetur, appropinquat,  
tanto gravius sonat, quia  
longior chorda est.

thickness--and then the  
short or long distance of  
[these] strings produces  
the highness or lowness  
[of the pitch] according  
to the measurement of the  
proportion for the [whole]  
tones or other intervals.  
[The monochords] that are  
made in this way are  
easily tuned, since each  
pitch is easily made in  
agreement to the sound of  
its octave.<sup>54</sup>

There are also other  
[instruments], such as the  
lyre, whose strings are  
arranged in the opposite  
way, since however much  
the finger that is  
superimposed upon the  
string approaches the  
place where it is wound,  
to the same degree they  
produce the lower pitches  
and vice-versa. But this  
is not in opposition to  
our [mono-chord] division,  
because the pressure of  
the strings is not made by  
the middle part of the  
string--that is, between  
the place where it is  
wound and *h*--but rather,  
between the place where it  
is tied and *h*. Thus, the  
more the finger that is  
super-imposed [upon the  
string] approaches the  
place where the string is  
tied, the higher the pitch  
will be, because the  
string is shorter; and the  
more it approaches the  
place where [the string]  
is wound, the lower it  
sounds, because the string  
is longer.

Si hoc igitur instrumentum dividere voluerimus, permutatis litteris transpositisque idem eveniet, hoc est: *h* littera, ut prius erat, media remanente transponatur *q* ad locum *a* et *a* ad locum *q* et reliquae litterae unaquaeque in alterius locum transferantur.

Est autem tonus in duo semitonia divisus in quolibet novorum instrumentorum perfecto, sicuti nostro meses et parameses per trite synemmenon, de qua divisione paulo post dicemus. Quando vero tonum in talibus facere voluerimus, duas chordarum divisiones transire nos decebit. In hoc igitur instrumento usque ad semitonia sic divisio plures chordae ponuntur, aliae scilicet grossiores, aliae vero subtiliores.

Utuntur autem nunc quinque sic dispositis, ut grossior in tota sua extensione sonet tono sub proslambanomeno, quod dicimus *F ut*, secunda parhypate hypaton diatessaron distans ab ea, tertia [hypate] meson

If we wish to divide this instrument, the same [division] will result with the exchange and transposition of the letters--that is, the letter *h* remains in the middle as it was before, [the letter] *q* is transferred to the place where *a* was, *a* [is transferred] to the place where *q* was, and each one of the remaining letters are transferred to the place of the other.

Now the tone is divided into two semitones on any of the new chromatic instruments,<sup>55</sup> just as on our [monochord] the *mesē* and the *paramesē* are divided by the *trite synemmenōn*--[but] we will speak about this division a little later.<sup>56</sup> Truly, when we wish to make a tone on such [instruments], it will be necessary for us to pass through two divisions of the strings.<sup>57</sup> Consequently, many strings are placed on this instrument, having thus been divided as far as the semitones; naturally some [of the strings] are thicker and others are thinner.

And now they make use of five [strings] arranged in such a manner so that the thicker [string]--in its entire extension--sounds a [whole] tone below *proslambanomenos*, which we call *F ut*; the second [string]--*parhypatē*

ditono altior ista; sed quarta mesen pronuntiet, quinta paraneten diezeugmenon, sive netes synemmenon sonum emittat, diapason et diapente sonans cum prima. Nec tamen hoc de necessitate fit. Aliis enim modis diversis concorditer disponi possunt, ut prima sit proslambanomenos, secunda lichanos, tertia mese et aliae alibi, et istae similiter alibi locari possunt ad arbitrium pulsantis. Sed quia hoc nunc magis in usu est, sic potius posuimus.

*hypatōn*--is distant from [the first string] by a diatessaron; the third [string]--*hypatē mesōn*--is a ditone higher [than *parhypatē hypatōn*]; the fourth [string] will proclaim *mesē*; the fifth [string] sounds the *paranētē diezeugmenōn* or, if you prefer, the *nētē synēmmenōn*, sounding a diapason plus a diapente above the first [string]. Nevertheless, this is not done out of necessity, for [the strings] can be concordantly arranged in various other ways, so that the first [string] is *proslambanomenos*, the second is *lichanos*, the third is *mesē*, and the others are in another position; and similarly, these can be placed similarly in another position according to the player's discretion. But we prefer to arrange [it] in this manner, because this [order] is more in use now.

In aliis vero instrumentis, quae spiritu sonant, calamorum amplitudo secundum superius datam proportionem acumen faciet et gravitatem. Itaque calami, qui in duplo fuerint ampliores, diapason gravius sonent, et alii intermedii secundum maiorem minoremve grossitiem graviore acutioreve sonos efficient, dum tamen apertura, ubi causatur sonus, et longitudini et

[15]

But on other instruments that make [their] sound by means of the breath,<sup>58</sup> the width of the canes produce the highness or lowness [of the pitch] according to the proportion given above. Therefore, the canes that are double in width sound a diapason lower, and the other intermediate-sized [canes] produce the higher or lower pitches according to the greater or lesser thickness--provided that the aperture where the

grossitiei correspondeat. Sunt et fistulae et sambucae, in quibus longitudo facit differentiam; nam [istae] saltem octo foraminibus aperiuntur, ut digitis omnia possint obturari. Nam si plura essent, aut frustra essent, quia claudi non possent inferiora, aut superiora discoperta manerent et sonum, quem non vellemus, emitterent. Quanto igitur foramina magis ad orificium accedunt, tanto sonos reddunt graviores, et quanto ad os pulsantis magis appropinquant, tanto acutius clamant. Sed si uniuscuiusque foraminis medietas digito claudatur, semitonium facit ad totam aperturam.

Sunt et alia huiusmodi, diversa tamen, quoniam quatuor tantum foramina cum orificio tenent et illis quatuor quemcunque cantum in acumine et gravitate comprehendunt, quod maxime mirandum est. Sed hoc fit, quia foramen idem sonum diapente et sonum diapason et utriusque et bisdiapason sub aut supra potest facere et hoc, si spiritus emittitur in duplo vel in triplo aut in quadruplo vel in trienti.

sound is produced, corresponds both in length and in thickness. There are also *fistulas* and *sambucas*, in which the length makes the difference [in pitch]; for these are made accessible with at least eight holes, so that all [the holes] can be stopped with the fingers.<sup>59</sup> For if there were more, they would serve no purpose, because either the lower [holes] could not be closed or the higher [holes] would remain uncovered and emit an undesirable sound. Therefore, the closer the holes approach toward the orifice--the lower the pitches they yield, and the closer they approach toward the player's mouth --the higher they sound. But if the middle of any hole is closed with the finger, it produces a semitone for the entire aperture.

There are also other [instruments] of this kind, still diverse, because they only have four holes with an orifice, and with these four [holes] they [can] express any song in highness and lowness, which is especially wonderful! This happens when the breath is emitted in double, triple, quadruple, or one-third [proportions], because the same hole is able to produce the sound of the diapente and the diapason, as well as both [of them]

combined [i.e., the twelfth], and the bisdiapason below or above.<sup>60</sup>

Sed de his quidem instrumentis plenam notitiam desiderantes et de eorum inventoribus qualiterque ad perfectionem paulatim devenerint, speculationem seu theoricam nostram inquirant, in qua mira et cognitu suavissima reperient. Quae si parvo huius primi libri volumine [conclusissemus], doctrinam fecissent impeditiorem. His igitur dimissis ad reliquum, ut polliciti sumus, naturale instrumentum deveniemus.

Certainly [those who] desire a full knowledge of these instruments--both of their inventors and how they gradually reached perfection--may inquire into our [*Musica*] *speculatione* or *theorica*, where they will discover wonderful things that are most delightful to know. If we had included these things in the small volume of this first book, they would have made [our] doctrine more difficult. Therefore, with these matters dismissed to the future, we will discuss the natural instrument as we have promised.

## CAPITULUM SEPTIMUM

### COPULANDI VOCEM CUM INSTRUMENTO MODUS SUBTILIS

Multi volentes nos hac imbuere doctrina ea, quae sunt praeponenda, postponunt et e contra ita quod, quando aliquid futurum ex dictis probare voluerint et se de iilo locis debitis mentionem nullam fecisse perpendunt, alibi, ubi minus quadrat, illud interserunt. Inde ergo [illa] doctrina *ὄλη* sive materia informis vel chaos dicitur, confusio. Nos autem non sic procedendum putamus, sed, quemadmodum ex uno in aliud facilius quis duci potest, nos intelligentiae servientes ordine disciplinae convenientissimo ista digessimus. Unde viso sub mediocri cognitione, quod arte factum est, instrumento volumus naturale per istud elevatione ordinata et depositione limatius erudire.

## SEVENTH CHAPTER

### THE DETAILED MANNER OF JOINING THE VOICE WITH AN INSTRUMENT

Many [people], wishing to instruct us in this doctrine, postpone that which should be placed first, and vice-versa. Thus, when they attempt to examine some aspect in the future according to what has been said, and they consider that they have made no mention of it in the proper places, they insert it somewhere else where it is less properly arranged. Therefore, from that time forth, that doctrine is called *ὄλη*,<sup>61</sup> or "formless matter," "confusion," or "chaos." However, we do not think we should proceed in this manner, for just as anyone can too easily be led from one [topic] to another, we of discernment--complying with the methodical order of teaching--have arranged this [doctrine] with the greatest harmony. Whence, having become acquainted with the artificial instrument<sup>62</sup> in a brief fashion, by means of this [doctrine] we wish to teach the orderly elevation and lowering of the natural [instrument] in a more refined manner.

Idcirco monemus, ut teneat discens a nobis factum ante se monochordum percutiensque chordam vocem emittat illi unisonam. Deinde digito superposito in secunda littera scilicet *b* comprimens chordam cum ligno percutiensque desuper chordam soni qualitatem notet; deinde ipse vocem emittat chordae sono unisonam et aequalem. Et sic seriatim per alias litteras ascendens usque ad mesen vocem emittat ac eodem modo remittat. Sic enim ab unaquaque littera ad eius octavam facere poterit.

Sed quoniam oportet addiscentem credere, volumus erudiendos quibusdam legibus coarctare ita, quod non a quavis littera [sed] a littera *c* usque ad aliud *c* inchoare praecipimus; nec tangent primum *b* sed secundum *h*, quod tono distat ab *a* tam in ascensu quam in descensu. Sed dicet quis: quid proferam ore, verbum an sonum tantum? Dicimus, quod non refert prima nec secunda vice, utrum duorum feceris; sed solum sonos connotare ac sonorum distantias oportet, quae in octo vocibus diapason continentibus includuntur.

[16] Therefore, we advise the one who is learning to hold before himself the monochord that we have made, and striking the string, let him emit a sound in unison with that [string]. Then, with the finger placed above [the string] on the second letter--namely *b*--let him notice the quality of the sound while flattening the string with the wood and striking the string from above. Then, let the teacher emit a sound that is unison and equal to the sound of the string. And thus, ascending through the other letters in succession, let him emit the sound up to *mesē* and also return by the same method. For he will be able to perform in this manner from any letter up to its octave.

And since it is necessary for the student to have trust, we wish to confine the students to certain rules in such a way that we advise [them] to begin not from just any letter but rather, from the letter *c* up to the other *c*. [We also suggest] that they do not play the first *b* but the second *h*--which is distant from *a* by a tone--in ascension as well as in descension. But someone will say: "What shall I utter--a word or only a sound?" We say that it does not matter whether you have performed one or the other on the first or



Sed postea, ut memoria sonorum recordetur, unusquisque nomine proferatur diverso, quod fuit antiquis in morem, ut Oddo *Enchiriadis* dicebat: *noe noananne caneagis*, quae nihil sunt significantia.

Alli vero *tu, pro, de, nos, tri, te, ad*, quae significabant modorum sedes, de quibus in suo loco dicemus. Alii autem solum litteras alphabeti ponebant scilicet: *a, b, c, d, e, f, g*, ut Gregorius, Augustinus, Ambrosius et Bernardus; Guido vero *ut, re, mi, fa, sol, la*, sicut ante diximus. Quamquam illud ex accidenti fecerit, quoniam etiam litteris omnia exempla sua demonstrat, sequaces vero post ita his vocibus adhaerent, ut omnino illas putent esse musicae necessarias, quod deridendum est.

Nos igitur, qui circa huius artis veritatem inquirendam lucubrando atque vigilando diu laboravimus, dictiones singulis chordis imponimus

second time; it is only necessary to note the sounds and the distances of the sounds, which are included in the eight notes of the diapason. But afterwards, so that the record of the sounds may be remembered, let each one be uttered with a distinct name. This was the ancient custom, just as in the *Enchiriadis* Oddo said *noe noananne caneagis*, which [actually] have no significance at all.<sup>63</sup>

But some people, whom we will discuss at their proper time, use *tu, pro, de, nos, tri, te, [and] ad*, which signified the seats of the modes.<sup>64</sup> However, others such as Gregory, Augustine, Ambrose, and Bernard, set down only the letters of the alphabet--namely *a, b, c, d, e, f, g*. But Guido [set down] *ut, re, mi, fa, sol, la*, as we have said before. Although he may have done that by accident--since he also demonstrates all his examples by letters--truly, [his] followers afterwards adhere to these syllables in such a manner that they believe them to be entirely necessary to music, which is ridiculous!<sup>65</sup>

We therefore, who have labored for a long time--working by night and losing a great deal of sleep for the purpose of inquiring about the truth

novas et effectus totius denotantes concentus ita, ut in graviori dicatur *psal*, in sequenti *li*, in tertia *tur*, in quarta *per*, in quinta *vo*, in sexta *ces*, in septima *is* et in octava *tas*; et sic erit conclusio syllabarum: *psallitur per voces istas*, quoniam octo vocibus fit totus concentus. Locamus autem eas a littera *c* gravi in litteram *c* acutam, quoniam perfecte canere docent.

Ideo a littera *c* sunt incipiendae, quia cantus ab eadem littera inchoat et semitonium primum duorum tonorum clauditur intercapedine et secundum inter duas semitonia sonat. Primum igitur est *e f* idest *tur per*. Sed quia secundum semitonium quandoque fit a littera *a* in *b*, quandoque a littera  $\sharp$  in *c* acutam propter tetrachordum synemmenon et diezeugmenon, quia sunt ibi tria semitonia divisim locata, tria illa loca littera *s* sunt denotata, hoc est: *ces*, *is*, *tas*. His etenim vocibus cum chordis instrumenti [aequisonantibus] facile [17] poterimus naturale instrumentum cum eo, quod arte factum est, concordare.

of this art--are assigning new names to the individual strings and designating the execution of the entire *concentus* in such a manner, so that the lowest [note] is named *psal*, the second *li*, the third *tur*, the fourth *per*, the fifth *vo*, the sixth *ces*, the seventh *is*,<sup>66</sup> and the eighth [note] *tas*. Thus, the conclusion of the syllables will be: *psallitur per voces istas*,<sup>67</sup> since the entire *concentus* is created from [these] eight voices. Therefore, we place these [syllables] from the low letter *c* to the high letter *c*, since they teach one to sing perfectly.

Therefore, they should begin on the letter *c*, because the production of melodious sound begins from the same letter<sup>68</sup> and the first semitone is surrounded by an interval of two tones while the second [semitone] resounds between two semitones. Therefore, the first [semitone] is from *e-f*--that is, *tur-per*. However, since the second semitone occurs at times from *a* to *b* and at other times from the letter  $\sharp$  to *high c*--on account of the *synemmenon* and *diezeugmenon* tetrachord--there are three semitones placed there separately.<sup>69</sup> Those three places are denoted by the letter *s*--that is, *ces*, *is*, *tas*. For with these voices sounding equally with the

strings of the instrument, we will easily be able to tune the natural instrument with the artificial instrument.

Quod si supra diapason scandere volumus, in eodem sono *psal*, ut prius, locabimus. Manebit autem bisyllabum *c* scilicet *tas-psal* et sequitur cum *d li* et cum *e tur* et reliqua sicut prius. Sic et in gravi faciendum est, quoniam, ut saepe diximus, post diapason renascitur vox; et quotiens ultra diapason transcendimus vel descendimus, totiens vocem renovamus. De his igitur octo tantum doctrina est recta.

Cum ergo ad octavam sic graduatim [cantans] pervenerit chordam, eisdem gradibus syllabisque conversis pedetentim vocem remittat et tam diu hoc faciat, donec absque monochordi percussione idem facere perdidicerit. Quo peracto iterum a prima ad secundam ascendat et iterum a prima ad tertiam mediate ac postea immediate psallat et a tertia ad primam mediate et postea immediate descendat. Sic et a prima ad quartam mediate et postea immediate tam intendendo quam remittendo ac eodem modo a prima ad quintam mediate, deinde

And if we wish to ascend above the diapason, we will place *psal* on the same sounds as before. Moreover, *c* will remain a bi-syllable, namely *tas-psal*, and it continues with *d-li* and *e-tur*, and the rest [of them] just as before. Likewise, it should also be done this way in the low [range], since as we have often said: the sound is reborn after the diapason, [for] as often as we ascend or descend beyond the diapason, so we repeat the sound. Therefore, the doctrine is correct only in regard to these eight [notes].

Consequently, when the singer has gradually arrived at the eighth string, let him relax the voice, gradually [descending] with the same steps and syllables in reverse order; and let him do this for such a time until he has learned to do it without striking the monochord at the same time. When this has been accomplished, let him ascend again from the first [note] to the second [note] and then let him sing from the first [note] to the third [note] by step, and then after that, by leap;<sup>70</sup> and let him descend from the third

immediate in elevatione et depositione se habeat.

Sed quemadmodum se habuit a prima usque ad quintam in elevatione et depositione, sic a secunda ad sextam, a tertia ad septimam et a quarta ad octavam iubilare procuret. In hoc autem exercitio semper in quinta voce praecipimus pedem esse figendum et hoc multis de causis, quae dicuntur in tropis. Similiter et quando in principio usque ad octavam conscendit, quiescat in quinta voce et iterum in eodem sono incipiens ad octavam pertingat ita, ut dicat: *psal li tur per vo*, et post, intervallo quietis facto, dicat: *vo ces is tas*; sed in remittendo *tas is ces vo*, postmodum voce dimissa cum intervallo dicat: *vo per tur li psal*. Deinde a prima ad eius octavam vocem intendat, scilicet *psal tas* et econtra remittat *tas psal*.

[note] to the first [note] by step, and then later by leap. [And let him proceed] in this manner from the first [note] to the fourth [note] by step and then later by leap--in ascending as much as in descending--and also let him continue in the same way, ascending and descending from the first [note] to the fifth [note] by step and then by leap.

And just as he has continued from the first [note] up to the fifth--in ascension and descension--thus let him attend to singing from the second to the sixth, from the third to the seventh, and from the fourth to the eighth. Moreover, in this exercise we prescribe that the [metrical] foot should always be fixed on the fifth note, and [we say] this for many reasons which will be discussed [in the section] on the tropes.<sup>71</sup> And similarly, when [the singer] ascends from the first [note] up to the octave, let him rest on the fifth, and again beginning on the same sound--[that is, the fifth note]--let him reach the octave in this manner so that he may say: *psal-li-tur-per-vo* and later, after he has made a pause of a rest, he may say: *vo-ces-is-tas*; however, [let him say] *tas-is-ces-vo* when descending and later, after a rest, [let him continue to descend] saying *vo-per-tur-li-*

*psal.*<sup>72</sup> Then, let him stretch the voice from the first [note] to its octave--namely *psal-tas* and let him relax the opposite way [with] *tas-psal*.

In his et in aliis tantum exercitium sibi quisque assumat, quantum ad prompte expediteque cantandum viderit esse necessarium. Sed ne impediatur soni pronuntiatio multitudine litterarum in una syllaba, [volumus, ut] cantantes removeant litteras, quae sequuntur post vocalem, si nocumentum fecerint; at etiam *p*, quae praecedit *s*, semper removeatur, quoniam hic non orthographiam sed musicam docemus.

In these things and in others, let each one take for himself only as much of the exercise as seems necessary for singing readily and freely. But lest the pronunciation of a sound be hindered by the multitude of letters [that occur] on one syllable, we allow the singers to remove the letters that follow a vowel if they cause a problem. Yet even *p*, which precedes *s*, can always be removed, because we are not teaching orthography here but music!

Dubitare tamen aliquis posset nec immerito, qua de causa octo diversas ponimus, cum tantum septem sint differentes et a nobis sic traditum et concessum fuisse meminerit. Dicendum est, quod, licet maximam fore conformitatem et similitudinem inter primam et octavam asseruerimus, in acumine tamen et gravitate eas differre numquam negavimus. Igitur [18] et differentiam inter eas et similitudinem demonstravimus. Cum eandem litteram vocalem scilicet *a* posuimus, similitudinem et conformitatem ostendimus; sed litteris aliis, hoc

Nevertheless, someone may doubt--and not without reason--why we establish eight different [syllables], since there are only seven different [notes]; and will remember that it was submitted and taught by us in this way. It is necessary to say that although we have claimed the greatest conformity and similarity between the first [voice] and the eighth [voice], nevertheless, we have never denied them to differ in [regard to their] highness and lowness. Therefore, we have demonstrated both the difference and the similarity between them.

est s in principio aut t, differentiam acuminis et gravitatis patefecimus cognita eorum differentia, quoniam grave est, cum ex profundo pectoris attrahitur spiritus, acutum vero, cum ex oris superficie sonus emittitur. Quanto magis circa pulmonem profundior fit pronuntiatio, tanto sonat gravius, et quanto appropinquiori dentibus loco venit, tanto sonat acutius. Sic ergo t littera iuncta cum a ex contactu linguae et clausura dentium fieri cognoscimus. Sed s iuncta cum a ex applicatione linguae ad palatum proferri non dubitamus. Manifestum igitur est ex dictis magis grave sal esse quam tas. Quodsi gravitatis et acuminis differentiam in prolatione l et s in fine syllabae positaram perpendamus, convenientissime a nobis talem locutionem factam constabit. Liquida enim littera l naturaliter gravem sonum emittit, spissitudo autem litterae s quasi sibilans in acumen ascendit. Sibilo enim nulla vox [acutior est].

We have shown similarity and conformity when we have set down the same vowel letter--namely a [for psal and tas]; however, with the other letters at the beginning [of the syllable]--that is s or t--we have revealed the difference of [their] highness and lowness, having recognized their dissimilarity. For when the breath is drawn from the depth of the chest [the sound] is low, but when it is emitted from the surface of the mouth [the sound] is high. The deeper the pronunciation is made in the region around the lung, the lower it sounds; the closer it comes to the mouth cavity,<sup>73</sup> the higher it sounds. Therefore, in this way we know that the letter t united with [the letter] a is produced by the contact of the tongue and the closure of the teeth. And we do not doubt that [the letter] s united with [the letter] a is produced by the application of the tongue to the palette. Therefore, it is clear from what has been said that [p]sal is lower than tas. And if we consider the difference of highness and lowness in the pronunciation of [the letter] l and [the letter] s [which is] placed at the end of the syllable, it will be agreed that such a discussion was most suitably made by us. For the liquid letter l naturally emits a low

sound; however, the density of the letter s rises into the high range as if [it were] whistling. And no voice is higher than whistling.

CAPITULUM OCTAVUM

EIGHTH CHAPTER<sup>74</sup>

Si autem de numero arguatur, quia non tanti valoris octonarius noster videtur, quanti septenarius est, quo volvitur mundus et orbis, qua de causa Gregorius tantum septem litteras posuit, et cum non sit tantae perfectionis quantae senarius, cuius gratia Guido ad sex voces reduxit, cum ergo senarius et septenarius perfectiores sint octonario et cum per illos fieri possit idem, quod per octonarium nos facimus, rectius sensisse videbuntur illi, quorum quidam septenarium, quidam senarium secuti sunt, quam nos, qui sequimur octonarium.

Dicendum numerum octonarium magnam in musica perfectionem et dignitatem obtinere et non frustra esse sed necessario positum. Primo probatur eius perfectio per comparationem. Sicut enim quidam septenarii perfectionem propterea, quod septem [sunt] planetae, nos eadem ratione octonarii probamus perfectionem, quod septem

Now with respect to the number: it may be argued that our number eight does not seem of as much value as the number seven, by which the world and the universe are turned.<sup>75</sup> [It was] for this [very] reason that Gregory only set down seven letters. And [the number eight] is not as perfect as the number six, for the sake of which Guido reduced the voices to six.<sup>76</sup> Therefore, since the number six and the number seven are more perfect than the number eight, and since the same thing can be done through those [numbers] that we ourselves have done by means of the number eight, those who have followed the number seven [or] the number six will seem to have perceived [these things] more correctly than [those of] us who pursue the number eight.

[However], it should be said that the number eight possesses great perfection and value in music, and it is not established in vain but rather, by necessity. In the first place, its perfection is proven by means of a comparison. For just as some [affirm] the perfection of the number seven on this account--because there are seven planets--we prove



planetis addito firmamento  
 octonarius numerus  
 resultat. Et in illorum  
 comparatione gravius  
 peccatur, quia quod  
 excellentius est, scilicet  
 octava [sphaera],  
 dimittitur. Nam dato  
 silentio sicut Terra cum  
 elementis prima et gravior  
 est sphaera Lunae, secunda  
 Mercurii, tertia Veneris,  
 quarta Solis, quinta  
 Martis, sexta Iovis,  
 septima Saturni, octava  
 [coeli stellati]. Quam  
 comparationem etiam Marcus [19]  
 Tullius facit in sexto  
 libro, quem *De re publica*  
 composuit, aliis quidem  
 verbis, sed in [hac] tamen  
 [sententia]. Et hoc  
 quantum ad septenarium.

the perfection of the  
 number eight by the same  
 reason, because [when] the  
 firmament is added to the  
 seven planets, it results  
 in the number eight. And  
 they err more seriously in  
 their comparison, because  
 they dismiss that which is  
 more excellent--that is,  
 the eighth sphere. For  
 with the given silence--  
 such as the Earth with  
 [its] elements--the first  
 and lowest [sound] is the  
 sphere of the Moon, the  
 second is that of Mercury,  
 the third is that of  
 Venus, the fourth is the  
 that of Sun, the fifth is  
 that of Mars, the sixth is  
 that of Jupiter, the  
 seventh is that of Saturn,  
 [and] the eighth is that  
 of the starry sky. Marcus  
 Tullius also made such a  
 comparison in the sixth  
 book of *De re publica*;  
 certainly [it is stated]  
 with different words but  
 nevertheless, the thought  
 is the same.<sup>77</sup>

Quantum vero ad  
 senarium, quia  
 mathematicae sunt  
 rationes, dicemus  
 mathematica corpora  
 subiicienda esse  
 cogitationi et non sensui.  
 In quibus principium est  
 punctus, qui longitudinem  
 nec latitudinem habet nec  
 profunditatem aut  
 altitudinem. Hic  
 protractus efficit lineam,  
 quae unius dimensionis est  
 scilicet longitudinis sine  
 latitudine et profunditate  
 et duobus punctis ex  
 utraque parte longitudinem

But indeed, in regard to  
 the number six we will  
 say, for mathematical  
 reasons, that the  
 mathematical bodies should  
 be subject to reason  
 rather than the senses.  
 The first of these  
 [mathematical bodies] is  
 the point--which has  
 neither longitude nor  
 latitude, neither depth  
 nor height. [When] this  
 [point] is dragged, a line  
 of only one dimension is  
 produced--that is, [a line  
 that] has longitude  
 without latitude and

terminantibus continetur. Hanc lineam si geminaveris, alterum corpus mathematicum fiet, quod duabus dimensionibus extenditur, in longum scilicet et latum carens altitudine, quod superficies dicitur; et hoc punctis quatuor continetur datis scilicet cuilibet duarum linearum duobus punctis. Si vero hae duae lineae fuerint duplicatae, ut, si subiectis duabus duae aliae superponantur, adiicietur profunditas et sic solidum corpus efficitur, quod sine dubio octo angulis continetur. Et hoc videre possumus in taxillo seu tessera, quae et cubus graeco nomine vocatur.

His rationibus geometricis adiungantur naturae numerorum. Nam monas punctus putatur, quia, sicut punctus corpus non est, sed ex se facit corpus, ita monas numerus esse non dicitur sed numerorum origo. Primus ergo numerus binarius est, qui similis est lineae de puncto sub gemina punctorum terminatione protractae. Hic numerus idest binarius duplicatus de se quatuor facit; quaternarius quoque geminatus octonarium reddit, qui numerus solidum corpus imitatur.

depth; and it is contained by the two points terminating the longitude from both directions. If you duplicate this line, another mathematical body will be made that is extended into two dimensions--that is, into longitude and latitude. [But it will be] lacking height, which is called "surface"; and this is contained within four given points--that is, [within] any [mathematical body] of two lines with two points. But if these two lines are duplicated--as if two other [lines] are superimposed upon the two lower [lines]--depth will be added, and thus a solid body is produced that, without doubt, is contained within eight angles. And we can see this in a die or a cube of wood, which is also called by the Greek name *cubus*.

To these geometrical principles, let the natures of the numbers be added. For the point is considered [as] *monas*, because just as the point is not a body but produces a body from itself, thus *monas* cannot be called a number but rather, [it is called] the origin of the numbers. Accordingly, the first number is binary, which is similar to a line drawn from a point below the duplicated limit of the points. This number--that is, two--duplicated, produces [the number] four; and the number four

Diximus enim duas lineas duabus lineis superpositas octo angulorum dimensione integram corporis soliditatem creare. Et hoc est, quod apud geometros dicitur bis bina bis corpus solidum esse, quod Macrobius commemorat in [libro] *De somnio Scipionis* aliis quidem verbis, eandem tamen sententiam continentibus. Et concludit: a pari ergo numero accessio usque ad octo soliditas est corporis, et prosequitur: ideo inter principia huic numero plenitudinem deputant. Concludimus ergo nos, quod qui octo voces truncat aut minuit a musica nostra, perfectionem atque plenitudinem aufert ab ea. Non ergo numerus octavus imperfectus est, sed in musica plenus atque perfectus, quoniam totum continens est et totus concentus, ut saepe dictum est, octo vocibus includitur. Non ergo frustra, immo necessario utimur octonario; et de his hactenus. Nunc ad vocem figuris in plano repraesentandam festinamus.

duplicated, renders the number eight [which] represents a solid body. For we have said that two lines superimposed upon two lines create the entire solidity of the body with a dimension of eight angles. And it is this-- twice two times two--which is called a "solid body" among geometricians. Macrobius mentions this in [his] book, *De somnio Scipionis*; indeed, it contains the same thought even though [he uses] other words. For he concludes: "Therefore, the solidity of the body is an increase from an equal number up to [the number] eight." And [later] he continues: "For that reason, among [their] principles they attribute fullness to this number." Thus, we conclude that whoever truncates or diminishes the eight notes from our music, takes perfection and fullness away from it.<sup>78</sup> Therefore, in music, the number eight is not imperfect; rather, it is full and perfect, since it contains everything, and as it has often been said: "All harmony is included within [these] eight notes." Accordingly, we do not use the number eight in vain, no, indeed we use [it] out of necessity. But enough of these things! Now we hasten to graphically represent sound by means of the figures.

## TRACTATUS SECUNDUS

### CAPITULUM PRIMUM

IN QUO OSTENDITUR,  
QUALITER ET QUOMODO VOX  
IN PLANO DEBEAT FIGURARI

Etiam nunc voces musicas [20] distinguamus. Vox est aeris repercussio indissoluta usque ad auditum perveniens. Humana vox duplex est: quaedam continua, quaedam vero discreta. Continuae voces sunt, quando communi fine iunguntur, ut, si quis nervum percutiat et percutiendo torqueat, eveniet, ut in principio gravius sonet et continuo magis acuatur; et ita continui fient vocis gravis et acutae sonitus, sicut etiam in gemitu accidit infirmorum. Idem etiam quibusdam legentibus contingit, qui vocem legendo continuantes sensim ascendunt descenduntve. De talibus autem, ut verbis Boetii loquar, nolumus nos tractare, quoniam ab harmoniae scientia separantur. Discretae vero voces proprios habent locos. Igitur et soni instrumentorum discreti et voces harmonicae subiiciuntur arti.

## SECOND TREATISE

### FIRST CHAPTER

IN WHICH IT IS SHOWN HOW  
THE SOUND SHOULD BE  
FIGURED GRAPHICALLY

Now let us distinguish the musical sounds. Sound is the uninterrupted repercussion of air reaching the ear.<sup>79</sup> The human voice is twofold: one [type] is continuous, but the other [type] is separated.<sup>80</sup> Sounds are continuous when they are united for a common purpose, so that if anyone should strike a string and twist it while striking it, it will happen that it will sound lower in the beginning and continuously be raised higher. Thus, the sounds of the low and the high voice will become continuous, just as it also occurs in the groaning of the sick. The same thing also happens to certain readers who gradually raise or lower [their] voice during continuous reading. But concerning such sounds, let me speak in the words of Boethius: "We do not want to examine such things, since they are separated from the science of harmony." Certainly, the separated sounds have [their] proper places. Consequently, both the separated sounds of the

Alio etiam modo distinguit Boethius in libro primo vocem humanam in continuam et discretam. Dicit enim continuam esse, qua loquentes vel prosam orationem legentes verba [percurrimus]. Festinat enim tunc vox non inhaerere in acutis aut in gravibus sonis, sed quam velocissime verba percurrere, expediendisque sensibus exprimendisque sermonibus [continuae] vocis impetus operatur. Discretam vero illam dicit, quam canendo suspendimus, in qua non sermonibus sed modulis potius inservimus, estque vox ipsa tardior et per modulandas varietates quoddam faciens intervallum, non taciturnitatis aut silentii, sed tardae potius ac suspensae cantilinae. His, ut Albinus autumat, additur tertia differentia, quae medias voces possit includere, cum scilicet heroum poemata legimus, quae neque continuo cursu, ut prosam, neque suspenso segniorique tractu vocis, ut canticum, pronuntiamus. Similiter, cum in eccelsia orationes, capitula, lectiones et his similia legimus, de quibus in tractatu de tropis manifestius apparebit.

instruments and the sounds of harmony are subjected to art.

Still, in [his] first book, Boethius divided the human voice into continuous and separated by another method.<sup>81</sup> For he says that it is continuous "by which we execute words [when] speaking or reading prose. For then the voice hastens, not to remain on the high or the low sounds but to execute the words as quickly as possible; and the attack of the continuing voice is busy releasing the emotions and the expressing [the thoughts] of the discourse." But he calls "separated" that which we lift up in singing--which we do not attend to in discourses but rather, in melodies. And the sound itself is slower, making a certain interval--not of quietness or of silence but rather, of slow and sustained song--through the diversities of melody making.<sup>82</sup> To these--as Albinus asserts--a third difference is added, which may include the intermediate voices such as when we read heroic poems, which we recite neither with a continuous course, as [in] prose, nor with a sustained and slower flow of the voice, as [in] the canticle.<sup>83</sup> Similarly, [it is also used] when we read prayers, chapters [of scripture], readings, and

similar things in church; these things will be much more evident in the treatise about the tropes.

Vox igitur, cum sit de genere successivorum, dum fit, est; sed cum facta est, non est. Ideo oportet eam regulis ac figuris imaginationi repraesentare. Figura enim vocis [similiter] fieri non potest, praesertim in plano depicta, quoniam, cum profertur, non causatur ad modum puncti fluentis lineam constituentis in longum tantum aut in longum et latum ut linea et superficies, sed in orbem et in sphaeram diffunditur sic, ut per sex positionis differentias ab auribus audiatur, hoc est: sursum, deorsum, ante, retro, dextrorsum et sinistrorsum. Boethius enim vocem per lapidem in stantem aquam proiectum repraesentare conatur undis iactu lapidis excitatis in orbem profugientibus, ut intelligatur sic aerem a voce sicut aquas a lapide propelli.

[21]

Therefore, sound, since it concerns a kind of succession, exists while it is being made, but does not exist after it is made. On that account, it is proper to represent it with straight lines and figures of the imagination. For a figure resembling a sound cannot be made; particularly it cannot be depicted graphically, since when it is produced it does not cause the construction of a line in only length, [as] in the manner of a flowing point, or in length and width, as a line and [its] surface, but it is extended into a circle and into a sphere in such a manner that it may be heard by the ears through six different positions--that is: upwards, downwards, forwards, backwards, towards the right, and towards the left. For Boethius attempts to represent sound by means of a stone thrown into stagnant water with the rippled waves of the thrown stone escaping into a circle, so that thus it may be understood that the air is placed in motion by the voice, just as the water is placed in motion by the stone.<sup>84</sup>

Vox igitur in plano non figuratur, sed vocis elevatio sive intensio et depressio sive remissio quodam modo repraesentatur. Sicut enim in geometrica demonstratione linea picta, quae loco lineae geometricae ponitur, non caret latitudine, qua geometrica linea carere intelligitur, sic in musica nostra elevationem ipsam sive depressionem, quae in puncto consistunt indivisibili, intervallis quibusdam notularum sensibilibus ostendimus.

Cum igitur notulam sequentem super primam inspexerimus, a gravitate inchoantes in acumen vocem elevare docemur. At si secunda inferior fuerit, ab acuto in gravem deveniemus. Et iste modus in omnibus notulis totius cantus subsequenter est observandus. Sed quoniam elevatio notulae sive depressio, quanta in voce tenenda sit, non est facile cognitu, contemporanei nostri optimum in hoc modum excogitaverunt. Decreverunt enim, ut lineae quatuor extendantur aut quinque et a linea in spatio et a spatio in linea talis sit processus, qualis in arte facto instrumento. Voces

Therefore, sound is not represented graphically but [rather], the elevation or, if you prefer, the stretching of the pitch and the lowering or, if you prefer, the relaxing of the pitch is represented in a certain manner. For just as in a geometrical representation, a drawn line--which is established in place of the geometrical line--is not lacking the width that a geometrical line is understood to be lacking; thus, in our music we show either the elevation itself or the lowering, which occurs on an indivisible point with certain perceptible intervals of the notes.

Therefore, after we have examined the following note that is higher than the first [note], we are taught to raise [the sound], beginning from the low and proceeding to the high sound. But if the second [note] is lower, we will arrive at the lower [sound] from the higher [sound]. And this method should be observed on all the subsequent notes of the entire song. But since, with the raising or lowering of the note, it is not easily perceived how much [the sound] should be controlled with the voice, our contemporaries have invented an excellent method in regard to this matter. For they have

continuo se invicem  
 subsequuntur et sibi  
 invicem succedunt. Et ut  
 cognoscantur loca illius  
 distincta propter  
 intervallorum differentiam  
 et intercapedinum  
 inaequalitatem, signatur  
 una illarum linearum hoc  
 ♯ signo vel isto ♮,  
 quorum primum *f* grave,  
 secundum vero *c* acutum  
 demonstrat. Et haec signa  
 neoterici claves appellare  
 solent, quoniam loca  
 manifeste demonstrant.

Disponemus igitur lineas  
 quinque: cum primo signo  
 media illarum signata,  
 quod est *f*, cadet *c*, quod  
*sal* diximus, in spatio a  
 linea inferiori et  
 sequenti contento et in  
 linea [secunda] *d*, quod *li*  
 appellavimus, et in spatio  
 sub linea signata contento  
*e*, quod *tur* nuncupavimus.  
 In hac igitur linea  
 ponitur per et in spatio  
 super ipsa contento, quod  
 est *g*, *vo*; et sequitur  
 eodem modo de reliquis  
 scilicet: *ces*, *is*, *tas*  
 ita, quod *tas* in linea  
 cadet altiori, quod est

determined that four or  
 five lines may be  
 extended, and such is the  
 procedure from the line to  
 the space and from the  
 space to the line, as on  
 the artificial  
 instrument.<sup>85</sup> The notes  
 continuously follow one  
 after another, and [those  
 notes] follow after each  
 other in turn. And in  
 order that its distinct  
 positions may be  
 recognized according to  
 the difference of the  
 intervals and the  
 inequality of the  
 interruptions, one of  
 these lines is marked with  
 this sign ♯, or with this  
 sign ♮. The first of  
 these [signs] indicates  
*f* grave, but the second  
 [sign] indicates *c* acutae.  
 And the moderns are  
 accustomed to calling  
 these signs "clefs," since  
 they clearly show the  
 positions.<sup>86</sup>

Therefore, we will  
 arrange five lines with  
 the first sign--that is,  
*f*--having been marked on  
 the middle one of [those  
 lines]; *c*--which we have  
 called *sal*--will fall upon  
 the space situated between  
 the lowest line and the  
 following [line]; *d*--which  
 we have named *li*--[will be  
 placed] on the second  
 line; and *e*--which we have  
 named *tur*--[will be  
 placed] on the space  
 situated below the marked  
 line. *Per*, therefore, is  
 placed upon this line  
 [where *f* has been marked],



aliud *c*, ubi est alia  
 clavis collocata. At si  
 volumus cum hac idem  
 facere in altiori posita,  
 idem eveniet. Sed si  
 clavis ista non in altiori  
 sed in subsequenti  
 ponatur, sub linea prima  
*sal* ponemus. Et sic *tas*  
 in linea cadet signata,  
 quod etiam cum prima fiet,  
 si in linea quarta a  
 superiori ponatur, ita  
 quod nec lineae nec spatia  
 inter lineas contenta  
 semper eandem tenebunt  
 vocem. Sed secundum quod  
 clavis magis vel minus  
 elevabitur, graviora seu [22]  
 acutiora loca tenebunt.  
 Signabimus igitur nunc  
 duplicem diapason, unam a  
 littera [C] in *c* acutam et  
 aliam ab eadem in  $\acute{c}$   
*superacutam*, ut inchoantes  
 per diversa loca connotent  
 voces.

Si autem lector non ita  
 facile per notulas potest  
 discurrere cum vocis  
 elevatione seu  
 depressione, ad  
 monochordum recurrat et a

and *vo*--which is *g*--[is]  
 on the space situated  
 above it. Likewise, it  
 follows with the rest--  
 that is, *ces*, *is*, *tas*--in  
 such a manner that *tas*  
 will fall on the highest  
 line--that is, [upon] the  
 other *c* where the other  
 clef was placed. But if  
 we wish to do the  
 same with this [*c* clef]  
 positioned upon the  
 highest [line], the result  
 will be the same. But if  
 this [*c*] clef is not  
 placed upon the highest  
 [line] but [rather], on  
 the line below, we will  
 place *sal* below the first  
 line. And thus *tas* will  
 fall on the marked line  
 [*c*], which will also occur  
 with the first [clef, *f*],  
 if it is placed on the  
 fourth line from the top.  
 For neither the lines nor  
 the spaces contained  
 between the lines will  
 always have the same  
 sound, but they will have  
 lower or higher positions  
 according to how [much]  
 the clef is raised, more  
 or less. Therefore, we  
 will now mark the double  
 diapason, [for there is] a  
 [diapason] from the letter  
 C to *c* acutae and another  
 from [*c* acutae] to  $\acute{c}$   
*superacutae*, so that they  
 denote the sounds that  
 begin with the different  
 positions.

However, if the reader  
 cannot pass through the  
 notes easily, with the  
 raising or lowering of the  
 sound in this manner, he  
 may return to the

tertia voce incipiens  
 usque ad eius octavam  
 conscendat et ad tertiam  
 vocem [descendat], ut  
 dictum fuit capitulo  
 [septimo tractatus primi].  
 Multi volentes totum  
 igitur, quod dictum fuit,  
 debere fieri cum  
 instrumento in  
 hoc sine eo facere  
 [scient] notulis  
 inspectis.

monochord; and beginning  
 from the third note he may  
 ascend up to its octave,  
 and [then he may] descend  
 to the third note, as it  
 has been discussed in the  
 [seventh] chapter [of the  
 first treatise].  
 Therefore, everything that  
 has been said [in the  
 section which begins]  
 "Multi volentes . . ."  
 should be done in this way  
 with the instrument  
 [until] they know how to  
 make [the sounds]  
 without [the monochord]--  
 [that is, simply] by  
 looking [at] the notes  
 [themselves].<sup>87</sup>

Sal li tur per vo vo ces is tas tas is ces vo vo pertur li sal  
 C D E F G G a b c c b a G G F E D C

Sal li tur per vo vo ces is tas tas is ces vo vo pertur li sal  
 c d e f g g a b c c b a g g f e d c

Figure 24. [P]sallitur per voces istas, *Musica practica*, 22.  
 Source: Johannes Wolf, ed., *Musica practica*, 27.  
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CAPITULUM SECUNDUM

FICTAE MUSICAE DECLARATIO

Ut autem de his signis atque notulis plenior habeatur cognitio, aliqua circa hoc subtilius investigabimus. Solent enim alia signa in cantibus poni, per quae distantia intercapedinum cognoscitur inaequalis. Quorum alterum sic *b* rotundo scribitur, alterum vero sic *♯* quadrum figuratur. Primum signum *b* molle dicitur sive *b* rotundum, secundum vero *♯* quadratum sive *♯* durum; *♯* quadratum et *b* rotundum appellantur a figurae qualitate, sed *b* molle aut *♯* durum dicitur ex eo, quod canentes per litteras Gregorii, quando ab *a* in *b* faciunt semitonium, illud *b* dicunt molle, quia, cum in arsim et thesim saltus fit per semitonium, magis mollescit vox illa quam quando per tonum, sicut *a* *b* molle, *a* *♯* quadrum durum. Sic etiam quando per semiditonus magis molle quam per ditonus, sicut *g* *b* molle, *g* *♯* quadrum durum. Similiter diatessaron magis molle quam tritonus, sicut *f* *b* molle, *f* *♯* quadrum durissimum.

SECOND CHAPTER

AN EXPLANATION OF  
MUSICA FICTA

In order that one may have a fuller understanding of these signs and notes, we will investigate some [of these] things in greater detail. For in songs it is customary for other signs to be established, through which the variable distance of the intervals is known. One of these is written as a round *b*, but the other is represented with a square *♯*. The first sign is called soft *b* or, if you prefer, round *b*; however, the second [sign is called] either square *♯* or hard *♯*. [And] they are called square *♯* and round *b* due to the quality of the figure. But it is called soft *b* or hard *♯* due to the fact that the singers, who sing according to the letters of Gregory, call it soft *b* whenever they make a semitone from *a* to *b*(*b*), because when a leap of a semitone is made in arsis or thesis, that note is made softer than when [a leap] of a tone [is made], as for example: *a* to soft *b* [compared to] *a* to hard square *♯*. Thus, even when [a leap] of a semiditone [is made], [it is] softer than [a leap] of a ditone, as for example: *g* to soft *b*

[compared to] *g* to *hard square ♯*. Similarly, the diatessaron is softer than the tritone, as for example: *f* to *soft b* [compared to] *f* to *hardest square ♯*.<sup>88</sup>

Ex his patet error quorundam cantorum, qui dicunt *b* molle aut ♯ quadratum. Duobus enim modis errant: primo, quia ipsi cantant per syllabam Guidonis et non per litteras Gregorii, neque igitur *b* molle neque ♯ quadrum durum pronuntiant, sed *fa* aut *mi*. Secundo non faciunt rectam relationem; nam quando dicunt ♯ quadratum, debent correspondenter dicere *b* rotundum, et quando dicunt *b* molle, debent dicere ♯ durum et sic relatio recta fiet. Et hoc fuit antiquis in morem per Gregorii litteras cantantibus, quibus propria sunt vocabula sicut Graecis propria synemmenon aut diezeugmenon. Per nostras autem dictiones canentibus propria erunt nomina *b is* in coniuncto et *is ♯* in disiuncto. Omnibus vero communia tonum aut semitonium facere sunt vocabula. Sed alibi non solum in paramese signant istis signis tonos aut semitonia cantores. Dicunt namque: ubicunque *fa* sine *mi* reperitur, ibi *mi* faciendum est, sicut in *b fa ♯ mi*. Idem quoque, ubi *mi* sine *fa*, quod appellant multi fictam musicam, quorum Philipetus

The error of certain singers, who say *soft b* or *square ♯*, is revealed from these things. For they err in two ways: (1) because they themselves sing according to the syllables of Guido rather than according to the letters of Gregory, and therefore, they proclaim neither *soft b* nor *hard square ♯* but [rather], *fa* and *mi*; (2) [because] they do not make a correct proposition, for they should say *round b* whenever they say *square ♯*, and correspondently they should say *hard ♯* whenever they say *soft b*, and thus [their] proposition will be correct. And this was the custom of the ancients, singing according to the letters of Gregory, for whom there are special terms, just as for the Greeks the special [terms] are *synemmenōn* or *diezeugmenōn*. However, by means of our syllables, the special terms for the singers will be *b is* in the conjunct [tetrachord] and *is ♯* in the disjunct [tetrachord]. Indeed, [these] are common terms to everyone producing a tone or a semitone. With these signs the singers signal tones or semitones,

temerarie loquens sic ait:  
 una est ficta musica  
 Philipetus dicit. Verum  
 tamen ignoravit, quod  
 saltem modis deberet fieri  
 duobus. Facere enim ex *mi*  
*fa* diversus est modus ab  
 illo, qui facit ex *fa mi*,  
 ut paulo post dicetur, ex  
 eo, quod non voces  
 correspondent eo modo, quo  
 naturaliter sunt  
 collocatae. Quando igitur  
 ex *mi fa* est faciendum,  
 tali signo perscribunt  
 scilicet *b* rotundo; sed  
 quando ex *fa mi*, hoc signo  
 notant scilicet *♯* quadro  
 vel hoc *✱*.

Locabitur igitur istud *b*  
 molle in quinque locis  
 secundum eos, scilicet in  
*b mi* et in *e la mi*, in *a*  
*la mi re* primo, in *e la mi*  
 acuto et in *a la mi re*  
 secundo. In his quidem  
 locis dicemus *fa* per  
 semitonium a loco proprio  
 depressum, sed istud *♯* vel  
 istud *✱* in *c fa ut*, in *f*  
*fa ut*, in *c sol fa ut*, in  
*f fa ut* acuto et in *c sol*

not only on *paramesē*, but  
 on other places as well.  
 For they say: "Wherever  
*fa* is found without *mi*, *mi*  
 should be made there, as  
 in *b fa ♯ mi*"; likewise  
 [this also holds true]  
 where *mi* [is found]  
 without *fa*, which many  
 [people] call *musica*  
*ficta*. Philipetus,<sup>89</sup>  
 speaking thoughtlessly,  
 said: "Musica ficta [is  
 made] in one way."<sup>90</sup>  
 Nevertheless, truly he  
 ignored that it should be  
 done in at least two ways.  
 For a different method was  
 [used] to make *fa* from *mi*  
 than that which [was used]  
 to make *mi* from *fa*, as it  
 will be discussed a little  
 later. This is because  
 the notes do not  
 correspond in the way that  
 they were naturally  
 arranged. Therefore,  
 whenever *fa* must be made  
 from *mi* they write [it]  
 down with such a sign--  
 that is, round *b*; but  
 whenever *mi* should be made  
 from *fa* they indicate  
 [it] with this sign--that  
 is, square *♯*, or this  
 [sign] *✱*.<sup>91</sup>

Therefore, according to  
 [their method], this  
 soft *b* will be arranged in  
 five positions--that is,  
 on *b mi*, on *e la mi*, on  
 the first *a la mi re*, on  
*e la mi acutae*, and on the  
 second *a la mi re*.  
 Certainly, we will say  
 that in these places *fa*  
 was lowered by a semitone  
 from its proper position,  
 but [when] this [sign] *♯*

fa, in quibus quidem locis dicemus *mi* per semitonium a loco proprio elevatum. Quod etiam appellant coniunctas propter hoc, quia sicut quando post mesen ponitur trite synemmenon, qua de causa tonus meses et parameses in duo semitonia dividendus est, ita et quilibet alius tonus alibi locatus dividi debet. Adduntque ulterius: quaelibet istarum coniunctarum hexachordum est sicut alia, quae prius posita sunt; et ideo sicut post *f fa ut*, in quo *ut* dictum est, sequitur *g sol re ut*, ubi iterum *ut* collocatur propter iam dicta, sic et in unoquoque locorum. Diffiniuntque hoc modo: Coniuncta est facere de semitono tonum et de tono semitonium, sic et de semiditono ditonum et de ditono semiditonus et de aliis speciebus similiter.

Et sic bene dicunt, quia ad modum diezeugmenon et synemmenon tetrachordorum se habent ista hexachorda coniuncta. Semotus a vera cognitione Johannes Tinctoris sic ait: Coniuncta est positio *b*

or this [sign] ✱ [is placed] on *c fa ut*, on *f fa ut*, on *c sol fa ut*, on *f fa ut acutae*, and on *c sol fa*, we will say that in these places *mi* was raised by a semitone from its proper place. They also call this *coniuncta*, because just as when *trite synemmenon* is placed after *mesē*--for which reason the tone [between] *mesē* and *paramesē* must be divided into two semitones--thus also any other tone located elsewhere should be divided. And furthermore, they instruct us: "Any of these *coniunctae* is a hexachord, just as the others that were arranged previously," and therefore, just as after *f fa ut* (on which it is called *ut*), *g sol re ut* follows--where *ut* is placed again according to [those things which have] already been said; likewise also, in each one of the positions. And they define [it] in this way: "Coniuncta is [the method of] making a tone from a semitone and a semitone from a tone; thus also, making a ditone from a semiditone and a semiditone from a ditone, and similarly concerning the other species."

And thus they speak correctly, because these *coniuncta* hexachords behave in the same way as the *diezeugmenon* and *synemmenon* tetrachords. Johannes Tinctoris--far removed from the true

aut  $\flat$  in loco irregulari.  
 Nam si signum  $b$  mollis  
 poneretur in  $c$  sol fa ut  
 vel in alio loco, ubi fa  
 esset, irregulariter esset  
 positum et tamen coniuncta [24]  
 non esset, ita si  $\flat$   
 quadrum ubi mi. Quod si  $b$   
 ponatur in  $b$  mi, coniuncta  
 fit et tandem locus est  
 irregularis ipsius  $b$ , quia  
 octava est ad  $b$  rotundum.  
 Cum igitur in  $b$  mi fa  
 ponatur, octavo loco a fa,  
 quod ponitur in trite  
 synemmenon diapason  
 resonans consonantiam, ut  
 habebit et reliquas voces  
 singulas singulis  
 referendo in diapason  
 consonantia cum aliis  
 resonantes. Sicut igitur  
 ut synemmenon ab ut  
 diezeugmenon tono  
 superatur, ita ut istius a  
 gamaut tono suberit, quod  
 appellatur ab ipsis  
 retropolis, quia, cum  
 gamaut in capite pollicis  
 superpositum sit, retro  
 ipsum in prima scilicet  
 exteriori iunctura digiti  
 ponitur et sequitur in  
 gamaut re, in a re mi, in  
 b mi fa, sed in c fa ut  
 sol et in d sol re la.  
 Sic et ad mi, quod ponitur  
 in c fa ut elevandum, ut  
 ponitur in a re, et  
 completur istud  
 hexachordum in f fa ut.

knowledge--states thus:  
 "Coniuncta is the position  
 of  $b$  or  $\flat$  in an irregular  
 place."<sup>92</sup> For if the  
 soft  $b$  sign were placed on  
 c sol fa ut or in another  
 position where fa was, it  
 would be placed  
 irregularly, and yet it  
 would not be coniuncta;  
 likewise, if square  $\flat$  were  
 placed where mi had been.  
 But if  $b$  is placed on  
 b mi, coniuncta is made,  
 and in the end it is an  
 irregular place for [b] $\flat$ ,  
 since it is an octave to  
 round  $b$ . Therefore, when  
 fa is placed on b mi at  
 the octave position from  
 fa, it will hold [the  
 syllable] ut, since it is  
 placed on trite  
 synemmenon, sounding the  
 consonance of the  
 diapason; and the several  
 remaining notes will sound  
 with the others--one by  
 one--in relation to the  
 consonance of the  
 diapason. Therefore, just  
 as ut synemmenon is higher  
 than ut diezeugmenon by a  
 tone, thus that ut will be  
 lower than  $\Gamma$  ut by a tone.  
 [And] they call this  
 retropolis, because when  
 $\Gamma$  ut is superimposed upon  
 the top of the thumb [the  
 retropolis] is placed  
 behind it--that is, on the  
 first exterior joint of  
 the finger; and it is  
 followed by re on  $\Gamma$  ut, mi  
 on a re, fa on b mi, sol  
 on c fa ut, and la on  
 d sol re. Likewise also  
 ut is placed on a re for  
 the purpose of raising mi  
 --which is placed on

*c fa ut*--and this hexachord is completed on *f fa ut*.<sup>93</sup>

Coniunctae autem, quae per semitonium vocem a loco proprio deprimunt, appellantur ab ipsis coniunctae *b mollis*; sed quae eodem elevantur semitonio,  $\sharp$  quadrati. Ad brevem autem uniuscuiuscunque coniunctae cognitionem ut hoc interest, ut cognito loco coniunctae ab eodem per iuncturas retrocedamus dicentes: *fa, mi, re, ut*, si *b mollis*, aut *mi, re, ut*, si  $\sharp$  quadrati. Unde qui bene omnia, quae dicta sunt, inspexerit, taliter manum compositam recte conspiciet: In *retropolis* scilicet *ut*, in *gamaut*, *ut re*, in *a re ut*, *re, mi*, in *b mi ut*, *re, mi, fa*, in *c fa ut* vero *ut, re, mi, fa, sol*, in *d sol re ut, re, mi, fa, sol, la*, a quo usque a *la mi re* secundum in omnibus signis vel locis sex istas voces reperiemus. Post a *la mi re* resolvitur; nam id quod prius incepit, prius desinit. Et ita in secundo *b fa  $\sharp$  mi* erunt *re, mi, fa, sol, la*, in *c sol fa mi, fa, sol, la*, in *d la sol fa, sol, la* et in *e la sol, la*, postquam ponunt aliam vocem scilicet *la*, quae distat per tonum ab ista, quoniam dependet ab ultima coniunctarum. Et sic erunt loci viginti duo, ideoque post coniunctarum additionem manus perfecta dicitur, quoniam tota per

And they call the coniunctae that lower a note from its proper position by a semitone soft *b coniunctae*, but [they call the coniunctae] that are raised by the same semitone, *square  $\sharp$  coniunctae*. However, for a brief notion of each one of the *ut* coniunctae, it is important that, having become acquainted with the position of the coniuncta, we may retrogress from the same position by means of the joints saying: *fa, mi, re, ut*, if [we are using] soft *b*, or *mi, re, ut*, if [we are using] *square  $\sharp$* . Whence, whoever will have thoroughly examined all the things which have been said will see the hand correctly arranged in this manner: namely, *ut* on *retropolis*; *ut, re* on *Γ ut*; *ut, re, mi* on *a re*; *ut, re, mi, fa* on *b mi*; *ut, re, mi, fa, sol* on *c fa ut*; [and] *ut, re, mi, fa, sol, la* on *d sol re*. From here up to the second *a la mi re*, we will find these notes again on all the signs or, if you prefer, in the six positions. After [the second] *a la mi re*, it is dissolved, for that which has begun first, ends first. And thus, there will be *re, mi, fa, sol, la*, on the second *b fa  $\sharp$  mi*; *mi, fa, sol, la* on *c sol fa*; *fa, sol, la* on *d la sol*; and *sol, la* on



semitonia recte divisa est. Ipsi autem dicunt perfectam, quoniam trium diapason est continentia. In ternario enim maxima perfectio denotatur, quoniam totum aequale est suis partibus quotis et aliquotis simul sumptis nec aliquis alius numerus hanc sibi dignitatem vendicat. Sed ex parte bene dicunt, in hoc scilicet, quod ternarius numerus perfectus est. Verum in hoc errant, quia manus trium diapason non est, ut paulo post ostendemus.

e la. After this, they place another note--that is, la--which is distant from that [e la] by a tone, since it depends on the last of the coniunctae--[that is, a la mi re]. And thus, there will be twenty-two positions, and therefore after the addition of the coniunctae, the hand is called *perfect*, since the entire hand has been correctly divided by means of the semitones.<sup>94</sup> Moreover, they themselves call [it] *perfect*, since it contains three diapasons. For the greatest perfection is indicated in the number three, since it is entirely equal [when] taken together in its proportional and fractional parts, and no other number claims this distinction for itself. For the most part, they speak correctly concerning this, since the number three is perfect; but yet they [also] err in this, because a hand of three diapasons does not exist, as we will demonstrate a little later.

Ex his autem, quae dicta sunt, lectores excogitare poterunt, quomodo ex Guidonis doctrina confusio suborta est. Ipse enim consideravit, quod semper, ubicumque semitonium esset pronuntiandum, *mi* et *fa* cantores proferre deberent. Propter hoc autem crebrius hexachorda in tetrachordis tam

[25] [Our] readers will be able to deduce from these things that have been said how confusion arose from Guido's teaching. For [Guido] himself considered that the singer should always perform *mi* and *fa* whenever a semitone must be pronounced. Moreover, for this reason he frequently placed the

coniunctis quam disiunctis  
 locavit, propter quod  
 binas voces et ternas in  
 uno eodemque loco, ut  
 supra monstratum est, de  
 necessitate collocavit.  
 Nos autem de necessitate  
 easdem sex in locis  
 praedictis componi ipsius  
 habito fundamento  
 mathematice  
 demonstravimus. Sed de  
 vocum in uno loco  
 confusione de Guidonis  
 arte proveniente satis  
 hactenus. Deinceps autem  
 quae ipsarum proferendae  
 sint, quae vero  
 reticendae, quod eius  
 sequaces mutationes  
 appellant, subtilius  
 discutiamus.

hexachords on conjunct  
 tetrachords as much as on  
 disjunct tetrachords, on  
 account of the fact that,  
 out of necessity, he  
 arranged double and triple  
 notes on one and the same  
 place, as it was shown  
 above. We, on the other  
 hand, out of necessity,  
 have demonstrated by  
 treating his foundation  
 mathematically that the  
 same six are composed in  
 the positions mentioned.  
 But enough already about  
 the confusion of the notes  
 in one position stemming  
 from Guido's art. Now  
 lets us discuss in greater  
 detail which of [the  
 voices] should be  
 performed [and] which of  
 them should be silenced--  
 that which his followers  
 call *mutations*.

CAPITULUM TERTIUM

[desideror]

THIRD CHAPTER

[missing]

CAPITULUM QUARTUM

DE VOCUM PERMUTATIONE

Superest nobis tanta  
vocum cognita variatione,  
ad quid in uno loco sint  
collocatae, subtiliter  
disserere, utrum scilicet  
omnes simul pronuntiare  
aut unam alia in eodem  
loco dimissa debeamus  
accipere. Circa quod  
advertendum est tres  
illarum ascendentes dici  
scilicet *ut, re, mi*, tres  
vero descendentes scilicet  
*fa, sol, la*. Unde  
Guidonis sequaces dicunt:  
*ut, re, mi* scandunt, *fa,*  
*sol, la*que descendunt. Et  
cum cantus in altum  
ascendit, pro descendente  
voce ascendentem accipere  
nos percipiunt, ut, si  
sumus in mese cum *la* et  
cantus petit loca altiora,  
iuxta istorum doctrinam *la*  
dimittere et *re* aut *mi*  
debemus assumere et tunc  
cum *re* aut cum *mi* ad  
altiora loca facilius  
poterimus pervenire. Sic  
et cum in paranete  
synemmenon vel trite  
diezeugmenon fuerimus cum  
*ut* et cantus ad ima  
perlabitur, *ut* dimittere  
et *sol* vel *fa* iubent  
accipere, et sic cum *fa*  
vel *sol* cantando  
descendere poterimus. Et  
hoc est, quod ipsi  
mutationem appellant  
dicentes: mutatio est  
unius vocis in aliam  
variatio. Alii autem sic

FOURTH CHAPTER

CONCERNING THE PERMUTATION  
OF THE NOTES<sup>95</sup>

Now that the great  
diversity of the notes has  
been examined, it remains  
for us to discuss in  
greater detail how they  
may be arranged in one  
place; namely, [we will  
discuss] whether we should  
pronounce all [the  
syllables] together, or  
take [only] one, after  
dismissing the other in  
the same position.  
Concerning this, it should  
be noticed that three of  
them ascending are called  
namely, *ut, re, mi*, but  
three descending [are  
called] namely, *fa, sol,*  
*la*. Whence, the followers  
of Guido say: *ut, re, mi*  
when they ascend and *fa,*  
*sol, la* when they descend.  
And when the song ascends  
into the high [range],  
they teach us to take the  
ascending note instead of  
the descending note, so  
that if we are on *mesē*  
with *la* and the song seeks  
higher positions,  
according to their  
doctrine we should abandon  
*la* and take *re* or *mi*, and  
then with *re* or *mi* we will  
be able to arrive more  
easily at the higher  
positions. Thus also when  
we will have been with *ut*  
on *paranētē synēmmenōn* or  
*tritē diezeugmenōn* and the  
song makes its way to the  
lower positions, they tell

diffiniunt: mutatio est  
duarum vocum aequalium  
inter se per diversas  
proprietas in uno signo  
et una voce variatio.

Permutatio autem  
dupliciter fit: aut a  
causa necessitatis  
scansionis aut remissionis  
aut causa praeponendi  
postponendive semitonium.  
Haec autem semper in  
vocibus, quae eiusdem sunt  
qualitatis, fieri  
cognoscimus, hoc est ambae  
ascendentes aut ambae  
descendentes. Illa autem  
non sic, sed ex una  
ascendente et alia  
descendente componitur.  
Erit igitur triplex  
mutatio: una totidem in  
ascendendo, alia totidem  
in descendendo, tertia  
vero capit utrumque. Sed  
quae totidem in ascendendo  
fit, ea est quae de  
vocibus ascendentibus  
composita est, uti in *g*  
*sol re ut re ut, ut re*, in  
*a la mi re mi re, re mi* et  
in suis octavis. Quae  
vero totidem in  
descendendo fit, ea  
nimirum est, quae ex  
vocibus descendentibus  
constat, sicut in *c sol fa*  
*ut sol fa, fa sol*, in *d la*  
*sol re la sol, sol la* et

[us] to abandon *ut* and  
take *sol* or *fa*; and thus  
we will be able to descend  
by singing with *fa* or *sol*.  
And this is what they  
themselves call *mutatio*  
saying: "Mutation is the  
variation of one voice for  
another."<sup>96</sup> But others  
give this definition:  
"Mutation is the variation  
of two equal notes  
interchanged with one  
another by means of  
diverse properties on one  
sign and one note."

A permutation is made in  
two ways: (1) either out  
of necessity for ascending  
or descending; or (2) for  
the purpose of placing a  
semitone before or after  
[a note]. And we  
recognize that these  
things are always done in  
the notes that are of the  
same quality--that is,  
[with] both [notes]  
ascending or both [notes]  
descending. However, that  
[permutation] is not done  
in this way; rather, it is  
made from one [note]  
ascending and another  
[note] descending.  
Therefore, mutation will  
be threefold: often one  
[method occurs] while  
ascending, another while  
descending, and a third  
[method] engages in both.  
For that which is so often  
done in ascending is that  
which is composed of  
ascending notes, as on  
*g sol re ut: re ut, ut*  
*re*; on *a la mi re: mi re,*  
*re mi*; and on their  
octaves. And that which  
is so often done in

in suis octavis. Itaque semper fit inter voces per tonum secundum ordinem distantes. Secundum ordinem dico, quia, ut supra dictum fuit, sicut ut a re distat per tonum, sic a re *mi*, ita etiam *fa* a *sol* et *sol* a *la*. Sed quando mutatio fit, in loco aequali sunt collocatae.

Tertia vero mutatio dupliciter fit, quia aut in vocibus quae in ordine [positae] per diatessaron aut per diapente distant. Per diatessaron tribus modis scilicet *fa ut*, *ut fa*, *sol re*, *re sol*, *la mi*, *mi la*, per diapente autem duobus scilicet *la re*, *re la*, *sol ut*, *ut sol*. Quando igitur manus est imperfecta, in *gamaut*, in *a re*, in *b mi*, in *e la* permutatio fieri non [potest], quoniam unius vocis non est sed duarum aequalium, propter quod etiam in utroque *b fa* & *mi* non fit.

descending, to be sure, is that which consists of descending notes such as on *c sol fa ut*: *sol fa*, *fa sol*; on *d la sol re*: *la sol*, *sol la*; and on their octaves. And so it always happens among notes that according to [their] order are distant by a tone. I say "according to [their] order," since as it was said above: just as *ut* is distant from *re* by a tone, thus also *mi* from *re*, *fa* from *sol*, and *sol* from *la*. But when a mutation is made, they are arranged on an equal position.

But the third mutation is made in two ways, because in the notes that are placed in order they are distant either by means of a diatessaron or a diapente. [They are arranged] by means of the diatessaron in three ways --that is: (1) *fa ut*, *ut fa*;<sup>97</sup> (2) *sol re*, *re sol*; (3) *la mi*, *mi la*. However, [they are arranged] by means of the diapente in two ways, that is: (1) *la re*, *re la*; and (2) *sol ut*, *ut sol*. Therefore, when the hand is imperfect, a permutation cannot be made on *f ut*, *a re*, *b mi*, [or] on *e la*, since [a permutation] does not consist of only one note but of two equal [notes]; also for that reason [a permutation] cannot be made on either *b fa* or *mi*.<sup>98</sup>

In arte prima imperfecta, ubi igitur tantum duae voces erunt aequales, duae fient mutationes: una a prima voce in secundam et alia e converso. Sed cum tres fuerit, hunc modum tenebunt: a prima in secundam et e converso fiunt duae et a prima in tertiam et e converso aliae duae et a secunda ad tertiam et e converso aliae item duae et sic sex habebuntur. Sed cum secundo vocem ascendentem nominamus, mutationem in ascendendo causari dicunt.

Sed ulterius addunt illi vocis proprietatem scilicet *♯* quadrati aut *b* mollis sive naturae. Naturae autem appellant hexachorda, quae in utroque *c* sunt inchoata. *♯* quadrati, quae a *g*, *b* mollis vero, quae ab *f*. Ut ergo uno concludamus exemplo, per quod in aliorum cognitionem facile veniatur, dicimus in *g* sol re ut sol re, re sol, sol ut, ut sol, re ut, ut re: sol re in ascendendo de natura in *b* molle, re sol in descendendo de *b* molli in naturam, sol ut in ascendendo de natura in *♯* quadrum, ut sol per

In the first imperfect method then, where there will only be two equal notes, they will make two mutations: one [mutation] from the first note to the second [note], and the other [mutation] vice-versa. But when there will be three [notes], they hold to this rule: they make two [mutations] from the first [note] to the second [note] and vice-versa; [they make] another two [mutations] from the first [note] to the third [note] and vice-versa; and [they make] another two [mutations] from the second [note] to the third [note] and vice-versa; and thus they will have six [mutations].<sup>99</sup> But when we name a note ascending in the second [way], they say that the mutation takes place while ascending.

But farther on they add the property of the note to it--that is, [the property] of square *♯* or soft *b* or, if you prefer, [the property] of nature. Now they name the hexachords that are begun on the first or the second *c*, naturae; [they name the hexachords] that are begun from *g*, square *♯*; and [they name the hexachords] that are begun from *f*, soft *b*.<sup>100</sup> Therefore, so that we may conclude with an example through which we may easily arrive at the knowledge of others, on *g* sol re ut we say: sol re, re sol, sol ut,

contrarium, *re ut* in ascendendo de *b* molli in *♯* durum, *ut re* in [descendendo] de *♯* quadro in *b* rotundum. Hoc enim modo servato in aliis locis quisque per se poterit per ea, quae dicta sunt, has permutationes investigare.

Sed et hoc habito fundamento in manu perfecta facile de omnibus sex vocibus in eodem loco positis mutationes omnes facere poterit. Unde exempli gratia capiamus *d sol re*, ubi sex voces fuerunt locatae, iungemusque *la* modo praedicto scilicet cum vocibus, quae in ordine per tonum aut diatessaron aut per diapente distaverint, dicemusque *la sol*, *sol la* habebimusque duas; deinde cum *mi* scilicet *la mi*, *mi la* et erunt quatuor; at cum *re*, quia per diapente coniungendo, iterum binas facimus permutationes scilicet *la re*, *re la*. Ex *la* igitur sex provenire non dubitamus.

*ut sol*, *re ut*, *ut re*. [For] *sol* [becomes] *re* in ascending from *natura* to soft *b*; *re* [becomes] *sol* in descending from soft *b* to *natura*; *sol* [becomes] *ut* in ascending from *natura* to square *♯*; *ut* [becomes] *sol* [moving] in the opposite direction; *re* [becomes] *ut* in ascending from soft *b* to hard *♯*; *ut* [becomes] *re* in descending from square *♯* to round *b*.<sup>101</sup> For with this method observed in the other positions, and through the things that have been said, everyone will be able to investigate these permutations for themselves.

But also, when this foundation has been considered on a perfect hand, one will easily be able to make all the mutations out of all six of the notes placed in the same position. Whence, for the sake of example, let us take *d sol re*--where the six notes have been established--and we will add *la* [to it] in the manner mentioned before--that is, with the notes in an order that will have been distant by a tone or a diatessaron or a diapente. For we will have two [permutations] by saying *la sol*, *sol la*; [27] then there will be four [permutations] with *mi*--that is, *la mi*, *mi la*; but we make two permutations again by uniting [*la*] with *re* by means of the



diapente--that is, *la re*,  
*re la*. Therefore, we do  
 no doubt that six  
 [permutations] appear  
 from *la*.

Qua dimissa *sol* capiatur  
 et fient eodem modo sex  
 scilicet *sol fa*, *fa sol*,  
*sol re*, *re sol*, *sol ut*, *ut*  
*sol*. *La sol*que dimissis  
*fa* capiatur, quae solum  
 cum voce *ut* iungi poterit,  
 eruntque quatuordecim.  
 Sed *mi* cum *re* et *re* cum *ut*  
 combinatis quatuor  
 efficiunt. Ubicunque ergo  
 sex voces reperiuntur,  
 decem octo fieri  
 mutationes videntur. In *c*  
*fa ut* igitur, quoniam  
 deficit *la*, duodecim  
 erunt, in *b mi* sex tantum,  
 sed quatuor in *a re*. In *F*  
*ut* duas tantum habebis;  
 eodemque modo *b fa ♯ mi*  
 secundo sicut *c fa ut* et *e*  
*la* sicut *F ut*. Sic et  
 cetera signa vel loca  
 inter ista contenta.

After this [*la*] is  
 dismissed, let *sol* be  
 taken, and six  
 [permutations] will be  
 made in the same way,  
 namely *sol fa*, *fa sol*,  
*sol re*, *re sol*, *sol ut*,  
*ut sol*. [With] *la* and *sol*  
 dismissed, let *fa* be  
 taken, which will only be  
 able to be joined with the  
 note *ut*,<sup>102</sup> and [then]  
 there will be fourteen  
 [permutations]. But *mi*  
 combined with *re* and *re*  
 combined with *ut* produce  
 four [more]. And  
 therefore, whenever six  
 notes are found, eighteen  
 mutations seem to be made.  
 Therefore, on *c fa ut*  
 there will be twelve  
 [permutations], since it  
 lacks *la*; on *b mi* [there  
 will only be] six; and on  
*a re* [there will only be]  
 four. On *F ut* you will  
 only have two  
 [permutations], and in the  
 same way with the second  
*b fa ♯ mi* as *c fa ut* and  
*e la* as *F ut*. Thus, the  
 rest of the signs or  
 positions are likewise  
 extended among these  
 [hexachords].

## CAPITULUM QUINTUM

### REPROBANS ALIQUA PRAECEDENTIS ET RECTUM MODUM CONIUNCTARUM DEMONSTRANS

Disposita iam manu perfecta et eorum, quae ad eius perfectionem requiruntur, forma praescripta super sunt nobis aliqua subtilius investiganda, quoniam, etsi dictum sit a *d sol re* usque a *la mi re* secundo sex voces esse in quolibet loco repertas et ex illis quoque sex vocibus decem et octo mutationes causari, de vocibus quidem verum est, sed de mutationibus minime.

Ad cuius evidentiam disponatur figura cum vocibus Guidonis a gamaut usque e *la*, quae dicetur ordo naturalis ex eo, quod voces naturaliter sunt dispositae, sicut ex monochordi regularis [proveniunt] divisione. Sed haec eadem figura ad latus eius sinistrum tono intensa disponatur, sic et ad dextrum per eundem tonum remissa. Ex hac figurae dispositione reperiemus quemlibet tonum ordinis naturalis ab [altero] accidentalium esse divisum, qua divisione omne

## FIFTH CHAPTER

### REJECTING SOME MATTERS OF THE PAST AND DEMONSTRATING THE CORRECT METHOD OF THE CONIUNCTAE

Now that the perfect hand has been arranged, and the forms that are required for its perfection have been outlined above, there are some matters that we should investigate in greater detail. For it has been said that there are six notes found in any place whatsoever from *d sol re* up to the second *a la mi re*, and also that eighteen mutations are produced from those six notes. Certainly [this] is true in respect to the notes, but by no means in respect to the mutations.

For evidence of this, let the figure be arranged with the notes of Guido from *Γ ut* up to *e la*. This will be called the *natural order*, because the notes are arranged naturally just as they appear in the division of the regular monochord. But let this same figure on its left side be arranged with the tone raised; and likewise also on its right side let it be lowered by the same tone.<sup>103</sup> We will discover from this arrangement of the figure that any tone of the

instrumentum perfectum  
 divisum esse debet.  
 Namque ab a re in b mi  
 tonus naturaliter est,  
 quia re mi. Sed cum ex  
 ordine accidentalitono  
 remissa sit mi aequalis  
 vox ipsi re naturalis,  
 relinquatur, quod fa vox,  
 quae ab ista voce mi  
 sequitur, non attinget mi  
 naturalis ordinis, cum  
 illa semitonium faciat et  
 ista tonum intendat.  
 Praeterea cum a b mi ad c  
 fa ut ordinis naturalis  
 semitonium fit, quia mi  
 fa, et a re accidentalis  
 sinistri, quae illi mi est  
 aequalis, sequetur mi tono  
 elevatum, relinquatur,  
 quod altior erit per  
 semitonium voce fa  
 naturalis, et sic tonus  
 naturalis, qui a c fa ut  
 ad d sol re canitur, in  
 duo semitonia manet  
 divisus.

Rursus cum a d sol re ad  
 e la mi tonus naturaliter  
 fit, quia re mi aut sol  
 la, et illi re aut sol  
 naturalis mi accidentalis  
 dextri fit coequalis,  
 sequitur, vox fa, quae  
 semitonium faciet tonum  
 illum, qui inter d sol re  
 et e la mi est, dividendo,  
 ad vocem mi naturalis

natural order is divided  
 by another [note] of the  
 accidental [orders]; [and]  
 every perfect instrument  
 ought to be divided by  
 this division. For since  
 [there is a tone from] re  
 to mi there is naturally a  
 tone from a re to b mi.  
 But when it is lowered by  
 a tone on account of the  
 [right] accidental order,  
 mi is equal to re of the  
 natural [order], whereas  
 the note fa--which follows  
 after this note mi--will  
 not arrive at [the same  
 place as] mi of the  
 natural order, since the  
 former produces a semitone  
 and the latter ascends a  
 tone. Moreover, a  
 semitone is made from b mi  
 to c fa ut of the natural  
 order--since [there is a  
 semitone from] mi to fa--  
 and after re of the left  
 accidental [order]--which  
 is equal to mi [of the  
 natural order]--mi will  
 follow elevated by a tone,  
 because it will be higher  
 by a semitone than the  
 note fa of the natural  
 [order]; and thus the tone  
 of the natural order that  
 is sung from c fa ut to  
 d sol re remains divided  
 into two semitones.

On the other hand, when  
 a tone is made naturally  
 from d sol re to e la mi  
 --because re [to] mi or  
 sol [to] la [produces a  
 tone]--and mi of the right  
 accidental [order] is made  
 equal to that re or sol of  
 the natural [order], it  
 follows that the note fa  
 --which will produce a

ordinis non attinget.  
 Quemadmodum igitur in hoc  
 fecimus tetrachordo,  
 lector subtilis in  
 reliquis faciet inspecta  
 figura [in hoc] margine  
 posita.

semitone by dividing the  
 tone that is between  
*d sol re* and *e la mi*--  
 will not arrive at [the  
 same place as] the note  
*mi* of the natural order.  
 Therefore, having viewed  
 the figure placed in this  
 margin,<sup>104</sup> the reader  
 will continue in greater  
 detail to do in the rest  
 of them as we have done in  
 this tetrachord [see  
 Figura 4].

Diceret tamen aliquis,  
 quod, licet possint fieri  
 ad libitum istae  
 coniunctae, mensura tamen  
 non, ad quod breviter  
 dicimus: ita evidenter  
 fient atque sine labore  
 sicut ipsemet ordo  
 naturalis factus fuit in  
 prima figura. Ad quod  
 examinandum disponatur  
 prima mensurata figura,  
 deinde faciemus coniunctas  
*b mollis* hoc modo:  
 Duplicata quantitate *q i*  
 signabimus primam *b mollis*  
 coniunctam; sic prima *b*  
 eritque inter *a* et *b*.  
 Deinde quantitas chordae *i*  
 et prima *b* medio dividatur  
 signeturque secunda *b*,  
 quae erit inter *d* et *e*.  
 Quodsi secunda *b q* mediam  
 diviserimus quantitatem,  
 signabimus [quartam] *b*  
 inter *l* et *m*. Sed quarta *b*  
 secunda *b* quantitate per  
 medium divisa signabimus  
 [tertiam] *b*. Sed tertia *b*  
*q* quantitas si per medium  
 dividatur, quinta *b*  
 signabitur. Habebimus  
 igitur ex hac divisione  
 quinque *b mollis*  
 coniunctas ex recta  
 divisione perpensas.

[28] Nevertheless, anyone  
 might say that although  
 these coniunctae can be  
 made according to one's  
 pleasure, the [string] has  
 still not been measured.  
 We will address this  
 briefly [and] thus [these  
 things] will be made more  
 evident and without  
 difficulty, just as the  
 natural order was created  
 in the first figure. The  
 first measured figure is  
 arranged for the purpose  
 of examination. Then, we  
 will make the coniunctae  
 of soft *b* in this way:  
 with the quantity<sup>105</sup> of  
*q* to *i* doubled, we will  
 designate the first  
 coniuncta of soft *b*; thus  
 the first *b* [*bb*] will be  
 between *a* and *b*. Then,  
 let the quantity of the  
 string from *i* to the first  
*b* be divided in half, and  
 let the second *b* [*eb*] be  
 designated, which will be  
 between *d* [and] *e*. And if  
 we will divide the  
 quantity from the second  
*b* to *q* in half, we will  
 designate a fourth *b* [*eb*]  
 between *l* [and] *m*. And we  
 will designate the third *b*

[ $ab$ ] by dividing the quantity from the fourth  $b$  to the second  $b$  in half. And a fifth  $b$  [ $ab$ ] will be designated if the quantity of the third  $b$  to  $q$  is divided in half. Therefore, from this division we will have five coniunctae of soft  $b$  calculated according to a correct division.

Sed si [ $\sharp$ ] quadrati habere procuramus coniunctas, per tria  $b$   $q$  dividemus et a littera  $q$  versus  $b$  venientes in fine trientis ponemus [quartam]  $\sharp$  scilicet inter  $n$   $o$  et in besse [secundam  $\sharp$ ] quadratam, quae cadet inter  $f$   $g$ . Sed si secundae [ $\sharp$ ] quadratae  $q$  quantitas per tria dividatur, a littera  $q$  versus secundam  $\sharp$  quadratam venientes in besse ponemus tertiam  $\sharp$  eritque inter  $k$   $l$ , cuius et  $q$  quantitas si duplicetur, proveniet sic prima  $\sharp$  inter  $c$   $d$  signata. Habebimus igitur ex hac divisione quatuor  $\sharp$  quadrati coniunctas ex recta divisione provenientes, ut patet in figura.

But if we want to have the coniunctae of square  $\sharp$ , we will divide [the quantity]  $b$  to  $q$  into three [parts], and advancing from the letter  $q$  toward  $b$ , we will place the fourth square  $\sharp$  [ $f\sharp$ ] at the end of the third [part]--namely, between  $n$  and  $o$ ; and at the two-thirds [part we will place] the second square  $\sharp$  [ $f\sharp$ ], which will fall between  $f$  [and]  $g$ . And if the quantity of the second square  $\sharp$  to  $q$  is divided into three [parts], advancing from the letter  $q$  toward the second square  $\sharp$ , we will place the third square  $\sharp$  [ $c\sharp$ ] at the two-thirds [part] and it will be between  $k$  [and]  $l$ ; and furthermore, if this quantity is doubled from  $q$ , then the first square  $\sharp$  [ $c\sharp$ ] will appear marked between  $c$  [and]  $d$ . Therefore, from this division we will have four coniunctae of square  $\sharp$  arising from a proper division, as it appears in the figure [see Figura 5].

Si enim quintam habere  
 voluerimus, tertia  $\sharp$   $q$   
 quantitatem medio  
 dividamus et erit supra  $p$   
 per duos tonos. Verum  
 quia nihil sub  
 proslambanomenon nec supra  
 neten hyperboleon in  
 mensurata figura addere  
 volumus, non eam ponimus,  
 non ex eo, quod fieri non  
 posset, sed quia ista  
 tenuerunt antiqui et a  
 Boetio sic traditam  
 reperimus doctrinam.

Quando ergo addere  
 aliquid sub aut supra  
 voluerimus non in eadem  
 chorda, sed in diversis,  
 facere poterimus  
 concordantes illas chordas  
 cum his divisionibus in  
 una recte factis in  
 diapason correspondentes  
 ut puta: si unam chordam  
 addere sub  
 proslambanomenon  
 voluerimus, taliter  
 disponemus, quod in sono  
 diapason aequisonet  
 lichanos meson et erit  $\Gamma$   
 ut, et si aliam sub ista,  
 cum parhypate meson  
 aequisonabit in diapason,  
 diapente cum parhypate  
 hypaton, diatessaron cum  
 prima coniuncta. Haec  
 chorda erit, quam dicunt  
 moderni retropolis, ut  
 supra iam diximus, in qua  
 paene omnia modernorum  
 instrumenta, quae  
 polychorda, in Italia  
 reperimus incepta, etiam  
 organa et alia instrumenta

In fact, if we want to  
 have a fifth [coniunctae  
 of square  $\sharp$ ], let us  
 divide the quantity of the  
 third square  $\sharp$  to  $q$  in  
 half, and [the fifth  
 square  $\sharp$ ,  $c\sharp$ ] will be  
 above  $p$  by two tones.  
 But since we do not want  
 to add anything in the  
 measured figure below  
 proslambanomenos nor above  
 hyperboleon, we do not  
 place it [there]; not  
 because it cannot be done,  
 but because the ancients  
 held to these things, and  
 we [also] find the  
 doctrine handed down from  
 Boethius in this manner.

Therefore, when we will  
 want to add something  
 below [proslambanomenos]  
 or above [hyperboleon], we  
 can do it, not on the same  
 string but on different  
 [strings], harmonizing  
 those strings at the  
 corresponding diapasons  
 with these divisions [that  
 were] realized correctly  
 on one [string], as for  
 example: if we will want  
 to add a string below  
 proslambanomenos, we will  
 arrange [it] in such a  
 manner that the diapason  
 may be equal in sound to  
 lichanos meson, and [thus  
 the note] will be  $\Gamma$  ut.  
 And if [we will want to  
 add] another [string]  
 below this, it will sound  
 equal to parhypate meson  
 at the diapason, to  
 parhypate hypaton at the  
 diapente, [and] to the  
 first coniuncta at a  
 diatessaron.<sup>106</sup> This  
 string will be that which

completa, quae per semitonia sunt divisa. In Hispania vero nostra antiqua monochorda et etiam organa in *c* gravi reperimus incepisse. Sed modernorum polychorda et etiam organa octo voces sub *c* gravi in ordine ponunt naturali.

the moderns call *retropolis*, as we have mentioned above. In Italy, we find that almost all the instruments of the moderns that are polychords begin on this [*retropolis*]. [This is also true of] organs and other complete instruments which are divided by means of a semitone. But in Spain we find our ancient monochords and also our organs to begin on *c* grave. But the polychords and also the organs of the moderns establish eight notes below *c* grave in the natural order.<sup>107</sup>

Non tamen habent voces coniunctas ♯ quadrati sive *b* mollis sub proslambanomenon, sed tantum est diapente recta sub *Γ ut*, ita ut *Γ ut* sit octava *g sol re ut*, *retropolis* octava sive diapason *f fa ut* et alia diapason *e la mi* aliaque *d sol re* et alia *c fa ut* octava sub *d sol re* idest diapason, iam hic Bononiae reperimus polychordum, sed sub *c fa ut* non nisi in Hispania. Verum non refert, ubi quis incipiat, modo chordarum modi et divisiones semitoniorum et tonorum observentur.

[29]

Nevertheless, they do not have the coniunctae notes of *square ♯* or of *soft b* below *proslambanomenos*, for the diapente below *Γ ut* contains only *recta* [pitches],<sup>108</sup> so that *Γ ut* is an octave [from] *g sol re ut*, the *retropolis* is an octave or, if you prefer, a diapason [from] *f fa ut*, and [there is] another diapason [from] *e la mi*, and another [from] *d sol re*, and another octave--that is, a diapason--[from] *c fa ut* below *d sol re*. Now we have found [such] a polychord here in Bologna, but in Spain we have not found anything below *c fa ut*. But it does not matter where any anyone begins, provided that the quantities of the strings and the divisions of the

Habent se igitur ista tetrachorda sicut synemmenon et diezeugmenon. Inde est ergo, quod isti contemporanei nostri coniunctas appellant; sed etiam disiunctas improprie vocant, quando sine mutatione ab una proprietate in aliam se transferunt, ut puta: si reperiantur in *c sol fa ut* dicentes *fa* et ad *f fa ut* descendere immediate [cogantur] et deinde ad graviora, tunc ille descensus dicitur disiuncta, quia *fa* in altiori voce et *fa* in inferiori pronuntiant. Sic et quando per diapason saltus fit, ubicumque fit, semper disiuncta fiet necessario. Dixi in diapason necessario, quoniam in diapente non semper fit de necessitate, sed solum, quando diapente est *mi mi* ut *e ♯* aut *fa fa* ut [*f*] *k*. Sed si [cantus] fiat ab *a la mi re* [existente] cum *re* et [descendat] per saltum diapente, immediate illud *re* mutatur in *la* et dicitur *re la re*, quoniam tunc bene sequitur illud *re* ab illo *la*. Sic et in *g* existens cum *ut* saltu facto per diapente immediata non fit disiuncta, sed mutatur in *sol* et dicitur *ut sol ut*, quia bene sequitur [illud] *ut* ab illo *sol*.

semitones and tones are observed in this manner.

Therefore, these tetrachords conduct themselves just as [the tetrachords] *synēmmenōn* and *diezeugmenōn*. Accordingly, from there is that which these contemporaries of ours call *coniunctae*; but they also improperly call [them] *disiunctae* when they transfer them from one property to another without mutation, as for example: if they are found singing *fa* on *c sol fa ut* and they intend to descend directly to *f fa ut*, and then to [even] lower [notes], then that descent is called *disiunctae*, because they pronounce *fa* on the higher note and *fa* on the lower note [as well]. Thus also whenever a leap is made by means of a diapason, it will always necessarily make a *disiuncta* wherever [that leap] is made. I have said "necessarily" in regard to the diapason, since it is not always done from necessity on the diapente, but only when there is a diapente [from] *mi* to *mi* such as *e* to *♯*, or from *fa* to *fa* such as *f* to *k*. But if [a song] is composed with *re* from the existing *a la mi re* and it descends by a leap of a diapente, that *re* is directly changed to *la*; and it is called *re la re*, since then that *re* follows properly after that *la*. Thus also *disiuncta* is not



Tritonus immediatus  
semper causat disiunctas,  
ut si ab *f* fiat saltus  
usque *c sol fa ut*  
transiens  $\sharp$  unica notula,  
tunc dicitur in *f fa* et in  
*b fa  $\sharp$  mi mi* et sequitur *c*  
*fa* et tunc disiuncta  
dicitur, quoniam illud *mi*  
non sequitur nec dependet  
ab illo *fa* graviori. Alii  
saltus, qui maiores sunt  
diapente, semper faciunt  
disiunctas tam in  
intendendo quam  
remittendo, praeterquam  
ubi *la* possit accipi in  
hexachordo, ut, si in *a la*  
*mi re re* aut *mi* tenemus,  
cantus per saltum ad *c fa*  
*ut* remittatur; tunc *la* est  
accipiendum et dicitur *mi*  
*la ut* aut *re la ut*.  
Aliter autem supra  
diapente semper disiuncta  
fiet.

Sed videndum nobis est,  
quod erat probandum, utrum  
scilicet decem et octo  
mutationes in unoquoque  
locorum per voces  
coniunctas fieri possint?  
Quod si bene inspiciatur  
figura, facillime  
dignoscetur, quod solum in  
*d sol re*, *g sol re ut* et  
eorum octavis decem et  
octo fient mutationes,  
quoniam in his tantummodo

directly made on the  
existing *g* with a leap of  
a diapente from *ut* but  
rather, it is changed to  
*sol*; and it is called  
*ut sol ut*, since that *ut*  
follows properly after  
that *sol*.

The leap of a tritone  
always causes disiunctae,  
for example: if a leap  
occurs from *f* up to  
*c sol fa ut*--passing above  
 $\sharp$  by only one note--then  
*fa* is sung on *f* and *mi* is  
sung on *b fa  $\sharp$  mi*; *c fa*  
follows, and then it is  
called *disiuncta*, since  
that *mi* does not follow  
nor depend upon that lower  
*fa*. Other leaps that are  
larger than a diapente  
always produce disiunctae  
as much in ascending as in  
descending, except where  
*la* can be assumed in the  
hexachord, for example:  
if we have *re* or *mi* on  
*a la mi re*, the song may  
be lowered by leap to  
*c fa ut*; then *la* should be  
taken, and it is sung  
*mi la ut* or *re la ut*.  
Otherwise, disiunctae  
will always occur above  
the diapente.

Indeed, we ought to  
observe that which should  
have been proven--that is,  
whether or not eighteen  
mutations can be made in  
each one of the positions  
by means of the coniunctae  
notes. And if one  
examines the figure  
closely, it will be easily  
discerned that the  
eighteen mutations will be  
made only on *d sol re*,

locis sex illae voces  
 aequaliter sunt  
 collocatae, ut patet in  
 figura. In aliis vero,  
 quoniam non omnes voces in  
 eadem linea conveniunt,  
 sed aliquae altiores,  
 aliquae vero ponuntur  
 inferiores, non omnes  
 fient decem et octo. In  
*e la mi* ergo, ubi *fa* et *ut*  
 sunt inferiora, non decem  
 et octo sed tantum erunt  
 12 hoc modo: ex *la* sex,  
 sed ex *sol* tantum duae  
 scilicet *sol re*, *re sol*,  
 quoniam neque cum *fa*  
 combinari potest neque cum  
*ut*; ex *mi* cum *re* combinata  
 aliae duae et sic sunt 10,  
 sed *fa* cum *ut* quia inter  
 aequales, licet cum aliis  
 sint inaequales, alias  
 habebimus duas et sic  
 erunt 12. Sic et in *f fa*  
*ut*, ubi *la* et *mi* sunt  
 inaequales, tantum 12  
 habebimus hoc modo: *la*  
*mi*, *mi la* tantum duae  
 sunt, sed ex *sol* 6  
 provenire non dubitamus et  
 ex combinatione *fa* cum *ut*  
 et *re* cum *ut* quatuor  
 evenire certum est; igitur  
 duodecim. Sic in *e la mi*,  
 sed in *a la mi re*, ubi  
 solum *fa* est inaequale,  
 quatuordecim erunt. Hoc  
 ideo, quia quatuor cum eo  
 erant fiendae scilicet *sol*  
*fa*, *fa sol* et *fa ut*, *ut fa*  
 et in *c sol fa ut*  
 similiter. At in *b fa* &  
*mi* duodecim et ita in  
 eorum octavis, ut quisque  
 per se recte poterit  
 videre.

[30]

*g sol re ut*, and on their  
 octaves, since those six  
 notes are properly  
 arranged only on these  
 positions, as it appears  
 in the figure. And in  
 other [positions], all  
 eighteen mutations will  
 not be made, since not all  
 the notes meet on the same  
 line; rather, some are  
 placed higher and others  
 [are placed] lower.  
 Therefore, on *e la mi*  
 --where *fa* and *ut* are  
 lower--there will not be  
 eighteen but only twelve  
 [mutations] in this way:  
 from *la* [there will only  
 be] six; but from *sol*  
 [there will be] two--that  
 is, *sol re* [and] *re sol*,  
 because [*sol*] cannot be  
 combined with *fa* nor with  
*ut*; from *mi* combined with  
*re* [there will be] another  
 two, and thus there are  
 ten; but [from] *fa*  
 [combined with] *ut* we will  
 have another two, since  
 they are among equals--  
 even though they are  
 unequal with others--and  
 thus there will be twelve.  
 Likewise also on *f fa ut*--  
 where *la* and *mi* are  
 unequal--we will have only  
 twelve in this way:  
 [with] *la mi*, *mi la* there  
 are only two, but we do  
 not doubt that six  
 [mutations] appear from  
*sol*; and it is certain  
 that four [mutations] will  
 result from the  
 combination of *fa* with *ut*  
 and of *re* with *ut*;  
 therefore, we will have  
 twelve. Likewise on  
*e la mi*; but on *a la mi*  
*re*--where only *fa* is

unequal--there will be fourteen. This is because four should have been made with it--that is, *sol fa*, *fa sol*, and *fa ut*, *ut fa*; and likewise on *c sol fa ut*. But on *b fa ♯ mi* [there will be] twelve, and thus on their octaves, as anyone will be able to clearly see for oneself.

Apparet igitur ex his, [quod] non omnibus in locis 18 mutationes fiant; sic et apparet falsitas manus perfectae, quia non est perfecta tribus diapason, quoniam excedit per semitonium. Esset enim perfecta, si illa vox ultima ordinis accidentalis sinistri tantum distaret per semitonium a sua propinqua, et tunc faceret contra ipsum Guidonem suosque sequaces, quia scilicet inter *sol* et *la* non toni sed semitonii tantum esset distantia.

Notandum igitur ex hoc, quod cantare per ordinem accidentalem aliquando idem est quod per naturalem. Sola est signorum et linearum differentia, quod semitonium non eodem loco respondeat ut in naturali. Nam si in naturali ordine semitonium erat ab *e* in *f*, per signum *b* in eadem *e* positum deprimitur et fit

Therefore, from these things it appears that eighteen mutations may not be made on all the positions; thus also the falsehood of the perfect hand appears, because since it exceeds [three octaves] by means of a semitone, it is not a perfect [hand] with three diapasons. For it would be perfect if that last note of the left accidental order were only distant from its neighbor by means of a semitone; but then it would be done in opposition to Guido and his followers, since obviously there would not be the distance of a tone between *sol* and *la* but only [the distance] of a semitone.

Consequently, from this it should be noted that at times, singing according to the accidental order is the same as [singing] according to the natural [order]. The only difference is that of the signs and of the lines, because the semitone does not appear at the same place as [it did] in the natural [order]. For if

a littera *d* in *e*. Sic et si in *f* ponatur  $\flat$  vel  $\sharp$ , elevatur et fit ab *f* in *g*.

Verum cum per aliquem accidentalium ordinem cantare volumus, semitonium sequitur post duos tonos; sic et coniunctum, sic etiam et disiunctum tetrachordum, quod dictum fuit ficta musica. Et tunc cavendum est a naturali sicut ab accidentali. Quando per naturalem verum, sectatores Guidonis, contemporanei nostri, non ita faciunt, sed ab accidentali ad naturalem et *e* contra frequenter se transferunt, quidam forte et casu, quod non intelligant cantus compositionem, quidam vero ex industria astuteque. Sed qui ex industria hoc faciunt, signant lineam vel spatium hoc signo *b* vel hoc  $\flat$  sive isto  $\sharp$  et tunc secundum illud signum cantando prosequantur. Dicunt tamen, quod, si in principio signum positum sit, per totum cantum ordo talis observandus est. At si non in principio sed in processu ponatur, dicunt, quod tantum illa nota, cui apponitur, illius signi subiacet legi. Unde et varias faciunt

in the natural order there was a semitone from *e* to *f*, it is lowered by the sign *b* placed on the same *e*, and [a semitone] is made from the letter *d* to *e*. Also in a similar way, if  $\flat$  or  $\sharp$  is placed on *f*, it is raised and [a semitone] is made from *f* to *g*.

Truly, when we wish to sing by a certain order of accidentals, the semitone follows after two tones; the same also [with] the coniuncta [tetrachord], and even [with] the disiuncta tetrachord [in the method] that has been called *musica ficta*. And under these circumstances one should take care [to sing] from the natural [order] just as from the accidental [order]. Certainly when Guido's followers--our contemporaries--[sing] according to the natural order, they do not do it in this way, but frequently they pass over from the accidental [order] to the natural [order] and vice-versa. Some [do this] haphazardly and by chance, because they do not understand the composition of song; but others [do this] astutely and industriously. And whoever does this industriously marks the line or space with this sign *b*, or with this [sign]  $\flat$ , or with this [sign]  $\sharp$ ; and then they proceed by singing

considerationes in notulis elevando scilicet a loco proprio deprimendoque. Nam si in *b mi* notula sit hoc signo *b* signata et post illam sequatur altera in *c fa ut* isto ✱, quamquam semitonii in ordine naturali sit intercapedo, propter depressionem primae et sublimationem secundae in [semiditoni] transit intervallium. Sic et in omnibus locis semitonii distantiam includentibus. Quod si una oda in *e la mi* perscribatur hoc signo *b* et altera in *c fa ut* isto ✱, licet ditoni sit intervallium, convertitur in toni distantiam; sic in quibuscumque locis praedictam distantiam includentibus.

Eodem modo de aliis maioribus speciebus fiendum dogmatizant et

according to that sign. Nevertheless, they say that if the sign is placed at the beginning [of the song], such an order should be observed throughout the entire song. But if it is not placed at the beginning but rather, along its course, they say that only the note where it is placed is subject to the law of that sign. Whence also they make various considerations in the raising and lowering of the notes--that is, from their proper position. For if a note is marked with this sign *b* on *b mi* and after that another follows on *c fa ut* with this sign ✱, although it is an interval of a semitone in the natural order, it passes over into an interval of a semiditone on account of the lowering of the first [note] and the raising of the second [note]. Likewise also on all the positions that include the distance of a semitone. And if a note is written on *e la mi* with this sign *b*, and another [note is written] on *c fa ut* with this [sign] ✱, although it is an interval of a ditone, it is converted into the distance of a tone; likewise in any positions that include the distance mentioned.

Guido's followers dogmatize that it should be done in the same way

talis, dicunt, ordo  
 [servetur], quod semper  
 signum \* in loco  
 coniunctorum ♯ quadrati  
 ponatur et hoc b  
 in illis, in quibus  
 coniunctae b rotundi  
 locantur. Johannes vero  
 de Londonis et alii minus  
 periti dicunt:  
 quemadmodum in b fa ♯ mi  
 ambo signa possunt locari,  
 ita et in aliis locis, ubi  
 nec fa nec mi. Quod ita  
 fieri possit, minime  
 negandum est; at quod  
 debeat, concedendum non  
 arbitror.

Propterea igitur si per  
 iam dicta tonus in duo  
 semitonia manet divisus,  
 frustra fiunt reliqua  
 supervacanea, quoniam ad  
 hoc istud permittitur,  
 sicut iam dictum est, ut  
 tonum et semitonium a  
 qualibet voce possimus  
 habere, sicut a b fa ♯ mi.  
 Dicunt namque, si in g sol  
 re ut sit vocula signata b  
 praecedente et in eodem  
 sit altera isto ♯  
 praecedente, licet  
 unisonus videantur, tamen  
 propter primae  
 depressionem et secundae  
 elevationem semitonii  
 sicut mi fa. Duplici de  
 causa male dicunt: primo,  
 quoniam, etiamsi prima  
 signum non haberet,  
 secunda tamen esset altior  
 ea propter signum saltem  
 per semitonium; secundo  
 errant, quia, si prima iam

[31]

with the other larger  
 species; and they say that  
 such an order should be  
 observed, because the sign  
 \* is always placed in the  
 position of the coniunctae  
 of square ♯, and this  
 [sign] b is placed on  
 those coniunctae where the  
 coniunctae of round b are  
 placed. However, Johannes  
 of London and others less  
 experienced say: "Just as  
 both signs can be placed  
 on b fa ♯ mi, thus also  
 [it may be done] on other  
 positions where [there is]  
 neither fa nor mi." By no  
 means should it be denied  
 that it can be done in  
 such a manner, but I do  
 not think that it should  
 be resorted to.

Consequently, on that  
 account and according to  
 [that which] has already  
 been said, if a tone  
 remains divided into two  
 semitones, by [this] error  
 the rest of them become  
 useless. For it is  
 permitted according to  
 this method, just as it  
 has already been said,  
 that we can have a tone  
 and a semitone from any  
 note, as for example from  
 b fa ♯ mi. For they say  
 that if on g sol re ut a  
 soft note is marked with a  
 b preceding [it], and on  
 the same [place] another  
 [note] is marked with this  
 [sign] ♯ preceding [it],  
 although they seem [to be]  
 a unison, nevertheless,  
 because of the lowering of  
 the first [note] and the  
 elevation of the second  
 [note], [it is the

per aliud semitonium  
depressa est ab illo loco  
et secunda alio semitono  
ab illo loco elevata, duo  
semitonia sunt. Ergo toni  
differentia et non  
semitonii est, tamquam ut  
re. Eodem modo dicunt in  
*d sol re* et istorum  
octavis.

Horum quae dicta sunt  
exempla subtili lectori  
relinquimus invenienda,  
ita ut quatuor aut quinque  
extendat lineas et aliquam  
signet illarum littera  
sive clavi alterata duarum  
supradictarum et notulas  
disponat cum signis, sicut  
diximus. Incipit ex hoc,  
dumtaxat ex Guidonis  
doctrina, prolapsa  
confusio. Eius enim  
sectatores pertinaciter  
credunt et pro indubitato  
habent, quod nisi inter *fa*  
et *mi* non possit fieri  
semitonium. Dicunt,  
propterea [quod] *mi*  
claudens os austeritatem  
denotat, *fa* vero laxans os  
[mellitiem] signat. Hoc  
autem nihil esse  
rationibus firmissimis et  
mathematicis cognita

distance] of a semitone,  
such as *mi* to *fa*. [But]  
they speak incorrectly  
for two reasons: (1) even  
if the first [note] did  
not have a sign, the  
second [note] would still  
be higher than it at least  
by a semitone on account  
of the sign; [and] (2)  
they err, because if the  
first [note] has already  
been lowered from that  
position by a semitone and  
the second [note] is  
raised from that position  
by another semitone, there  
are two semitones.  
Therefore, there is a  
difference of a tone  
rather than a semitone  
such as *ut* to *re*. In the  
same way they speak of  
*d sol re* and its octaves.

We leave [it] to the  
discriminating reader to  
find the examples of these  
things which have been  
said. Let him draw four  
or five lines, and let him  
mark one of them with a  
letter, or with one of the  
two clefs mentioned above,  
and let him arrange the  
notes with the signs just  
as we have discussed. Of  
course, the confusion that  
leads one to ruin begins  
from this--[that is], from  
Guido's teaching. For his  
followers tenaciously  
believe [and] indubitably  
hold [to the idea] that a  
semitone cannot be made  
except between *fa* and *mi*.  
Therefore, they say that  
closing the mouth [to say]  
*mi* denotes severity and  
opening the mouth [to say]

musicae differentia  
curabimus ostendere.

fa signifies  
sweetness.<sup>109</sup> However,  
recognizing the  
*differentia musicae*,<sup>110</sup>  
we will take care to  
demonstrate with the  
firmest reasons and  
mathematics that this is  
of no value.



		la
	e la	t
la	t	la-sol
t	d la-sol	t
la-sol	t	sol-fa
	c sol-fa	mi
t	mi	b fa
sol-fa-ut	b fa	s
s	s	la-mi-re
mi	a la-mi-re	t
b fa	t	sol-re-ut
la-mi-re	g sol-re-ut	t
t	t	fa-ut
sol-re-ut	f fa-ut	s
t	s	la-mi
fa-ut	e la-mi	t
s	t	la-sol-re
la-mi	d la-sol-re	t
t	t	sol-fa-ut
la-sol-re	c sol-fa-ut	mi
t	s	b fa
sol-fa-ut	mi	s
s	b fa	la-mi-re
mi	a la-mi-re	t
b fa	t	sol-re-ut
la-mi-re	g sol-re-ut	t
t	t	fa-ut
sol-re-ut	f fa-ut	s
t	s	la-mi
fa-ut	e la-mi	t
s	t	sol-re
la-mi	d sol-re	t
t	t	fa-ut
sol-re	c fa-ut	s
t	s	mi
fa-ut	b mi	t
s	t	re
mi	a re	t
t	t	ut
re	f ut	
t	naturals	
ut	Ob- naturals	
		Ob- occliden- talis sinitter.

Figure 25. Figura 4 of the *Musica practica*, 27.  
 Source: Johannes Wolf, ed., *Musica practica*, 35.  
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	-g
-5a b	
	-p
	t 5a b
	-o
-4a b	t
	-n
	s
	-m
	t 4a b
	-l
-3a b	t
	-k
	s
	-h
	apot.
	-i
	s
	-h
	t 3a b
	-g
-2a b	t
	-f
	s
	-e
	t 2a b
	-d
-1a b	t
	-c
	s
	-b
	t 1a b
	a

Figure 26. Figura 5 of the *Musica practica*, 28.  
 Source: Johannes Wolf, ed., *Musica practica*, 36.  
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CAPITULUM SEXTUM

QUOD MUSICAE DIFFERENTIA  
NON EST IN QUALITATE  
SED IN QUANTITATE

Est enim differentia musicae in quantitate arsis vel thesis constituta, non autem in magnitudine sive fortitudine aut vocis debilitate collata. Cum enim in arte Guidonis tres vocum proprietates inter se [differentes] ponantur, necesse est, inter voces aequales differentiam ponat. Nam in *g sol re ut sol naturae a re b mollis* vel ab *ut ♯ duri* differentiam faciat necesse erit. Sic et *re ab ut*. Ergo aequales non sunt et per consequens mutatio in eis fieri non posset. Et tamen ipsi faciunt per suam doctrinam iam superius propositam. Ergo ipsi sibi contradicant necesse est.

Quidam vero, ut Magister Osmensis Hispanus, qui tractatum quendam in hac edidit facultate, putant

SIXTH CHAPTER

THE DIFFERENCE OF MUSIC  
IS NOT IN QUALITY  
BUT IN QUANTITY

For the difference of music is built upon the quantity of the arsis and thesis, and it is not based upon the magnitude or, if you prefer, the strength or weakness of a note.<sup>111</sup> For when the three properties of the notes--differing among themselves--are arranged in Guido's theory, it is necessary to establish the difference between the equal notes. For it will be necessary to make a difference between *g sol re ut* (the *sol* of the *natural* [hexachord]) and *re* of the *soft b* [hexachord] or *ut* of the *hard ♯* [hexachord]. Likewise also [it will be necessary to make a difference between] *re* and *ut*. As I was saying, they are not equals, and consequently a mutation cannot be made upon them. And nevertheless, they [Guido's followers] make [a mutation] according to their doctrine that was already discussed above. Therefore, it is necessary for them to contradict themselves.

But some such as the teacher of Osma<sup>112</sup>--the Spaniard who published a certain treatise on this

se ad inconveniens ducere hoc modo dicentes: si non [different] *fa* et *sol* in *c* *sol fa ut*, non ponerentur, quia frustra fit per plura. Sic ergo ponuntur, quia differunt; ita et reliquae voces alibi locatae. Sed istud inconveniens nullum est, quoniam ponuntur ibi ad faciendum semitonium longius aut propinquius, ex quo provenit differentia musicae. Nam si omnes intercapedines essent aequales tonorum aut semitoniorum, nulla esset musicae differentia. Quod si per inconveniens solvere volumus, multis dubitationibus hoc idem facere poterimus. Cum enim dicant voces  $\sharp$  *duri* a vocibus  $\flat$  *mollis* differre, idem a se ipso differre nescientes consentiunt, quod aliquibus exemplis comprobavimus. Est enim in *c* *fa ut fa*  $\sharp$  [*duri*]. Manifeste ponunt ibidem *mi* per  $\sharp$ ; coniunctam propter hoc enim ponunt, quia differentiam inter *fa* et *mi* magnam cognoscunt, et tamen utraque vox est  $\sharp$  quadrati. Ergo idem differt a se ipso, quod erat probandum. Sic et in *a* *la mi re*; ubi est *mi*  $\flat$  *mollis*, ponitur *fa* coniunctae  $\flat$  *mollis*. Ergo  $\flat$  *molle* differt a  $\flat$  *molli*.

practice--believe that they are guiding [students] inconsistently, when they say in this way: "If *fa* and *sol* were not different, they would not be arranged on *c sol fa ut*, since it is done by means of many [syllables] for no [real] purpose. Therefore, they are arranged in this manner because they are different; likewise also the remaining notes that are arranged elsewhere." But this is by no means inconsistent, since they are arranged there for the purpose of making a semitone farther or closer, from which the difference of music arises. For if all the intervals of the tones or of the semitones were equals, there would not be a difference of music. But if we wish to resolve this inconsistently, we will be able to do this same thing with many doubts. For when they say that the notes of the *hard*  $\sharp$  [hexachord] differ from the notes of the *soft*  $\flat$  [hexachord], without knowing [it] they affirm that the same differs from itself, which we have confirmed with some examples. For *fa* of the *hard*  $\sharp$  [hexachord] is on *c fa ut*. In that very place they clearly arrange *mi* by means of  $\sharp$ , for on account of this they establish a *coniuncta*, since they recognize the great difference between *fa* and *mi*, and

[32]

nevertheless, both of the notes are from *square ♯*. Therefore, as it was necessary to demonstrate-- the same differs from itself. Likewise also *fa* of the *coniuncta* of *soft b* is arranged *a la mi re* where there is *mi* of *soft b*. Therefore, *soft b* differs from *soft b*.

Absurdum certe est in musica differentiam inter voces *♯* duri et *b* mollis aut naturae ponere, quod frater Johannes de Sancto Dominico, magister in theologia, conatus est affirmare. Verum quia librum nullum composuit, nihil de eo dicendum. Sed frater Johannes Ottobi anglicus carmelita, qui semitonium durum ponit et molle atque naturale, longe peius cognovit. Bene quidem in suo monochordo numeros assumpsit, quia eosdem, quos in suo Boethius, ponit. Differentiam tamen illam semitonii [eum] non ab illo, sed ab aliquo indocto reor accepisse. Sed mihi de eo dicere, quod frater Johannes Carthusiensis de Marcheto dicere solitus est. A seculo non est auditum triplex ponere semitonium: chromaticum scilicet, enharmonium atque diatonicum, quia, ut ait, quis umquam audivit ab aliquo vero doctore triplex esse semitonium nisi ab isto marchetista. Frater Johannes Ottobi, credo, ab ipso aliquot fundamentum assumpserit.

Certainly it is absurd to place the difference in music between the notes of *hard ♯* and [the notes of] *soft b*, or [the notes of] the *natural*, which Brother Johannes of Santa Domingo,<sup>113</sup> a teacher of theology, attempted to confirm. But since he did not write a book, nothing should be said about him.<sup>114</sup> But Brother Johannes Hothby,<sup>115</sup> the English Carmelite who arranges the hard, the soft, and the natural semitone, perceived [it] by far the worst [of all]. Certainly he properly adopted the numbers for his monochord, since they are the same ones that Boethius arranges on his [monochord].<sup>116</sup> Nevertheless, I do not think that the difference of a semitone was taken from him, but from someone untrained. And let me say about [Hothby] that which Brother Johannes Carthusiensis was accustomed to saying of Marchettus. For it has not been heard for a long time [that one may] arrange the semitone in three ways, namely:

Sed non miror, quia sequax  
 Guidonis est. Ego enim  
 caput conterere volo, ut  
 corpus istud in erroribus  
 constitutum cadaver iam  
 fiat nec amplius vivere  
 possit.

Praeterea iste magister  
 Osmensis iam allegatus  
 dicit: istae tres  
 proprietates scilicet  $\sharp$   
 durum,  $b$  molle et natura  
 sic se habent sicut illa  
 tria genera melorum, quae  
 ponuntur a Boetio  
 scilicet: diatonicum,  
 chromaticum et  
 enharmonium, quoniam  
 diatonicum, quod  
 aliquantulum durius est,  
 dicit  $\sharp$  quadrati  
 similitudinem tenere,  
 enharmonium vero, quod  
 magis ad molle coaptatum  
 est,  $b$  molli comparat,  
 chromaticum vero, quod  
 inter utrumque medium  
 tenet, naturae imaginem  
 servat. Hoc autem iam,  
 cum in studio legeremus  
 Salmantino, praesente et  
 coram eo redarguimus et in  
 tractatu, quem ibi in hac  
 facultate lingua materna  
 composuimus, ipsi in

chromatic, enharmonic, and  
 also diatonic, because as  
 [Johannes Carthusiensis]  
 says: "Who has ever heard  
 from some well-grounded  
 teacher that there are  
 three ways [to arrange] a  
 semitone if not from this  
 little Marchettus?"<sup>117</sup> I  
 believe that Brother  
 Johannes Hothby may have  
 taken some [of his]  
 foundation from him. But  
 I do not marvel [at this],  
 because he is a follower  
 of Guido. Truly, I wish  
 to destroy the head, so  
 that this body [of  
 knowledge] undertaken in  
 errors may become a  
 corpse, and not be able to  
 live [any] longer.

Furthermore, this  
 teacher of Osma<sup>118</sup>  
 already mentioned above  
 says: "These three  
 properties--that is, *hard*  
 $\sharp$ , *soft*  $b$ , and *natural*--  
 conduct themselves thusly  
 just as those three genera  
 of melody, which are  
 arranged by Boethius,  
 namely: diatonic,  
 chromatic, and  
 enharmonic," since he says  
 that the diatonic [genus],  
 which is somewhat harder,  
 has a resemblance to  
*square*  $\sharp$ ; but he compares  
 the enharmonic [genus],  
 which was associated more  
 with *soft*  $b$ , to *soft*  $b$ ;  
 and [he says that] the  
 chromatic [genus], which  
 he holds in the middle  
 between [the diatonic and  
 the enharmonic genus],  
 preserves the image of the  
*natural*. However, we have  
 already refuted this

omnibus contradiximus adeo, ut ipse viso et examinato tractatu meo hoc dixerit: Non sum ego adeo Boetio familiaris sicut iste. Nam ego quidem probavi in duobus aliis generibus esse *h* durum et *b* molle sicut in isto. Ibidem enim tetrachordum synēmmenōn reperiri non dubito et alia partitio illorum est, alia vero istius.

Partiamur enim tetrachorda chromatici per semitonium, semitonium et trihemitonium, hoc est: primum intervallum est semitonii et secundum semitonii, sed tertium est trihemitonii sive semiditoni. Enharmonium vero genus semitonium dividit in duas partes, quae dieses appellantur, et sic duo spatia prima singulas dieses tenent; at vero tertium intervallum [ditonum] amplectitur. De his tamen generibus nihil ad praesens tractamus, quoniam in fine huius primae partis ea in practicam ponemus notulis signatis.

publicly in his presence when we were doing research in Salamanca, and in the treatise that we published in the mother tongue while on the faculty there. We have contradicted him on everything to such a degree that he himself, after viewing and examining my treatise, said: "I am not as familiar with Boethius as he is."<sup>119</sup> For indeed, I demonstrated that *hard h* and *soft b* are in the two other genera just as in the latter. For I do not doubt that the tetrachord *synēmmenōn* is found in the same place, and that there is one division of former, and another division of the latter.

For let us divide the tetrachords of the chromatic [genus] by a semitone, a semitone, and a trihemitone--that is: the first is an interval of a semitone, and the second is [an interval] of a semitone, but the third is [an interval] of a trihemitone or, if you prefer, of a semiditone. But the enharmonic genus divides the semitone into two parts, which are called *dieses*, and thus the first two intervals each have a *dieses*; but truly the third interval encompasses a ditone.<sup>120</sup> Nevertheless, for the present we will treat nothing in regard to these genera, since at the end of this first part we will

establish them in  
practice with marked  
notes.

Nunc autem qualiter non  
semper inter *mi* et *fa* sit  
semitonium declaremus, et  
qualiter mutationes  
coniunctarum sint  
necessariae dicemus vel  
voces tonales efficientur  
semitonales, et ditonales  
semiditonaes et e contra.  
Iuxta quod recte  
intelligendum quae  
sequuntur diligenter  
perscrutemur.

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However, now let us  
explain how there is not  
always a semitone between  
*mi* and *fa*, and we will  
discuss how mutations of  
the coniunctae are  
necessary, or [how] tonal  
notes will produce  
semitonal notes, and [how]  
ditonal notes [become]  
semiditonal [notes], and  
vice-versa. Immediately  
afterwards, let us examine  
that which should be  
properly understood--[the  
theories] which they [so]  
diligently follow.



CAPITULUM SEPTIMUM

REPROBANS GUIDONIS  
SEQUACES ET VERITATEM  
REI SUBTILITER DEMONSTRANS

Perscrutata enim musicae differentia atque perspecta restat probandum, qualiter voces tonales fiant semitoniales et e contra, iuxta quod sciendum, quod cantus in ascensu, ut dicit Johannes de Villanova, vult vocem fortificari et in descensu molle fieri. Unde dicit ipse, quod, si cantus psallat *a c d* et non revertatur ad *c*, quamvis deberet dici *re fa sol*, ut ordo demonstrat, debet tamen dici *ut mi fa* propter hoc, quia *a c* non est semiditoni sed ditoni intercapedo; aut illismet vocibus scilicet *re fa* si pronuntietur, dicatur ditonus subintellectus. Item si cantus fiat sic *g f g* et iterum non tangat *f*, est semitonium subintellectum, quamquam dicatur *sol fa sol* sive *re ut re*.

Idem esse arbitratur semper synemmenon fiendum, cum post notulam positam in *b fa † mi* sequitur alia

SEVENTH CHAPTER

REFUTING THE FOLLOWERS OF  
GUIDO AND DEMONSTRATING  
IN GREATER DETAIL THE  
TRUTH OF THE MATTER

Certainly with the difference of music having been examined and clearly perceived, there remains to be shown how the tonal notes produce semitonal notes and vice-versa. In addition, it should be known--as Johannes of Villanova says--that the song prefers for the note to be made hard while ascending and to be made soft while descending. Whence, he himself says that if a song is sung *a c d* and it does not return to *c*, although it should be called *re fa sol*--as the order demonstrates--nevertheless, it should be called *ut mi fa* on account of this: *a c* is not the interval of a semiditone but of a ditone; or if it is sung with those same notes--that is, *re fa*--let it be called a ditonus subintellectus.<sup>121</sup> Likewise, if the song is made in this manner *g f g* and it does not touch upon *f* again, it is a semitonus subintellectus<sup>122</sup> even though it may be called *sol fa sol* or *re ut re*.

The same man [Johannes of Villanova] believes that the synemmenon should always be performed when

in mese, sive a gravibus  
litteris ad ipsum  
pervenerit, sive ab acutis  
descendens ipsum  
tetigerit, praesertim si  
pluries eundem locum  
repercusserit. Idem  
quoque, si cantus hunc  
progressum fecerit *d b c d*  
*c d d* et in suis octavis;  
*b c* est tonus et *c d*  
semitonium bis factum et  
sic aut subintellecte  
voces tonales tenebunt  
semitonium aut mutatio  
fiet *mi* in *re*, quae vox  
est coniunctarum.

Etiam dicit ipse  
Johannes ex ditono  
semiditonum fieri hoc  
modo: Si cantus dicat *la*  
*fa sol sol* non veniens  
iterum ad *fa*, aut  
subintellecte semiditonus  
erit aut mutatio fiat *la*  
in *sol*, ut dicatur *la sol*  
*mi fa fa*; et ad hunc modum  
diligens lector de aliis  
poterit iudicare hoc modo  
dispositis. Et tales  
notae debent esse signatae  
hoc signo scilicet ♯ vel  
isto ✱. Ad maiorem  
evidentiam igitur, qui  
cantum componere vult,  
multum debet advertere  
circa haec, de quibus  
etiam subtilius in secunda  
parte dicemus. Nunc vero  
ad confusionem ex Guidonis  
vocibus consecutam  
declarandam pauca ista  
sufficiant.

after a note is placed on  
*b fa ♯ mi*, another [note]  
follows on *mesē* or, if you  
prefer, it will either  
arrive at it from the  
lower letters or it will  
touch upon it while  
descending from the higher  
[letters]--especially if  
it strikes the same place  
several times. The same  
will also [occur] if the  
song produces this  
progression: *d b c d c d d*  
and on its octaves, [for]  
*b c* is a tone [and] *c d* is  
a semitone that occurs  
twice; and thus either the  
tonal notes will include a  
*semitonus subintellectus*,  
or the mutation *mi* to *re*  
will be made,<sup>123</sup> which is  
a note of the coniunctae.

Furthermore, Johannes  
himself says that a  
semiditone is made from a  
ditone in this manner:  
"If the song proclaims  
*la fa sol sol*, not  
returning again to *fa*,  
either it will be a  
*semiditonus subintellectus*  
or the mutation *la* to *sol*  
is made, so that it is  
sung *la sol mi fa fa*"; and  
in this manner the  
diligent reader will be  
able to judge [for  
himself] concerning the  
rest [of them] arranged in  
this way. And such notes  
should be marked with this  
sign--that is, ♯--or with  
this [sign] ✱. Therefore,  
for greater clarity,  
whoever wishes to compose  
a song should pay a lot of  
attention in respect to  
this [matter], which we  
will discuss in even

Bene quidem dixit de his mutationibus ipse frater Johannes Carthusinus: non dico vocis in vocem mutationem, sed ab ambage in ambagem variationem. Solum refert tonos et semitonia [annotare] et per litteras Gregorii canere. Hoc equidem de vocibus meis dico. Nam qui per nostras cantare voluerint voces, unicam tantum mutationem in una diapason facere tenebuntur, quod est: cum cantus ultra *c* acutum conscenderit, *tas* in *psal* mutabimus et sic fiet mutatio *tas psal*; at cum deorsum venire voluerint, *psal* in *tas* mutabunt. Hoc enim modo et in gravi fiendum. Atque etiam hoc facere non cogantur addiscentes, quoniam quandoque unum pro alio dicere permittimus. Sed solum regulas supradictas advertere, hoc est species tonorum aut semitoniorum observare, consuescant, ita ut non unam pro alia faciant, sicut contingit solfizantibus, ut aiunt, per voces Guidonis.

greater detail in the second part. But [for] now, let these few [words] suffice in order to clarify the confusion that resulted from the syllables of Guido.

Certainly Brother Johannes Carthusiensis<sup>124</sup> himself spoke properly concerning these mutations: "I do not proclaim it a *mutation* when a note is changed into [another] note but rather, a *variation* from an interval [of one quality] to an interval [of another quality].<sup>125</sup> It is only important to notice the tones and the semitones, and to sing according to the letters of Gregory."<sup>126</sup> Of course, I [also] say this about my syllables. For whoever desires to sing according to our syllables will only be obligated to make a single mutation within a diapason<sup>127</sup> --that is: when the song climbs beyond *c acutae* we will change *tas* to *psal*, and thus the mutation *tas psal* will be made; but when they desire to come down, they will change *psal* to *tas*.<sup>128</sup> Truly, it should also be done in this manner in the low [range]. And yet, let not the students be forced to do this, since sometimes we permit [them] to say one in place of the other. But let them only become accustomed to noticing the rules mentioned above-- that is, to observe the

[34]

In tantum enim  
 neothericorum fides  
 catholica circa Guidonis  
 voces crevit propter  
 consuetudinis  
 longitudinem, ut Ugolinus  
 Urbeveteranus Ferrariae in  
 ecclesia cathedrali  
 reclusus, cum de vocibus  
 tractare incipit, eas  
 dictiones graecas appellat  
 et addit: Graeci tantum  
 habebant quinque scilicet  
*re, mi, fa, scl, la,*  
 carentes *ut*. Probat hoc,  
 quia ars illorum a  
 proslambanomeno incipit,  
 quod est a *re*. Inde  
 concludit intentum suum.  
 Verum hoc non esset in  
 lucem et in publicum  
 adducendum, sed pro  
 ridiculo et ludibrio  
 habendum.

Nos igitur in hac nova  
 nostra speciosissimae  
 artis forma mirifice  
 delectati statuimus in *c*  
 cantum inchoare, tum quia  
 illa vox nobiliorem tonum  
 tenet, ut post dicetur,  
 tum etiam quia, ut ipse  
 Guido ait, natura  
 numerorum eam reperimus  
 primam. Faciemus igitur  
 sibi diapason unam in  
 graviori parte aliamque in  
 acutiori, ita ut tribus

species of the tones or of  
 the semitones, so that  
 they do not perform one in  
 place of another as it  
 occurs in singing with  
 solmization--as they say--  
 according to the syllables  
 of Guido.

For in respect to the  
 syllables of Guido, the  
 Catholic faith of the new  
 theorists has grown to  
 such a degree on account  
 of the length of [its]  
 usage that when Ugolino  
 Urbeveteranus of Ferrara--  
 a recluse in the  
 cathedral--begins to deal  
 with the syllables, he  
 calls them [according to]  
 the Greek names and adds:  
 "The Greeks only had five  
 [syllables], namely *re,*  
*mi, fa, sol, la,* lacking  
*ut*."<sup>129</sup> He demonstrates  
 that this is because their  
 art begins from  
*proslambanomenos*--that is,  
 a *re*. After that, he  
 concludes his endeavor;  
 but this should not be  
 brought to the light nor  
 made public but rather, it  
 should be regarded with  
 laughter and mockery.

Therefore, we, [who are]  
 wonderfully delighted in  
 this our new form of the  
 most beautiful art, have  
 decided to begin the song  
 on *c*, not only because  
 that note holds a nobler  
 sound--as it will be  
 discussed later--but also  
 because, as Guido himself  
 says, we encounter it  
 first by the very nature  
 of the numbers. Therefore,  
 we will make one diapason

diapason musica nostra  
 contineatur, ut non solum  
 sit utilis ecclesiastico  
 cantui, verum etiam  
 seculari curiosiori. Erit  
 igitur musica Gregorii,  
 Ambrosii, Augustini,  
 Bernardi, Isidori, Odonis  
*Enchiridion*, Guidonis, qui  
 ab istis quasi totam  
 assumpsit, suorumque  
 sequentium sicut lex  
 scripturae, quae non  
 omnibus data fuit; nam  
 aliqui sine ea hodierna  
 die cantant. Nostra autem  
 catholica sive universalis  
 erit sicut lex gratiae,  
 quae legem scripturae in  
 se continet atque naturae.  
 Sic etiam nostra totum,  
 quod isti ecclesiastici  
 viri et sapientissimi  
 musici antiqui dixerunt et  
 invenerunt, continebit.

Cum igitur octavam sub *c*  
 ponimus vocem, ne mirentur  
 Italici, quia constat non  
 esse novum, sed  
 frequentissime usitatum et  
 omnia fere polychorda  
 neotericorum illud habent.  
 Antiquorum vero monochorda  
 in eadem *c* gravi fecisse  
 principium reperitur per  
 instrumenta. Inde ergo  
 nos in cantu in eadem  
 littera statuimus  
 principium, in monochordo  
 autem secundum Graecos  
 Boetium secuti in *a*.

from [*c*] in the lower part  
 and another in the higher  
 [part] in such a way that  
 our music is contained  
 within three diapasons, so  
 that it is not only useful  
 for the ecclesiastical  
 song, but also for the  
 more curious secular  
 [song]. Therefore, it  
 will be [as] the music of  
 Gregory, of Ambrose, of  
 Augustine, of Bernard, of  
 Isidore, of Odo's  
*Enchiridion*, and of Guido  
 and his followers, who  
 took almost everything  
 from these men as a law of  
 scripture which had not  
 been given to everyone;  
 for some [still] sing  
 without it to this very  
 day. However, ours will  
 be "catholic" or, if you  
 prefer, "universal," just  
 as the law of grace which  
 contains within itself the  
 law of Scripture and also  
 [the law] of nature. Thus  
 also, ours will contain  
 everything that these  
 ecclesiastical men and the  
 wisest ancient musicians  
 have said and discovered.

Therefore, when we place  
 the note *c* an octave  
 below, let not the  
 Italians be amazed, since  
 it is agreed that it is  
 nothing new but rather, it  
 is the most common usage;  
 almost every polychord of  
 the new theorists contains  
 that [extension]. And it  
 has been learned by means  
 of the instruments that  
 the monochords of the  
 ancients began on the same  
*c* grave. Therefore, from  
 there we have established

the beginning of the song on the same letter; on the monochord, however--in accordance with the Greeks--we have followed Boethius [by beginning] on a.

Nunc autem artem memorativam, hoc est per digitorum iuncturas litteras canendas cum vocibus hoc modo in palma collocamus. Non sine ratione ut Guido ad libitum sed cum maxima rei similitudine voces disponemus hoc modo: Sit concavum instrumenti in concavo manus, ubi silentium ponatur, quoniam ibi nulla vox fieri debet, eritque sicut terra. Deinde prima vox in restricta ponetur, sub qua gravior non sit ponenda, quia silentium erit; nam concavum manus carens iunctura motu caret distincto. Sed restricta motum habet primum ex applicatione montis pollicis ad pinguedinem manus. Inde igitur, quia motus ibi est, sonum locabimus; deinde secunda vox in radice pollicis in parte exteriori, ubi alius motus ab isto distinctus est; [tertiam] vero in alia iunctura pollicis exteriori, ubi motus etiam est distinctus; quartam vero in penultima exteriori eadem ratione. [Quintam] vero, quoniam maiorem [convenientiam] habet cum prima quam ipsa quarta, in vertice pollicis ponemus conversam, idest

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And now I will discuss art--that is, [how] we arrange the letters with the notes on the palm for the purpose of singing by means of the joints of the fingers according to this method. We arrange the notes not without reason as Guido [did] by a whim, but with the greatest similitude of reason in this manner: Let the concave [part] of the instrument be in the concave [part] of the hand where silence is placed, since no note should be made there, and it will be as the ground. Then, the first note will be placed upon the wrist, below which nothing should be placed [any] lower, since there will be silence; for the concave [part] of the hand, lacking a joint, is deprived of [any] distinct movement. But the wrist has the first movement from the attachment of the mount of the thumb to the thick part of the hand. Therefore, from there we will place a sound, because there is movement there; then [we will place] the second note on the exterior part at the base of the thumb where there is another movement distinct from the former; but [we will place] the

respicientem primam. Hoc ideo, quia illa vox et aliae tres sequentes eiusdem qualitatis sunt cum praemissis quatuor, scilicet diatessaron. Et sic sextam vocem ponemus in sequenti iunctura interiori respicientem inferius et sic etiam septimam. Et sic septem differentes differenti modo ponentur. Sed octava, quae similis est primae, acutior tamen in radice indicis locabitur, et quoniam digitus ille subtilior est pollice, clare monstratur chordam subtiliorem voces reddere subtiliores.

Aliam vero diapason hoc modo diponemus, ut similiter cum octava huius primae diapason scilicet tas ponamus primam sequentis scilicet psal in ipsius indicis radice et

third note on the other joint [on the] exterior [part] of the thumb where there is also distinct movement; but [we will place] the fourth note on the penultimate exterior [joint] for the same reason. But since the fifth note has a greater correspondence with the first [note] than with the fourth, we will arrange it [so that it is] reversed on the top of the thumb--that is, looking back toward the first [note]. And this is [done] because that note and the other three [notes] that follow are of the same quality as the four preceding [notes]--that is, the diatessaron. And thus, we will place the sixth note on the following interior joint looking back downward, and likewise [in regard to] the seventh [note]. And thus the seven different [notes] will be arranged in a diverse manner. But the eighth [note], which is similar to the first [note] (although it is higher), will be placed at the base of the index finger, and since that finger is thinner than the thumb, it is clearly shown that the finer string renders the higher notes.

And we will arrange the other diapason in this method similarly so that we may place the eighth [note] of this first diapason--namely tas--with the first [note] of the

in secunda iunctura *li*, in tertia *tur*, at in summo *per*, a qua summitate usque ad digiti medii summitatem duas lineas protrahemus taliter, quod videantur illi duo digiti alligati superius, et in summitate medii digiti ponemus *vo* conversam eadem ratione, qua de alia diximus. Sic et voces sequentes sequentibus iuncturis aptabimus, ita ut in radice ipsius medii digiti vox octava [collocetur] et in radice medici *psal* in unisono ponatur. Et idem fiat de alia diapason tertia cum auriculari, in cuius radice *tas* faciet finem, non quia ultra procedere ad acutiores non posse dicamus nec sub gravioribus alias posse remitti [negemus]; sed hoc dicimus, quia his tribus diapason satis est dilatata doctrina. Et in gravibus chordis vocis est modus, ut non ad taciturnitatem usque gravitas descendat, et in acutis ille custoditur acuminis modus, ne nervi, ut dicit Boetius, nimium tensi vocis tenuitate rumpantur, sed totum sibi sit consentaneum atque conveniens. Totum hoc igitur subiecta patefaciet figura. [Locus manus sequentis]

following [diapason]--namely *psal*--at the base of the index finger itself; and [we will place] *li* on the second joint, *tur* on the third [joint], but [we will place] *per* on the highest [joint]. From this apex, we will trace two lines up to the apex of the middle finger in such a way that those two fingers appear to be tied together above; and we will place *vo* [so that it is] reversed on the apex of the middle finger for the same reason that we have discussed concerning the other [note]. Thus also, we will adapt the following notes to the following joints in this manner, so that the eighth note will be arranged at the base of the middle finger itself, and [so that] *psal* may be placed in unison at the base of the ring finger.<sup>130</sup> And let the same be done in respect to the other diapason--[that is], the third [diapason]--with the little finger<sup>131</sup> upon whose base *tas* will mark the end, not because we are declaring that it cannot proceed beyond [this point] to higher [notes], and not because we deny that others can descend beyond to lower [notes], but we are declaring this because the doctrine is sufficiently explained with these three diapasons. And the limit of the sound is on the low strings, so that the



lowness does not descend all the way to silence; and that limit of highness is observed on the high [strings] so that, as Boethius says: "the strings may not be broken, having been stretched too much by the high pitch of the note but rather, [so that] everything may be agreeable and also suitable to itself." Therefore, the figure below will reveal all [of] this. The arrangement of the hand [should be placed] in the following space [See Figura 6].<sup>132</sup>

Hanc igitur figuram sic dispositam ita imaginamur, ut pollex per medium secetur quasi ad concavum manus et pars interior erigatur simul cum indice a medio disparato. Sic et medius super ligatura, quae utrosque per capita ligat, erigatur. Fiet, ut voces, quae litteris conversis signatae sunt, erectis figurentur. Medicus autem a latere [figura 6] medii stans erecte auricularem per caput convertet erigendo, ita ut radix eius in acumine sit. Et ita primis quindecim chordis sive vocibus similitudinem antiquorum demonstramus. Ideo ponimus eas in una erectione; sed illas octo, quas iungimus, ad perfectionem ibi iungimus denotandum, ut patet in figura. Sed de his hactenus. Nunc ad priores

[36]

[37]

Therefore, we imagine this figure arranged in such a manner that the thumb is divided in half almost to the hollow of the hand, and let the interior part be erected together with the index finger separated in the middle. Thus also, let the middle [finger] be erected above the ligature, which binds both [of them] at the top. [And] it will come to pass so that the notes which were marked with the letters turned around will be figured with upright [letters]. Moreover, the ring finger, standing upright at the side of the middle [finger], directs [its attention] to setting up the little finger at the top in such a way that its base is at the point. And thus, with the first fifteen strings or, if you prefer, [the first

species, quae prius dictae fuerunt, quoniam in illis tota vis pendet harmoniae, convertamus orationem.

fifteen] notes, we demonstrate a similarity to that of the ancients. Therefore, we place them in one ascending [arrangement], but those eight [notes] that we add, we add there for the purpose of indicating perfection, as it appears in the figure. But enough about these things! Now let us turn the oration to the previously mentioned species, since all the essence of harmony depends upon them.



## CAPITULUM OCTAVUM

IN QUO SUBTILITER,  
QUOT MODIS UNAQUAEQUE  
SPECIES FIAT, DECLARATUR

Animadvertete, lector,  
quod unaquaeque species  
tot modis fiet, quot  
intervalla continet. Hoc  
ideo, quia semitonium,  
quod intervallum habet  
inaequale, per alia  
intervalla rotatur. Unde  
quandoque in primo,  
quandoque in secundo,  
aliquando vero in tertio  
collocatur intervallo.  
Species vero, quae  
semitonium non tenet,  
unico modo fiet, etiamsi  
plura teneat intervalla,  
ut ditonus et tritonus  
unico semper fiunt modo.

Semiditonus vero,  
quoniam duo habet  
intervalla, unum scilicet  
toni et aliud semitonii,  
duobus modis fiet: uno,  
quando semitonium est in  
altiori intervallo, ut a c  
sive d f vel g b aut [h k]  
disiunctim et in istorum  
octavis; alio modo, quando  
semitonium est in  
inferiori intervallo, ut b  
d sive [e g] aut [h k]  
coniunctim et in istorum  
octavis.

## EIGHTH CHAPTER

IN WHICH IT IS EXPLAINED  
IN DETAIL IN HOW MANY WAYS  
EACH SPECIES MAY BE MADE

Consider reader, that  
each species will be  
realized in as many ways  
as the intervals it  
contains. The reason is  
this: because the  
semitone, which contains a  
variable interval, is  
altered for the sake of  
other intervals. Whence,  
at times [the semitone] is  
arranged on the first  
[interval], at times on  
the second [interval], and  
at other times on the  
third interval. But the  
species that does not have  
a semitone will be made in  
only one way even though  
it has several intervals;  
for example: the ditone  
and the tritone are always  
made in only one way.<sup>133</sup>

But since the semiditone  
has two intervals--that  
is, one [interval] of a  
tone and another of a  
semitone--it will be made  
in two ways: (1) when the  
semitone is [found] within  
the higher interval such  
as a c or, if you prefer  
d f or g b or h k  
disjunct, and at their  
octaves; (2) when the  
semitone is [found] within  
the lower interval such as  
b d or, if you prefer e g  
or h k conjunct, and at  
their octaves.

Diatessaron, quia tria continet intervalla, duos tonos scilicet et unum semitonium, tribus fiet modis, quoniam quandoque semitonium est in medio ut *a d* et *d g* atque [*g k*] coniunctim et *h l* disiunctim et in eorum octavis. Et iste dicitur primus modus, quoniam ars Boetii incipit ibi. Secundus vero est, quando semitonium est in inferiori loco ut *b e* et *e h*, sic et *h l* coniunctim et in istorum octavis. Tertius modus est, quando semitonium est in altiori ut *c f*, *f b*, *g k* [disiunctim] et in istorum octavis.

Diapente vero quatuor modis fiet, quoniam quatuor continet intervalla, tres verum tonos unumque semitonium. Primus igitur modus habebit semitonium in secundo intervallo ut *a e* vel *d h*, sic et *g l* in coniuncto, *h m* in disiuncto et in eorum octavis. Secundus modus habebit semitonium in primo ut *e f* et *h m* in coniuncto et in istorum octavis. Tertius vero modus habebit semitonium in quarto intervallo ut *f k* disiuncto, *b n* et in suis octavis. Quartus vero modus habebit semitonium in tertio intervallo ut *c g* vel *f k* in coniuncto aut [*g l*] in disiuncto et in istorum octavis. Hoc in ordine

Since the diatessaron contains three intervals--that is, two tones and one semitone--it will be made in three ways, because at times the semitone is [found] in the middle such as *a d* and *d g*, and also *g k* conjunct and *h l* disjunct, and on their octaves. And this is called the first way, since the theory of Boethius begins there. But the second [way] is when the semitone is in a lower position such as *b e* and *e h*; likewise also *h l* conjunct, and on their octaves. The third way is when the semitone is in a higher [position] such as *c f*, *f b*, *g k* [disjunct] and on their octaves.

But since the diapente contains four intervals--that is, three tones and one semitone--it will be made in four ways. Therefore, the first way will have a semitone within the second interval such as *a e* or *d h*; likewise also *g l* in the conjunct, *h m* in the disjunct, and on their octaves. The second way will have a semitone within the first [interval] such as *e f* and *h m* in the conjunct, and on their octaves. But the third way will have a semitone within the fourth interval such as *f k* disjunct, *b n*, and on their octaves. But the fourth way will contain a semitone within the third interval such as *c g* or

intelligitur naturali,  
 quoniam in accidentalibus ab  
 unaquaque chorda ad aliam  
 venientes diversas omnes  
 quatuor possumus facere  
 diapente. [Sic] et alias [38]  
 species.

*f k* in the conjunct or *g l*  
 in the disjunct, and on  
 their octaves. This is  
 understood in the natural  
 order, since we can make  
 all four types of the  
 diapente in the accidental  
 [order], advancing from  
 any one string to another.  
 Likewise, we can also do  
 this with the other  
 species.

Sed ista ponimus, ne  
 doctrina fiat confusa et  
 cantus ecclesiasticus  
 intelligatur, qui  
 regulariter est ordinatus.  
 Alii vero cantus potius  
 lascivia quam venustate  
 compositi numquam vel raro  
 regulam servant, de qua  
 paulo post loquemur.  
 Prius tamen de omnibus  
 speciebus loquamur, quae  
 tredecim a multis esse  
 putantur.

We establish this so  
 that the doctrine does not  
 become confused, and so  
 that one may understand  
 the ecclesiastical song,  
 which is ordered in a more  
 regular way. But other  
 songs (composed more  
 licentiously than  
 beautifully), rarely or  
 never observe the rule  
 which we will discuss a  
 little later. Still, let  
 us first discuss all the  
 species, which are  
 considered by many  
 [people] to be thirteen.

Species vero secundum  
 Boetium est quaedam  
 positio propriam habens  
 formam secundum  
 unumquodque genus [in]  
 uniuscuiusque proportionis  
 consonantiam facientis  
 terminis constituta.  
 Scilicet ab aequalitate  
 discedentes usque ad  
 diapason per additionem  
 semitonii fiunt. Prima  
 igitur aequalis dicitur  
 unisonus; post hanc minor  
 quantitas est semitonium,  
 deinde tonus, qui valet  
 duo semitonia. Post hunc  
 semiditonus, qui tria  
 semitonia continet, tonum  
 scilicet cum semitono, et

According to Boethius,  
 "A species is a certain  
 position [of the notes]  
 constituted between  
 boundaries, having a  
 unique form according to  
 each genus, and producing  
 a consonance in each and  
 every one of the  
 proportions."<sup>134</sup>  
 Naturally, they are made  
 by the addition of the  
 semitone, starting from  
 equality<sup>135</sup> [and  
 continuing] up to the  
 diapason. Therefore, the  
 first equal [interval] is  
 called the *unison*; after  
 this smaller quantity is  
 the *semitone*; then the

sic deinceps: ditonus, diatessaron, tritonus, diapente, diapente cum semitonio, quae graeco nomine hexas minor, quoniam sex vocum capax est, et ultra diapente tantum habet semitonium. Diapente cum tono appellatur hexas maior vel hexachordum; habet etiam tonum supra diapente. Sic heptas minor et maior sive heptachordum, quia septem chordarum aut vocum est capax, diapente est cum semiditono et diapente cum ditono. Diapente cum diatessaron, quae ut diximus simul iuncta faciunt diapason. Ut igitur summatim dicam species, quibus omnis cantus regitur, haec tredecim esse putantur, videlicet: unisonus, semitonium, tonus, semiditonus, ditonus, diatessaron, tritonus, diapente, cum qua replicantur priores usque ad diatessaron, et isto modo completur ipsa diapason.

tone, which is worth two semitones. After this, a *semiditone*, which contains three semitones--that is, a tone with a semitone; and thus in succession: the *ditone*, the *diatessaron*, the *tritone*, the *diapente*, the *diapente with a semitone*, which [is called] by the Greek name *hexas minor* because it is capable of six notes, and it only contains a semitone beyond the diapente. The diapente with a tone is called *hexas major* or a *hexachord*; certainly it contains a tone above the diapente. Likewise, the *heptas minor* and the [*heptas*] *major* or, if you prefer, the *heptachord*, because each is capable of seven strings or notes; [the former] is a diapente with a semiditone and [the latter] is a diapente with a ditone. As we have said, the diapente joined together with the diatessaron produces the diapason. Therefore, so that I may speak summarily concerning the species by which all song is governed, these thirteen are considered to exist, namely: the unison, the semitone, the tone, the semiditone, the ditone, the diatessaron, the tritone, [and] the diapente, with which the previous ones [from the unison] up to the diatessaron are replicated; and in this way the diapason itself is completed.

Diceret tamen aliquis: quare dicimus diapente et diatessaron, quae simul iuncta complent diapason? Num quid enim idem faciet ditonus cum hexade minori aut semiditonus cum maiori, sic et tonus cum heptade minori et semitonium cum maiori? Dicendum, quod verum est. Sed quia illae sunt partes maiores scilicet diapente et diatessaron, in quas ipsa diapason primo dividitur, dicitur diapason ex illis integrari. Nam qui bene inspexerint quantitatem chordae in prima figura *h a*: in medio aequaliter distat ab utraque *d* et diatessaron cum *a* et diapente resonat cum *h*. Est igitur tanta quantitas chordae diatessaron *d a*, quanta diapente *d h*. Igitur nimirum, si semper de illa quantitate diapason perfici dicatur, in quam prius dividitur.

Sic et cantus in suo processu suavius procedit per illas voces, quae has species formant, quam per alias, ut paulo post dicetur. Non tamen arbitrentur aliqui ex hoc esse tantam quantitatem diatessaron in sono,

Nevertheless, someone might say: Why do we say that the diapente and the diatessaron that are joined together complete a diapason? For will not a ditone with a hexas minor, or a semiditone with a hexas major produce the same thing? Likewise also, a tone with the heptas minor or a semitone with the heptas major? It should be said that [this] is true. But because those parts into which the diapason is first divided --that is, the diapente and the diatessaron--are larger, it is said that the diapason is completed from those [intervals]. For whoever will have examined properly the quantity of the string *h a* in the first figure [may notice] that *d* is equally distant in the middle from both, and that a diatessaron sounds with *a* and a diapente sounds with *h*. Therefore, the quantity of the string is as much a diatessaron (*d a*) as it is a diapente (*d h*). Therefore, without doubt, if the diapason is said to be made perfect, it is always from that quantity into which it has previously been divided.

Likewise also, the song proceeds more agreeably on its own course through those notes that form these species than through others, as it will be discussed a little later. Nevertheless, no one thinks on account of this



quanta est diapente,  
quoniam per tonum, ut  
dictum est, exceditur.

Est tamen alia  
quantitas, quae quasi  
nihil differt in sono, in  
quam diapason dividi  
potest, utputa tritonus et  
diapente imperfecta, quae  
vocatur semidiapente, ut *b*  
*f* et *f* ♯, quoniam tanta  
distantia est inter *b* *f*,  
quanta inter *f* ♯ nec  
differt practitorum  
differentia, secus tamen  
theoricorum, qui  
differentiam semitonii  
speculantur. In sono  
tamen non minus discors  
est quam ipse tritonus  
immediate considerata.  
Ideo non fecimus mentionem  
semidiapente. Loco enim  
tritonii accipitur in sono.  
Notanter tamen diximus  
immediate, quoniam, si per  
voces intermedias  
procedatur, tam in ascensu  
quam in descensu suavis  
est et lasciva ut *f e d c*  
*b* et *e contra b c d e f*.  
Non tamen debet cantus  
quiescere in *f*, quando  
ascendit, sed converti ad  
*e*. Sic et in descensu  
converti debet ad *c*.  
Tritonum facere, ut frater  
Johannes Carthusinus  
dicit, non est peccatum  
mortale, ut multi credunt.  
Immo necessarius est; nam  
alias non esset dare  
tertiam speciem diapente,  
quod esset manifeste  
falsum et contra  
veritatem. Loco etenim

that the quantity of the  
diatessaron is worth as  
much in sound as the  
diapente, since, as it has  
been said, the diapente  
exceeds the diatessaron by  
a tone.

Still, there is another  
quantity into which the  
diapason can be divided,  
which hardly differs in  
sound [at all]: consider  
the tritone and the  
imperfect diapente which  
is called a *semidiapente*,  
such as *b f* and *f ♯*, since  
there is as much distance  
between *b* [and] *f* as  
between *f* [and] ♯; and to  
the performers there is no  
difference, nevertheless,  
[this is] not true of  
theorists, who speculate  
about the difference of  
the semitone. Yet,  
[taken] directly it is not  
considered [any] less  
dissonant in sound than  
the tritone itself.  
Therefore, we have not  
made mention [of] the  
semidiapente, for [its]  
place, in sound, is taken  
by the tritone.<sup>136</sup>  
Nevertheless, note that we  
have said "directly,"  
since it is gentle and  
expressive if it is  
advanced through  
intermediate notes in  
ascent as well as in  
descent, for example:  
*f e d c b* and in reverse  
*b c d e f*. Still, the  
song should not stop on  
*f* when it ascends, but [it  
should] be turned around  
toward *e*. Likewise also,  
in descent it should be  
turned around toward

suo necessarius videtur,  
 ut, si cantus ascendat,  
 hoc modo *f g a ♯ c* dulcior  
 ascensus est quam iste *f g*  
*a b c*. In descensu tamen  
 contrario modo; sed de his  
 hactenus.

Nunc autem de speciebus  
 ipsius diapason, quot sunt  
 et quae et quo modo  
 disponuntur, dicendum est,  
 in quo tota vis pendet  
 harmoniae, et dicuntur  
 modi sive tropi aut etiam  
 toni.

c.<sup>137</sup> As Brother  
 Johannes Carthusiensis  
 says, "To make a tritone  
 is not a mortal sin as  
 many believe."<sup>138</sup> On the  
 contrary, it is necessary,  
 for otherwise it would not  
 be possible to make the  
 third species of the  
 diapente, because it would  
 be manifestly false and  
 contrary to the truth.  
 Indeed, it seems necessary  
 in its own place, so that  
 if the song ascends in  
 this manner, *f g a ♯ c*,  
 the ascent is sweeter than  
 [when the song ascends in]  
 this manner, *f g a b c*.  
 Nevertheless, in the  
 descent [it should be  
 done] in the opposite way;  
 but enough concerning  
 these things.

And now the species of  
 the diapason itself--on  
 which all the essence of  
 harmony depends--should be  
 discussed--[that is], how  
 many there are, what they  
 are, and in which way they  
 are arranged; and they are  
 called *modes* or, if you  
 prefer, *tropes*, or even  
*tones*.

### TRACTATUS TERTIUS

#### IN QUO DE TONIS SIVE MODIS AUT TROPIS PLENA COGNITIO PONITUR

Redeamus igitur ad ipsam musicae speciem, quae totam harmoniae vim dicitur continere. Cum igitur ex octo vocibus fiat septem continentibus intervalla, quinque vero tonos cum duobus semitoniis, septenis fiet modis, quoniam, si ex diapente et diatessaron recte conficitur et diapente quatuor, diatessaron vero tribus modis fit, relinquitur ipsam diapason septem modis esse variandam. Ut igitur a proslambanomeno ordiamur, usque mese erit prima species, quae dividitur in diatessaron et diapente per lichanon hypaton dividendum chordam per medium. Habebit igitur haec species diapason primam diatessaron a d cum prima diapente d h, quoniam semitonium utriusque in secundo collocatur intervallo. Secunda species diapason erit ab hypate hypaton in paramese, quae dividitur per chordam aequaliter medio divisam per hypaten meson. Habebit ergo secundam diatessaron scilicet b e et secundam diapente scilicet e ♯, quoniam semitonium

### THIRD TREATISE

#### IN WHICH A COMPLETE UNDERSTANDING OF THE TONES, MODES, OR TROPES IS ESTABLISHED

Therefore, let us return to the species of music itself, which is said to contain the entire essence of harmony. Accordingly, it will be made into seven modes, since it is formed from eight notes containing seven intervals--that is, five tones with two semitones. It remains that the diapason itself should be changed into seven modes, because, if it is composed correctly from the diapente and the diatessaron, the diapente is made in four ways, and the diatessaron is made in three ways.<sup>139</sup> Therefore, so that we may begin, the first species [of the diapason] will be from *proslambanomenos* up to *mesē*, which is divided into the diatessaron and the diapente, dividing the string in half by means of the *lichanos hypatōn*. Consequently, this species of the diapason will contain the first diatessaron a d with the first diapente d h, since the semitone of both is arranged on the second interval. The second species of the diapason will be from *hypatē hypatōn* to *paramesē*, which

utriusque in primo collocatur intervallo, hoc est in inferiori. Tertia igitur species totius concentus fiet a parhypate hypaton in trite diezeugmenon, quae dividitur ut aliae in parhypaten meson. Habebit igitur tertiam speciem diatessaron et tertiam diapente, quoniam semitonium diatessaron in tertio collocatur intervallo et diapente in [quarto]. Quartam vero speciem diapason facis a lichano hypaton in paraneten diezeugmenon dividendo per lichanon meson. Habebit igitur quarta species diapason primam diatessaron, sed quartam diapente, quoniam semitonium in tertio collocatur intervallo et in hoc a prima specie satis cognoscitur differre. Verum si diapente fiat a lichano meson in nete synemmenon, idem erit quod prima nec aliqua est differentia, quoniam semitonium erit in secundo intervallo sicut in prima; et quia diatessaron omnino similis est, relinquatur nullam esse differentiam inter has species sic dispositas, nisi quis dicat eas differre, quia diapente primae speciei fit a linea in lineam ut *d h* et diapente quartae a spatio in spatium ut *g l*. Ista etenim cognitio nulla est, quoniam linea vel spatium non arguit [differentiam] in musica, ut frater Johannes

[40] is divided by a string that is segmented equally in the middle by means of the *hypatē mesōn*. Therefore, [this second species] will contain the second diatessaron--that is, *b e*--and the second diapente--that is, *e ♯*--since the semitone of both is arranged on the first interval--that is, on the lowest [interval]. Then, the third species of all harmony will be made from *parhypatē hypatōn* to *tritē diezeugmenōn*, which is divided as the others on *parhypatē mesōn*. Therefore, [the third species] will contain the third species of the diatessaron and the third [species] of the diapente, since the semitone of the diatessaron is arranged on the third interval and [the semitone] of the diapente [is arranged] on the fourth [interval]. But you make the fourth species of the diapason from *lichanos hypatōn* to *paranētē diezeugmenōn*, dividing [it] by means of the *lichanos mesōn*. And the fourth species of the diapason will contain the first [species of] the diatessaron, but the fourth [species of] the diapente, since the semitone is arranged on the third interval; and in this way it is understood to differ enough from the first species. Truly, if the diapente is made from *lichanos mesōn* to *nētē synemmenōn*, it will be the same as the first

Carthusiensis conatus est probare fuisse solum quindecim nervos ab antiquis positos propter hoc, quod a re et a la mi re secundo in spatio collocantur; sic et reliquae chordae, quae post a la mi re veniunt, simili modo respondent. Nam si sic tertia species diapentis similis esset primae et quarta secundae, quoniam eodem modo lineas vel spatia tenent, non ergo dissimilis primae, sed eadem est quarta species diapentis, si sumat tetrachordum synemmenon. Hoc etenim modo chordam dividentes medio quatuor species diapason facimus differentes nec plures esse poterunt.

[species], and there is not any difference, since the semitone will be on the second interval just as it was in the first [species]; and because the diatessaron is similar in every way, there remains no difference between these species that are arranged in this manner except that someone may say that they differ because the diapente of the first species is made from line to line, such as *d h*, and the diapente of the fourth [species is made] from space to space, such as *g l*. And indeed, this knowledge is worthless, since the line or space does not show the difference in music,<sup>140</sup> as Brother Johannes Carthusiensis tried to prove: "There were only fifteen strings placed by the ancients, and it was on account of this that a re and the second a la mi re are arranged on a space; likewise also the remaining strings that come after a la mi re correspond in a similar manner."<sup>141</sup> For thus, if the third species of the diapente were similar to the first, and the fourth [species of the diapente] were [similar] to the second--since they occupy lines or spaces in the same manner--then the fourth species of the diapente would not be unlike the first, but would be the same if it took the *synēmmenōn* tetrachord. For in this

manner, dividing the string in half, we make four different species of the diapason, and there cannot be more.

Verum si [chordam] non per medium sed per tria dividamus, alias quatuor differentes faciemus, non quod omnino differant, sed quia diatessaron erit supra diapente et non inferius, ut quinta a lichano hypaton in paraneten diezeugmenon; quoniam diapente erit eadem, quam tenuit prima, supra ipsam intendatur diatessaron, et satis in hoc a prima differre videbitur. Sexta vero [diapason] erit ab hypate meson in neten diezeugmenon, quae diapente habebit eandem, quam habuit secunda, diatessaronque similiter, sed intensam supra diapente; et in hoc differt ab ipsa secunda. Septima vero species diapason fiet a parhypate meson [in] trite hyperboleon sumens diapente, quam tenuit tertia, intendensque supra ipsam diatessaron. Octavam facimus hoc modo: a lichano meson intendimus diapente eandem, quam tenuit quarta, in paranete [41] diezeugmenon, supra quam intendimus primam diatessaron in paranete hyperboleon. Si autem sumat synemmenon, erit sicut quinta. Propter hanc igitur differentiam coniuncti scilicet et disiuncti additur species

But if we do not divide the string in half, but rather into three parts, we will produce another four different [species]; not because they differ altogether,<sup>142</sup> but because the diatessaron will be above and not below the diapente, as [when] the fifth [species is made] from *lichanos hypatōn* to *paranētē diezeugmenōn*. Since it will be the same diapente that the first [species] held, let the diatessaron be laid above it, and it will appear to differ enough in this way from the first [species]. Indeed, the sixth [species] of the diapason will be from *hypatē mesōn* to *nētē diezeugmenōn*, which will contain the same diapente that the second [species] held, and similarly the same diatessaron, but laid above the diapente; and in this way it differs from the second [species]. But the seventh [species] of the diapason will be made from *parhypatē mesōn* to *tritē hyperbolaiōn*, taking the diapente that the third species held and laying it above the same diatessaron. We make the eighth species in this way: from *lichanos mesōn* we lay the same diapente that the fourth [species]

diapason octava. Quomodo  
autem ex his speciebus  
modi sive toni proveniant,  
nunc disseremus.

held to *paranētē*  
*diezeugmenōn*, above which  
we lay the first  
diatessaron to *paranētē*  
*hyperbolaiōn*.<sup>143</sup>  
However, if it takes the  
*synēmmenōn*, it will be  
like the fifth [species].  
Therefore, on account of  
this difference of the  
conjunct and the disjunct  
[tetrachord], the eighth  
species of the diapason is  
added. However, now we  
will discuss how the modes  
or, if you prefer, the  
tones may arise from these  
species.

CAPITULUM SECUNDUM

DE ORIGINE TONORUM

Ex diapason igitur speciebus, ut ait Boetius existunt qui appellantur modi, quos eosdem tropos vel tonos nominant. Sunt enim tropi constitutiones in totis vocum ordinibus vel gravitate vel acumine differentes. Constitutio vero est veluti modulationis corpus ex consonantiarum coniunctione consistens. Appellat enim Boetius hos modos nomine proprio distinctos. Unde dicit ipse: quo enim unaquaeque gens gaudet, eodem nomine nuncupatus est, ut dorius, quia Dorici eo gaudebant, sic appellatus est et ex prima specie diapente et prima specie diatessaron intensa supra diapente constat, scilicet *d h* et *h l*, quam diapason in quarto loco locatam diximus esse. Cum autem haec diapente habet sub se diatessaron remissa, idest *d a*, appellatur hypodorius, quia sub dorio collocatus est. Secundam vero speciem diapente cum secunda diatessaron intensa ut *e ♯ ♯ m*, appellat phrygium, quia apud Phrygios erat in usu. Sin vero secunda species diapente secundam sub se remittat diatessaron, hypophrygius dicitur ab ipso ut *e ♯ e b*

SECOND CHAPTER

CONCERNING THE ORIGIN OF THE TONES

Therefore, as Boethius says, from the species of the diapason arise what are called *modes*. They are also called *tropes* or *tones*. Certainly there are constitutions of the trope in all the orders of the notes that differ either in lowness or in highness.<sup>144</sup> But the constitution is as the body of the melody, existing within the conjunction of the consonants. For Boethius calls these distinct modes by a particular name. Whence, he himself says: "For in whatever [mode] a particular people finds pleasure, by that same name [the mode] is called,"<sup>145</sup> for example: *Dorian* because the Dorians delighted in it; thus it was called and consists of the first species of the diapente and the first species of the diatessaron placed above the diapente --that is, *d h* and *h l*-- which we have said is the diapason arranged on the fourth position. However, when this diapente has the diatessaron placed below it--that is, *d a*--it is called *Hypodorian*, because it is arranged below the Dorian. But the second species of the diapente



diatessaron remissa.  
 Tertiam vero diapente cum  
 tertia diatessaron intensa  
 appellat lydium, quod in  
 Lydia, unde Tusci trahunt  
 originem, maiori cum  
 gaudio frequentabatur ut *f k*  
 diapente, *k n*  
 diatessaron intensa. Quod  
 si diatessaron non supra  
 sed infra tenuerit  
 hypolydium nominabitur  
 ratione praedicta ut *f k*  
 diapente, *f c* diatessaron.  
 Quarta vero diapente  
 species cum prima  
 diatessaron intensa caret  
 nomine proprio. Sed quia  
 iuxta lydium proposita est  
 mixolydium est appellatus  
 ut *g l* diapente intensa, *l o*  
 diatessaron intensa.  
 Quod si diatessaron supra  
 se non intenderit, sed sub  
 se remiserit  
 hypermixolydium est  
 nuncupatus ut *g l*  
 diapente, [*g d*]  
 diatessaron remissa.

with the second [species]  
 of the diatessaron placed  
 above he calls *Phrygian*,  
 such as *e ♯ ♯ m*, because  
 it was in use among the  
 Phrygians. However, if  
 the second species of the  
 diapente yields the second  
 [species] of the  
 diatessaron below, such as  
 [the diapente] *e ♯* with  
 the diatessaron *e b* placed  
 below, he calls it  
*Hypophrygian*. And the  
 third [species] of the  
 diapente with the third  
 [species] of the  
 diatessaron placed above,  
 such as the diapente *f k*  
 with the diatessaron *k n*  
 placed above, he calls  
*Lydian*, because in Lydia  
 (from whom the Etruscans  
 draw [their] origin), it  
 was often performed with  
 great joy. But if one  
 holds the diatessaron not  
 above, but rather below,  
 such as the diapente *f k*  
 with the diatessaron *f c*,  
 it will be called  
*Hypolydian* for the reason  
 mentioned before.<sup>146</sup> And  
 the fourth [species] of  
 the diapente with the  
 first [species] of the  
 diatessaron placed above  
 lacks its own special  
 name. But since it was  
 placed next to the *Lydian*,  
 it is called *Mixolydian*,  
 [and] the diatessaron *l o*  
 is placed above the  
 diapente *g l*. But if the  
 diatessaron is not placed  
 above but below, it is  
 called *Hypermixolydian*,  
 such as the diapente *g l*  
 with the diatessaron *g d*  
 placed below.

Propter hanc igitur conformitatem tam in re quam etiam in nomine Graeci et etiam nostri antiqui tantum quatuor esse dicunt modos, quia species diapente quadruplex est. Et sic prima species appellatur protus graece, quod latine primus interpretatur; secunda deuterus graece, latine secundus; tertia tritus graece, latine tertius; quarta [tetrardus] graece, latine quartus.

Quando igitur protus diatessaron habet supra se, dicitur protus auctenticus, idest primus auctoralis sive magister. Sed si diatessaron sub se recipit auctentica carens elevatione, plagis protinuncupatur idest collateralis vel discipulus, ut dicunt moderni. Quod si utrumque habuerit, mixtus dicitur. Sic et de aliis tribus intellige. De hac tamen mixtione nunc superficiei tenus dicimus, quoniam tantum de ipsius diapason speciebus tractamus, ex quibus illi octo proveniunt toni. Quando vero isti toni suam quisque implent diapason, singuli perfecti sunt. Si vero deficient, sunt imperfecti; si superabundant, superflui.

Therefore, on account of this conformity (as much in theory as in name), the Greeks and also our ancient writers say there are only four modes, because the species of the diapente is fourfold. And thus, the first species is called *protus* in Greek, which translates as *primus* in Latin; the second [species is called] *deuterus* in Greek, *secundus* in Latin; the third [species is called] *tritus* in Greek, *tertius* in Latin; [and] the fourth [species is called] *tetrardus* in Greek, *quartus* in Latin.

[42] Therefore, whenever the protus has the diatessaron placed above [the diapente], it is called *protus auctenticus*,<sup>147</sup> --that is, "the first of authority" or, if you prefer, "the master." But if the diatessaron retreats below, lacking the authentic elevation, it is called *plagis protin*,<sup>148</sup> --that is, as the moderns say, "the collateral" or "the disciple." But if it possesses both, it will be called "mixed." Thus also, one can apply this to the other three [modes]. Nevertheless, now we speak superficially [and] only up to a certain point concerning this mixture, since we only treat the species of the diapason itself from which those eight tones arise. And when each of these

Non autem sunt plusquamperfecti, ut Ugolinus asserit et Johannes de Muris, quem ipse nimium laudat, ac Marchetus reprobatus a fratre Johanne. Ego enim dico tonum, qui implet suam diapason nec plus nec minus, esse perfectum. Qui autem excedit vel deficit, imperfectus est superfluitate aut diminutione. Istos enim octo modos moderni sic appellant, ut protus auctenticus dicatur primus, eius plagalis secundus, deuterus auctenticus tertius, plagalis quartus, tritus auctenticus quintus, eius plagalis sextus, tetrardus auctenticus septimus, eius plagalis octavus.

Sed videndum nobis est, quomodo tropus sive modus intelligatur, utrum scilicet simpliciter intendendo diapente, intendendo vel remittendo diatessaron, vel a prima voce idest ab inferiori usque ad superiorem per omnes intermedias vel alio

tones completes its diapason, each [of them] is perfect. But if they are wanting [in any way], they are imperfect; if they are overabundant, they are superfluous.

However, there are no pluperfects as Ugolino, [and] Johannes de Muris (whom the master [Guido] praises excessively), and also Marchettus (who was refuted by Brother Johannes<sup>149</sup>) claim. For I say that a tone which completes its own diapason, neither more nor less, is perfect. However, that which exceeds or is wanting is imperfect by [its] superfluity or by [its] diminution.<sup>150</sup> For the moderns name those eight modes in the following manner: the authentic protus is called *first*, its plagal [is called] *second*; the authentic deuterus [is called] *third*, its plagal [is called] *fourth*; the authentic tritus [is called] *fifth*, its plagal [is called] *sixth*; the authentic tetrardus [is called] *seventh*, [and] its plagal [is called] *eighth*.

But we should observe how the trope or, if you prefer, the mode is perceived--that is, whether or not one should proceed in the song by simply placing the diapente above, placing the diatessaron above or below, or [proceeding]

quodam modo sit  
 procedendum in cantu,  
 quoniam, sicut quatuor  
 differentes posuimus, ita  
 in cantu differentiam  
 teneant, erit necesse.

Qualitas enim unius in  
 modum historiae recto  
 tranquilloque fertur in  
 cursu. Alter vero  
 anfractibus et saltibus  
 concinitur, alter  
 garrulus. Alius autem  
 severus in sublime vocem  
 extollens audientium  
 animos elevat, alter vero  
 placidus [laetitiam]  
 indicans morum. Ex quo  
 notandum est, quod musicus  
 motus ab ipso modo proto  
 scilicet vel deuterio aut  
 alio qualitatem trahit et  
 differentiam. De his ergo  
 singulatim dicendum est.

from the first tone--that  
 is, from the lower [tone]  
 up to the higher [tone]--  
 through all the  
 intermediate [tones]--  
 or by another manner,  
 since just as we have  
 placed four different  
 [species], so it will be  
 necessary that they  
 maintain a difference  
 within the song.

For traditionally, the  
 quality of one is sung on  
 a straight and tranquil  
 course. Another is sung  
 with intricacies and  
 leaps, and yet another is  
 sung in a speech-like  
 manner. One is serious,  
 lifting the voice on high  
 [and] raising the souls of  
 the listeners, but another  
 is gentle, indicating a  
 joyfulness of character.  
 Accordingly, it should be  
 noted that the musical  
 affection draws out [its]  
 quality and difference  
 from the mode itself--that  
 is, from protus or  
 deuterus, or from another  
 mode. Therefore, these  
 things should be discussed  
 individually.

### CAPITULUM TERTIUM

IN QUO MUSICAE MUNDANAE,  
HUMANAE AC INSTRUMENTALIS  
PER TONOS CONFORMITAS  
OSTENDITUR

Ista etenim musica instrumentalis maximam habet conformitatem et similitudinem cum humana mundanaque. Cum humana quidem hoc modo: nam quatuor illi modi quatuor complexiones hominis movent. Unde protus flegmati dominatur, deuterus vero colerae, tritus sanguini, tetrardus autem segnior et tardior melancholiae. Protus ipse modus flegma movet a somno excitando et sic eius figura colore cristalino depingitur, quoniam coelum cristalinum ex aquis fertur esse factum, quod elementum flegma creat. Sed ponimus cristalinum et non aliarum aquarum colorem, quia non omnes homines flegmatici sonum suavem perpendere valent. Sed viri ingeniosi et sicut cristallum perspicui, qui, cum aliquantulum aut cibo sive crapula aut aliquo alio extrinsecus accidenti flegmate gravantur, soporem aut aliquam pigritiem inducente vel tristitiam proto modo personante alleviantur. At vero suus plagalis contrario modo se habet. Nam primus tonus, ut dicit

### THIRD CHAPTER

IN WHICH THE CONFORMITY OF  
MUSICA MUNDANA, MUSICA  
HUMANA, AND MUSICA  
INSTRUMENTALIS IS SHOWN  
BY MEANS OF THE TONES

[43] Indeed, this *musica instrumentalis* has the greatest conformity and similitude with [*musica*] *humana* and [*musica*] *mundana*. Certainly, with *musica humana* in this manner: for those four modes influence the affections of man. Whence, the *protus* [mode] is the master of phlegm, but the *deuterus* [is the master] of cholera, the *tritus* [is the master] of blood, and the slower, more sluggish *tetrardus* [is the master] of melancholy. The *protus* mode stirs up phlegm, awakening one from sleep; thus its appearance is depicted with a crystal color, since the crystalline sky is said to have been made from the waters--an element which creates phlegm. But we maintain that the color is that of crystal and not the color of other waters, because not all men are capable of weighing carefully the gentle sound of the phlegmatic. But when men of genius and those who are as transparent as crystal, who due to either food or intoxication, or some

Lodovicus Sancii, est mobilis et habilis ad omnes affectus, scilicet optabilis ut in canticis. Secundus vero est gravis et flebilis et miseris et pigris maxime conveniens ut in threnis et lamentationibus Ieremiae. Ex tristitia enim somnum ob flegmatis motionem provenire non dubitamus. Unde illud: erant oculi eorum gravati prae tristitia. Erat autem pythagoricis in morem, ut, cum diuturnas in somno curas resolverent, hypodorio uterentur, ut eis lenis et quietus somnus irreperet. Experrecti vero dorio stuporem somni confusionemque purgabant scientes nimirum, ut ait Boetius, quod tota nostrae animae corporisque compago musica coaptatione coniuncta est. Et ut sese corporis affectus habet, ita quoque pulsus cordis motibus incitantur. [44]

other outward cause become somewhat oppressed with phlegm (which induces drowsiness, or some laziness or sadness), they are lifted up by the protus mode resounding. But certainly, its plagal conducts itself in the opposite way. For the first tone, as Lodovicus of Sanchez says,<sup>151</sup> "is quick and suitable for all affections,"--that is, it is desirable [for such music] as in the canticums.<sup>152</sup> But the second [mode] is grave and tearful; it is especially appropriate for both the miserable and the lazy, as in the dirges and lamentations of Jeremiah. For we do not doubt that drowsiness arises from sadness on account of the affection of phlegm. Whence that [saying]: "Their eyes were heavy from sadness." However, it was customary for the Pythagoreans, when they [wished to] release [their] daily cares in sleep, to employ the Hypodorian in order that gentle and quiet slumber might creep upon them. But awakened by the Dorian, they purged the stupor and confusion of sleep, knowing without a doubt, as Boethius says, that "the whole structure of our soul and body is united by means of musical harmony."<sup>153</sup> And just as the affection of the body conduct itself, thus also the pulses of the heart

are stimulated by the affections.

Deuterus vero modus coleram movet incitando et ad iracundiam provocando. Inde ergo igneo colore depingitur, quia severus est et incitatus in cursu suo fortiores habens saltus, ut suo loco dicemus. Hic tonus hominibus superbis, iracundis et elatis, asperis et saevis maxime convenit, et eo gaudent. De hoc dicit Boetius: qui asperiores sunt, Getarum durioribus delectantur modis; qui vero mansueti, mediocribus. Boetius hoc tono dixit iuvenem [Tauromenitanum] incitatum, ita ut scortifores frangere accingeret, at hypodorio fuisse sedatum. Eius vero plagalis idest tonus quartus dicitur blandus, garrulus, adulatoribus maxime conveniens, quia in praesentia verbis blandis homines mulcent, sed in absentia pungunt. Ita hic tonus videtur esse lascivus sine venustate tamen et quandoque incitativus secundum mixturam.

The deuterus mode inspires anger, exciting and provoking [men] toward wrath. For that reason, it is depicted with the color of fire, because it is severe and swift in its course, having bolder leaps, as we will discuss in its proper place. This tone corresponds the most to arrogant, wrathful, exalted men--the harsh and the cruel--and they rejoice in it. Concerning this, Boethius affirms: "Those who are harsher, such as [the men] of Getae,<sup>154</sup> are delighted by the rougher modes; but those who are gentle [are delighted] by the moderate [modes]."<sup>155</sup> Boethius relates that a young man of Tauromenium<sup>156</sup> was so excited by this tone that he was ready to break down the doors of a brothel, but he was sedated with the Hypodorian [mode].<sup>157</sup> But its plagal--that is, the fourth tone--is described as "flattering, talkative," corresponding especially to those who flatter, because they charm people with flattering words in their presence but sting them in their absence. Thus, this tone seems to be licentious without [any] beauty; nevertheless, at times, according to the mixture, it [can be] exciting.

Tritus autem tropus  
 auctenticus sanguinis  
 dominium obtinuit. Ideo  
 tonus iste a beato  
 Augustino dicitur  
 delectabilis, modestus et  
 hilaris, tristes et anxios  
 laetificans, lapsos et  
 desperatos revocans. Ideo  
 sanguineo colore  
 depingitur. De hoc dicit  
 Boetius, quod Lydii, qui  
 maxime iucundi sunt et  
 laeti, hoc delectantur et  
 praesertim eorum mulieres,  
 a quibus Russi exorti  
 dicuntur, qui maxime  
 choreis et saltationibus  
 oblectantur. Eius vero  
 plagalis est pius,  
 lacrimabilis, conveniens  
 illis, qui de facili  
 provocantur ad lacrimas,  
 quia voces habet maxime  
 coadunatas, ut dicetur in  
 eodem.

Tetrardus vero  
 auctenticus partem habet  
 lasciviae et iucunditatis  
 partemque incitationis  
 varios habens saltus et  
 mores adolescentiae  
 repraesentans. Ideo  
 melancholiae dominium  
 tenet, quandoque scilicet  
 resistens, quandoque vero  
 adaugens et hoc secundum  
 commixtionem, quam cum  
 aliis facit, ut paulo post  
 dicetur. Propterea luteo  
 colore semicristalino  
 depingitur. Plagalis vero  
 eius suavis et moratus  
 atque morosus secundum

Moreover, the authentic  
 tritus trope maintained  
 dominion over blood. For  
 that reason, this tone is  
 described by the blessed  
 Augustine as "delightful,  
 modest, and joyful,  
 cheering the sad and the  
 anxious, calling back the  
 stumbling and the lost."  
 Therefore, it is depicted  
 by the color of blood.  
 Concerning this [matter],  
 Boethius says that the  
 Lydians, who are  
 especially cheerful and  
 joyful, are delighted by  
 this [mode], especially  
 their women. The  
 Russians, who are greatly  
 amused by [their] choral  
 and leaping-style dances,  
 are said to have  
 originated from them [the  
 Lydians]. But its plagal  
 is pious, lamentable;  
 appropriate to those who  
 are easily inclined to  
 tears, because it has the  
 most harmonious sounds, as  
 it will be discussed  
 later.

But the authentic  
 tetrardus [mode] has a  
 side of frivolousness and  
 of joyfulness, and a side  
 of excitement, possessing  
 various leaps and  
 representing the character  
 of adolescence. Therefore,  
 it maintains dominion over  
 melancholy--that is,  
 sometimes resisting and  
 sometimes increasing; and  
 this [is] according to the  
 mixture that it makes with  
 the others, as it will be  
 discussed a little later.  
 For this reason, it is  
 depicted by a yellowish



modum discretorum, ut  
Ambrosius refert. Movent  
igitur septimus et octavus  
melancholiam modulo suo  
tristes homines atque  
remissos ad medium  
adducendo, videlicet  
auctenticus incitando,  
plagalis vero  
[laetificando].

Ex his igitur patet  
musicae instrumentalis et  
humanae convenientia.  
Quod autem musica mundana  
cum instrumentali maximam  
habet conformitatem, patet  
habita Tullii  
comparatione. Nam a  
proslambanomeno usque ad  
mesen disponitur ordo  
planetarum cum firmamento,  
ita ut Luna sit  
proslambanomenos,  
Mercurius hypate hypaton,  
Venus parhypate hypaton,  
Sol lichanos hypaton, Mars  
hypate meson, Jupiter  
parhypate meson, Saturnus [45]  
lichanos meson, coelum  
stellatum mese.

Si igitur Luna  
proslambanomenos, Sol vero  
lichanos hypaton, liquet  
istos duos planetas in  
diatessaron specie cantus  
collocandos atque ideo  
Lunam hypodorium, Solem  
vero dorium modum tenere.  
Ex quo liquido constat  
Lunam flegmatica et humida

color with a hint of  
crystal. But its plagal,  
as Ambrose relates, "is  
gentle, mannered, and  
slow," in the manner of  
distinguished [men].  
Therefore, the seventh and  
eighth [modes] arouse  
melancholy with their  
melody by leading sad and  
dejected men to a more  
moderate mood; clearly the  
authentic excites, the  
plagal gladdens.

Accordingly, from these  
things, the correspondence  
between *musica*  
*instrumentalis* and *musica*  
*humana* is clear. However,  
it is clear from the  
comparison conducted by  
Tullius<sup>158</sup> that *musica*  
*mundana* holds the greatest  
conformity with *musica*  
*instrumentalis*. For the  
order of the planets and  
the firmament is arranged  
from *proslambanomenos* up  
to *mesē* in such a manner  
that the moon is  
*proslambanomenos*, Mercury  
is *hypatē hypatōn*, Venus  
is *parhypatē hypatōn*, the  
sun is *lichanos hypatōn*,  
Mars is *hypatē mesōn*,  
Jupiter is *parhypatē*  
*mesōn*, Saturn is *lichanos*  
*mesōn*, [and] the starry  
sky is *mesē*.<sup>159</sup>

Therefore, if the moon  
is *proslambanomenos*, but  
the sun is *lichanos*  
*hypatōn*, it is evident  
that these two planets  
should be arranged on the  
diatessaron species of the  
song; and therefore, the  
moon holds the Hypodorian  
mode, but the sun holds

homini adaugere, Solem vero ipsa humida et flegmatica desiccare. Inde ergo isti duo planetae, quia principalia et luminaria sunt, primum modum regunt cum secundo, hoc est protum autenticum et plagalem proti. Nam dorius primus autenticorum recte Soli comparatur, quia principatum tenet inter omnes modos sicut Sol inter omnes planetas. Nam omnes exhalationes terrestres et vapores marini solaribus radiis elevantur, ex quibus impressiones meteoricae creantur. Convenientia igitur inter Solem et Lunam clara est. Ista lucet nocte, ille noctem fugat; hypodorius somnum ducit, dorius vero expellit. Concordant ergo et loco et conformitate in diatessaron consonantia.

Mercurius vero hypophrygium reget. Nam iste modus adulatorum est, qui viciosos et sapientes probosque aequo modo collaudant et ad utramque partem facile convertuntur, hoc est ad lamentum et ad laetitiam,

the Dorian. Accordingly, it is well known that the moon increases the phlegm and humidity of man, but the sun dries up that very humidity and phlegm. Therefore, these two planets--since they are principals and luminaries --govern the first mode along with the second [mode]--that is, the authentic protus and the plagal of the protus. Indeed, the Dorian (the first of the authentic [modes]), is properly compared to the sun, because it has pre-eminence among all the modes just as the sun [has dominion over] all the planets. For all the terrestrial exhalations and the vapors of the sea are raised by the solar rays, from which the meteoric assaults are created. Therefore, the correspondence between the sun and the moon is clear: the latter shines in the night, the former flees the night; the Hypodorian induces sleep, but the Dorian banishes it. Consequently, they agree both in location and in conformity with the consonance of the diatessaron.

And Mercury will govern the Hypophrygian. For this is the mode of the flatterers, who praise both the wise, honorable men and the corrupt equally, and who are easily turned to either direction--that is, to

ad incitationem et ad sedationem, qualis est natura Mercurii, qui cum bonis bonus et cum malis est pessimus. Mars vero phrygium tenet, qui totus colericus est et iracundus; nam omnia mundi bona iracundia sua conatur destruere. Iunctus ergo Mercurius cum eo aut in aspectu quodam ita malus est sicut ipse Mars. Nam ille ense vulnerat, iste vero lingua.

Hypolydius vero ipsi Veneri est attributus, quae fortuna est, feminea tamen, quia provocat ad lacrimas pias quandoque. Lydius vero Iovi, fortunae majori, qui homines sanguineos et benevolos creat mitesque atque iocundos, recte comparatur, cum semper gaudium notet. Convenientia cum Venere; in diatessaron atque in bonitatis fortuna concordant nec differunt nisi vocum differentia. Inferior enim vox non ita dulcis est sicut acuta neque suavis.

Mixolydius vero attribuitur Saturno, quoniam circa melancholiam versatur. Hypermixolydius vero totaliter ponitur

lamentation and to gladness, to excitation and to sedation. Such is the nature of Mercury, who is good with good people and extremely bad with bad people. But Mars, who is entirely full of anger and wrath, is master of the Phrygian [mode]; for he tries to destroy all that is good in the world with his wrath. Therefore, Mercury, united with him, is just as bad (or at least in a certain respect), as Mars himself. For the former wounds with the sword, but the latter with the tongue.

But the Hypolydian is attributed to Venus herself, who is fortune; nevertheless, it is feminine because sometimes it moves one to pious tears. But the Lydian is properly compared to Jupiter, of greater fortune, who creates sanguine and benevolent men [of] gentle and pleasant [disposition], since [this mode] always denotes [the quality of] joy. Its correspondence is with Venus, harmonizing on the diatessaron and in good fortune, and they do not differ except in the difference of the sounds. For the lower sound is not as sweet nor as gentle as the higher sound.

But since the Mixolydian deals with melancholy, it is attributed to Saturn. However, the Hypermixolydian is

castalinus, quoniam coelo attribuitur stellato sive firmamento. Nam hic modus super omnes alios habet quandam insitam dulcedinem cum venustate et immunis est ab omnibus qualitatibus et omni negotio conveniens. Guido et Oddo dicunt ipsum gloriam repraesentare nec multum descendunt ut dicunt: per septem aetates discurrentes laboramus, in octava vero requiem ab omnibus laboribus expectamus.

Ex his ergo patet musicae humanae et mundanae cum instrumentali convenientia. Sed hoc superficiei tenus dictum est, in secundo enim et tertio libro multa sumus dicturi. Haec autem hic posuimus, ut interim animum lectoris assuefaciamus et illi ignorantiam negationis auferamus. Patet igitur ex dictis comparationibus et auctoritatibus unumquemque tonum diversam ab altero qualitatem habere.

Quod si adhuc idem certius probare libet auctoritate et comparatione per id, a quo musica traxit originem, ut

established entirely in the realm of the divine, since it is attributed to the starry sky or, if you prefer, to the firmament. For this mode, above all others, has a certain innate sweetness coupled with beauty, and it is devoid of all the qualities that correspond to every worldly affair. Guido and Odo say that it represents glory, and they do not yield much when they say: "We toil, running about through seven ages, but in the eighth we expect rest from all [our] labors."

[46] Therefore, the correspondence of *musica humana* and *musica mundana* with *musica instrumentalis* is clear from these things. But this has been discussed superficially; truly we will have much [more] to say [about it] in the second and the third book. However, in the mean time, we have placed this [discourse] here in order that we may accustom the mind of the reader [to these things] and remove from him the ignorance of negation. Therefore, it is clear from the comparisons and authorities discussed that each tone has a quality which distinguishes it from another.

But if, in addition, it is agreeable to prove the same with greater certainty than through authority and comparison

Hesiodo placet, musas  
 novem filias Iovis et  
 memoriae taliter  
 disponemus, ut eam, quae  
 bella narrat, Marti  
 tradamus et sic tono  
 phrygio, ita et eam, quae  
 tragoedias sive caedes  
 commemorat, Saturno ac per  
 hoc mixolydio, quae vero  
 laetitiam indicat, Veneri.  
 Et sic unamquamque musarum  
 locis debitis collocabimus  
 secundum Martiani et  
 Macrobbi auctoritates.  
 Sic et unicuique versum  
 imponemus, per quem  
 convenientia cum musica  
 denotetur. Disponemus  
 ergo eas sic, ut Thalia  
 silentium teneat sicut  
 Terra. Deinde Clionem  
 Lunae attribuemus, sed  
 Calliopen Mercurio  
 dicabimus ac Terpsichoren  
 Veneri affigemus.  
 Melpomenen Sol  
 decolorabit, Erato Martem  
 incitabit, [Euterpen]  
 Jupiter benevolam facit et  
 laetam, Polyhymniam vero  
 Saturnus contristat.  
 Ultimae vero Euraniae  
 coelum stellatum dabit  
 decorem ac requiem. Cum  
 igitur a prima idest a  
 silentio ad ultimam  
 circulum facimus et ad  
 secundam totum concentum  
 remittentes recurrimus,  
 hypodorium procreamus.  
 Quemadmodum igitur de  
 istis fecimus, de reliquis  
 faciendum esse arbitramur,  
 ita quod spiras facere non  
 cessemus, donec ad ultimam  
 musam perveniamus, a qua  
 superflua, si fiat, erit  
 intentio, quoniam  
 replicatio prioris est, ut  
 Rogerius Caperon asserebat

then by means of that from  
 which music has drawn  
 [its] origin--as  
 Hesiod<sup>160</sup> prefers to do--  
 we will arrange the nine  
 Muses, daughters of  
 Jupiter and the goddess of  
 memory,<sup>161</sup> in such a way  
 that the one who relates  
 wars is entrusted to Mars  
 and thus, to the Phrygian  
 tone; likewise also [let  
 us entrust] the one who  
 relates tragedies or, if  
 you prefer, massacres to  
 Saturn, and by this means  
 to the Mixolydian [tone];  
 but [let us appoint the  
 one] who values gladness  
 to Venus. And thus we  
 will arrange each one of  
 the Muses in their proper  
 places according to the  
 authorities of Martianus  
 and Macrobbius.<sup>162</sup>  
 Likewise also we will  
 assign a verse to each one  
 by which a correspondence  
 with music may be  
 indicated. Therefore, we  
 will arrange them so that  
 Thalia will hold silence  
 just as the earth. Then  
 we will attribute Clio to  
 the moon, but we will  
 dedicate Calliope to  
 Mercury, and then we will  
 assign Terpsichore to  
 Venus. The sun will  
 bronze Melpomene, Erato  
 will stimulate Mars,  
 Jupiter makes Euterpe  
 benevolent and glad, but  
 Saturn makes Polyhymnia  
 sorrowful. And the starry  
 sky will give glory and  
 rest to the last Muse,  
 Urania.<sup>163</sup> Therefore,  
 when we make a circle from  
 the first--that is, from  
 silence--to the last, and

esse crisim vocem illam  
 supra neten hyperboleon  
 additam et coruph, quae  
 sub proslambanomeno. Ipse  
 etenim, credo, in die  
 [haeretico] artem totam  
 composuerit, et cum ad  
 coruph pervenit, ipse cum  
 tota corrui. Namque  
 probatum est istam musam  
 silentium, aliam vero  
 ultimam vocem altiorem  
 tenere. Nos vero caveamus  
 ab antiquitate auctore  
 aliquid transvertere.  
 Erit igitur prior vox  
 proslambanomenos, ultima  
 vero nete hyperboleon, in  
 quorum omnium exemplum  
 subscriptam subieciimus  
 figuram.

Ex hac igitur figurae  
 dispositione patet, quare  
 tropi dicti sint quia unus

when we return to the  
 second [mode]--lowering  
 the whole concentus--we  
 produce the Hypodorian.  
 Therefore, just as we have  
 done with these things, we  
 think it should be done  
 with the rest in such a  
 manner that we will not  
 stop making spirals until  
 we arrive at the last  
 Muse. [And] if this is  
 done, there will be a  
 superfluous stretching,  
 since there is a  
 replication of the first,  
 as Roger Caperon claimed  
 that the note *crisis*  
 [should be] added above  
*nētē hyperboleōn* and [the  
 note] *coruph* [should be]  
 added below  
*proslambanomenos*. Indeed,  
 I believe he composed all  
 [his] art in a heretic  
 day, and when he arrived  
 at [the concept of]  
*coruph*, he was destroyed  
 with all his art. For it  
 has been proven that this  
 [first] Muse occupies  
 silence, but that another  
 --the last [Muse]--  
 occupies the highest  
 sound. But let us take  
 care to carry over  
 something of antiquity  
 from the author.  
 Accordingly, the first  
 sound will be  
*proslambanomenos*, but the  
 last [sound] will be *nētē*  
*hyperbolaiōn*. [And] we  
 have presented the figure  
 written below as an  
 example of all of these  
 things [see Figura 7].

Therefore, it is clear  
 from this arrangement of  
 the figure why they have

scilicet ex alio  
 procreatur. Namque  
 istorum sic ordo procedit,  
 ut, si quis primam speciem  
 diapason a proslambanomeno  
 in mesen cum his, quas  
 extremae voces medias  
 claudunt, in acumen  
 intendat tono hypateque  
 hypaton eodem tono  
 [attenuet] ceterasque  
 omnes tono faciat  
 acutiores, acutior totus  
 ordo proveniet quam fuit,  
 priusquam toni susciperet  
 intensionem. Erit igitur  
 tota constitutio acutior  
 effecta hypophrygius  
 modus, et in aliis quidem  
 similis est in acumen  
 intensionemque processus.  
 Non ergo tropi dicti sunt,  
 quod in gravibus  
 incipientes in acutas se  
 transferunt voces et ad  
 finem recurrentes in  
 gravibus finiunt, ut  
 placuit Johanni sancto.  
 Aliqui enim sunt, qui non  
 in gravibus sed in acutis  
 incipiunt, ut paulo post  
 [dicemus] de unoquoque  
 singulatim pertractantes.

Primum tamen quaedam  
 omnibus generalia, per  
 quae cantus possit  
 cognosci, incognitus si  
 sit, corrigi, si minus  
 bene compositus exstat et

been called *tropes*,  
 namely, because one is  
 naturally produced from  
 another. For the order of  
 these things proceeds in  
 such a manner that if one  
 raises the first species  
 of the diapason from  
*proslambanomenos* to *mesē*--  
 including those middle  
 notes which are enclosed  
 by the extremes--into the  
 high [range] by a tone,  
 and stretch the *hypatē*  
*hypatōn* by the same  
 tone [in order to] make  
 all the rest higher by a  
 tone, the entire series  
 will become higher than it  
 was before it submitted to  
 the raising of the tone.  
 Therefore, the entire  
 arrangement--once it has  
 been made higher--will be  
 the Hypophrygian mode, and  
 certainly in the others  
 the process into the high  
 [range] and [of] elevation  
 is similar. Consequently,  
 they were not called  
*tropes*, because beginning  
 on the low notes they  
 transfer themselves to the  
 high notes, and returning  
 to the end they finish on  
 the low [notes], as Saint  
 John preferred to do.<sup>164</sup>  
 For there are some that do  
 not begin on the low, but  
 rather on the high  
 [notes], as we will  
 discuss a little later,  
 treating each one [of  
 them] individually.

Nevertheless, for the  
 benefit of everyone, let  
 us first discuss certain  
 generalities, by means of  
 which the song can be  
 learned if it is not

de novo alium recte  
componere scire possimus,  
disseramus. [Figura 7]

[47] known, corrected if it  
appears improperly  
composed improperly, and  
we can learn how to  
properly compose another  
[song] anew.





SECUNDA PARS  
IDEST CONTRAPUNCTUS

TRACTATUS PRIMUS

CAPITULUM PRIMUM

IN QUO NOTITIA  
CONSONANTIUM VOCUM ET  
DISSONANTIUM PONITUR

SECOND PART  
THAT IS, COUNTERPOINT

FIRST TREATISE

FIRST CHAPTER

IN WHICH A KNOWLEDGE  
OF THE CONSONANT  
AND DISSONANT NOTES  
IS ESTABLISHED

Taliter hucusque  
prosecuti fuimus, ut  
tantum de vocibus  
successive prolatis aliqua  
loqueremur. Nunc autem,  
quae illarum duae simul  
pluresve percussae sive  
cantatae consonent vel  
dissonent, breviter  
explicetur. Qualiter  
autem consonantia aut  
dissonantia aurem  
ingrediatur et utrum vera  
sit Platonis opinio aut  
Nicomachi, quoniam  
speculativa est, in  
secundo libro iuxta  
ingenii nostri vires  
declarare et diffinire  
conabimur. Nunc autem,  
quoniam practicos paulatim  
ad doctrinam hanc  
attrahere procuramus,  
breviter et quasi per  
modum corollarii ea, quae  
ad practicam pertinent,  
explicemus.

Dictum est totum corpus  
musicae unam esse  
diapason, quae vocibus  
octo constat. Si igitur  
has octo voces invicem

[49] Up to this point, we  
have proceeded in such a  
manner that we have only  
spoken to some degree of  
the notes written in  
succession. Now it will  
be briefly explained which  
of those two or more  
[notes] sound consonant or  
dissonant when they are  
plucked or sung at the  
same time. However, since  
it is speculative, in the  
second book we will try to  
explain and define  
according to the powers of  
our intellect how  
consonance and dissonance  
enter the ear, and whether  
or not the opinion of  
Plato or Nicomachus is  
true. But now, since we  
endeavor to gradually  
attract the practicing  
musicians to this  
teaching, we will briefly,  
and as if by way of a  
corollary, explain that  
which pertains to  
practice.

It has been said that  
the entire body of music  
is [made up of] a single  
diapason that consists of  
eight notes. Therefore,

referendo declaremus,  
 sufficiet. Per modum  
 igitur doctrinae scias  
 voces aequales concordare,  
 idest unisonum. Secunda  
 dissonat cum prima, tertia  
 consonat primae, quarta  
 sola cum prima discordat.  
 Concordat autem quinta et  
 sexta, septima discrepat,  
 aequisonat per optime  
 octava. Quemadmodum  
 igitur fecimus ad primam  
 omnes alias referendo, sic  
 ad secundam et tertiam et  
 ad reliquas, ita ut tertia  
 dissonet cum secunda,  
 quarta vero consonet; et  
 ita de ceteris hoc modo  
 ratus ordo monstrabit.

Ut autem inconsonum  
 sciamus evitare, consonum  
 vero eligere, dicemus  
 discrepantes voces esse  
 tres, videlicet secundam,  
 quartam, septimam; secunda  
 vero maior aut minor, quia  
 tonus aut semitonium;  
 quarta similiter, quia  
 diatessaron aut tritonus;  
 septima eodem modo, quia  
 heptas maior aut minor.  
 Sed concordantes sunt  
 unisonus, tertia, quinta,  
 sexta, octava. De unisono

it will suffice if we  
 explain these eight notes  
 in relation to one  
 another.<sup>165</sup> Accordingly,  
 by means of [our]  
 teaching, you may know  
 that the equal notes--that  
 is, the [notes of the]  
 unison--agree. The second  
 [note] is dissonant with  
 the first, the third is  
 consonant with the first,  
 [and] the fourth alone is  
 discordant with the first.  
 However, the fifth and  
 sixth [notes] are  
 concordant [with the  
 first], the seventh is  
 dissonant [with the  
 first], [and] the eighth  
 sounds equal in the most  
 perfect way. Therefore,  
 just as we did to the  
 first [we should do] in  
 relation to all the  
 others: thus to the  
 second and the third, and  
 to the rest, so that the  
 third sounds dissonant  
 with the second, but the  
 fourth sounds consonant;  
 and thus the established  
 order will serve as an  
 example concerning the  
 rest in this manner.

However, so that we may  
 know how to avoid  
 dissonance and to choose  
 consonance [instead], we  
 will say that the  
 disagreeing voices are  
 three, namely: the  
 second, the fourth, [and]  
 the seventh; indeed, the  
 major and minor second,  
 because [it is either] a  
 tone or a semitone;  
 similarly the fourth,  
 because [it is either] a  
 diatessaron or a tritone;

tamen nulli dubium, quia  
idem a se ipso non  
differt. Nec propterea  
inter consonantias  
computatur, quia  
consonantia non est  
similium sed dissimilium  
in unum redacta concordia  
aut dissimilium sonus  
permixtus et conformis  
suaviterque auribus  
accidens, dissonantia vero  
aspera, ut ait Boethius, et  
iniucunda collisio, quia  
uterque integer nititur  
pervenire nec alter alteri  
cedit, ut latius in  
theoricis demonstrabimus.

[and] the seventh for the  
same reason, because [it  
is either] a major or  
minor heptas. But the  
concordant voices are the  
unison, the third, the  
fifth, the sixth, [and]  
the octave. Moreover,  
there is no doubt for  
anyone concerning the  
unison, since the same  
does not differ from  
itself. For that reason,  
it is not reckoned among  
the consonances, because a  
consonance is not a  
concord of similar things  
but of dissimilar things  
made into one or, a sound  
of dissimilar things mixed  
and put together, falling  
sweetly on the ears, but a  
dissonance, as Boethius  
says, "is a harsh and  
unpleasant collision,  
since both [of the notes]  
endeavor to arrive whole,  
and yet one does not yield  
to the other,"<sup>166</sup> as we  
will demonstrate more  
fully in [the course of  
our] speculations.

Est tamen unisonus in  
musica sicut unitas in  
arithmetica principium  
numerorum, fons et origo  
consonantiarum. Unisono  
igitur praetermisso  
dicemus species  
concordantes quatuor esse,  
scilicet: tertiam,  
quintam, sextam et  
octavam, quarum duae sunt  
perfectae, quinta scilicet  
et octava, imperfectae  
vero tertia et sexta.  
Imperfectae enim dicuntur,  
quoniam variables sunt,  
quia per additionem  
semitonii vel

Nevertheless, the unison  
is the source and origin  
of the consonants in music  
just as the units are the  
foundation of the numbers  
in arithmetic.<sup>167</sup>

Therefore, passing over  
the unison we will say  
that there are four  
concordant species,  
namely: the third, the  
fifth, the sixth, and the  
octave, of which two are  
perfect--that is, the  
fifth and the octave--but  
two are imperfect--that  
is, the third and the  
sixth. For they are

subtractionem consonantiam non mutant, sed semper bene sonant, hoc est tertia ditonalis vel semiditonalis. Sed differt in hoc, quia illa dicitur maior, ista vero minor. Sic de sexta dicendum; diapente cum tono vel cum semitono est maior minorve. Octava vero nec augmentum recipit nec decrementum, quin dissonet et discordet, quia semper quinque tonos et duo semitonia vult habere nec plus nec minus; ideoque perfectissima vocatur et aequisona, quia aequae videtur sonare cum prima sicut unisonus. Unde si vir cum puero psallat, in unisono videntur et tamen sunt in octava. Quinta vero si augmentum vel decrementum recipiat semitonii, vel in sextae transit proprietatem vel in tritoni duritiem ac discrepantiam convertitur, qua propter perfecta quidem, sed non ut octava. Alias autem rationes mathematicas in theoreticis dicemus, quas practici non multum curarent, si hic poneremus, nec etiam recipere potuissent, quoniam oporteret illos prius scire proportiones et proportionalitates. Assentiant igitur rationibus dictis, quoniam omnino circa practicam versantur, et ita lactinia comedentes ad cibos duriores adducentur.

called *imperfect* since they are variable,<sup>168</sup> because they do not change [their quality of] consonance by the addition or subtraction of a semitone, for they-- that is, the ditonal or semiditonal third--always sound well.<sup>169</sup> But they differ in this, that the former is called *major*, but the latter [is called] *minor*. Thus it should be said concerning the sixth: the diapente with a tone or a semitone is a major or minor [sixth]. But the octave does not receive augmentation or diminution without sounding dissonant and discordant, since it always desires to have five tones and two semitones--neither more or less; and therefore, it is called the most perfect and equal in sound, because it seems to sound equal with the first [note] just as the unison [does]. Whence, if a man sings with a boy, they also seem to be in unison, yet [they are singing] at the octave. But if the fifth receives augmentation or diminution of a semitone, either it passes into the quality of the sixth or it is turned into the dissonance and harshness of the tritone; indeed, for that reason it is perfect, but not as [perfect] as the octave. However, in [our] speculations we will discuss other mathematical reasons, which practicing musicians would not pay

much attention to if we were to place them here, nor could they even understand [them], since it would be necessary for them first to become acquainted with ratios and proportions.<sup>170</sup> Therefore, let them agree to the reasons mentioned, since they deal exclusively with practice, and thus while consuming lactations,<sup>171</sup> they will be led to more solid food.

His igitur sic cognitis, si a quacumque specierum sive consonantiarum octavam intenderimus vel remiserimus, eandem speciem sine dubio procreabimus, quoniam saepe dictum est totum esse concentum diapason. Quidquid igitur de prima, et de eius octava similiter erit. Differt tamen in hoc, quia acutius aut gravius sonat. Erit igitur octava sicut fons, nona sicut secunda, decima veluti tertia, undecima sicut quarta, duodecima velut quinta, tertia decima sicut sexta. Sed decima quarta discrepat ut septima, decima quinta aequisonat sicut octava. Eodem modo a decima quinta usque ad vicesimam secundam faciendum est. Et sic tantum quatuor species sunt differentes consonae, quae per diapason augmentum saepius replicantur. Vocabuntur autem primae simplices, aliae compositae, tertiae decompositae, ut patet in figura.

Therefore, with these things having been understood in this manner, if we ascend or descend an octave from any of the species or, if you prefer, the consonants, without doubt we will produce the same species, since it has often been said that the diapason is the entire concentus. Consequently, whatever [happens] in regard to the first will [occur] in a similar manner at its octave. Nevertheless, it differs in this, that it sounds higher or lower. Therefore, the octave will be as the source, the ninth as the second, the tenth as the third, the eleventh as the fourth, the twelfth as the fifth, [and] the thirteenth as the sixth. But the fourteenth sounds dissonant like the seventh, [and] the fifteenth sounds equal like the octave. In the same manner, it should be done from the fifteenth up to the twenty-second. And

thus there are only four different consonant species that are frequently replicated by increasing [beyond] the diapason. However, the first [octave] will be called *simple*, the second [will be called] *compound*, [and] the third [will be called] *decompound*,<sup>172</sup> as it appears in the figure.<sup>173</sup>

Itaque si species creans dissona est vel perfecta aut imperfecta, et procreata. Ista autem procreatio consonantiarum secundarum est; quandocumque est altior cantu plano species, a qua intenditur octava, vel sub eodem, quando remittitur. Sed quid, si fiat e converso, hoc est, si a specie inferiori intendatur diapason vel a superiori remittatur? Dicendum, quod a tertia sexta provenit et a sexta tertia et a quinta quarta; ideoque tertia et sexta eiusdem sunt condicionis, quoniam imperfectae. Sed quinta et quarta maxime conveniunt, de quo in theoricis nostris. Sed in hoc volumine, quando de pluribus vocibus tractabimus, dicturum me polliceor. Ad praesens autem sit satis scire, [quod] quantum quinta habet perfectionis, tantum quarta ad dissonantiam accedit et a consonantiis recedit. Sicut, quando sexta ex tertia procreatur et e contra, si creans est maior, creata provenit

Therefore, if a dissonant species [that is] creating is either perfect or imperfect, so too is the [species that is] produced. However, this procreation of the secondary consonances is whenever in plain song there is a higher species, from which it is raised by an octave, or whenever it is lowered [an octave] below in the same manner. But what if it is done in the opposite way--that is, what if it is raised a diapason from a lower species or it is lowered [a diapason] from a higher [species]? It should be said that the sixth is produced from the third and the third is produced from the sixth; the fourth originates from the fifth,<sup>174</sup> and therefore, the third and the sixth are of the same nature since they are imperfect.<sup>175</sup> But the fourth and the fifth correspond the most,<sup>176</sup> which [we will discuss] in our speculations. And I promise that I am going to discuss it in this volume

[51]

minor et e converso, idem quoque de dissonantiis, quia a secunda septima formatur et e contra. Sed si maior est creans, erit minor creata et e contra.

when we deal with more notes. However, for the present, it is enough to know that as the fifth holds perfection, so the fourth approaches toward dissonance, and retreats from consonance. Thus, when the sixth is created from the third and vice-versa, if [that which] is creating is major, [that which] is created appears as minor and vice-versa; the same also [occurs] with the dissonances, since the seventh is formed from the second and vice-versa. But if [that which] is creating is major, [that which] is created will be minor and vice-versa.

Nunc autem, quoniam super datum cantum organizare curamus, quasdam regulas breves antiquorum prius inseremus, quarum prima est:

However now, since we are attending to making organum above a given song, we will first of all introduce some brief rules of the ancients, the first of which is:

Inchoandum et finiendum est in specie perfecta aut in unisono.

(1) [The song] should begin and end on a perfect species or on the unison.

Secunda: Non unam post aliam similem facere nec unisonum licet.

(2) One is not allowed to make a similar [species] or a unison one after another.

3a: Imperfectae duae aut plures unam post aliam possunt dari.

(3) Two or more imperfect [consonances] are able to be given one after another.

4a: Si cantus continuetur in eodem sono per duas voces aut plures, organum in eodem sono non

(4) If a song continues for two or more notes on the same sound, the organum [should] not rest



quiescat, sed per diversa loca mutetur.

Quinta regula: Sexta maior coniungit ad octavam, minor vero disiungit ad quintam. Sic et 3a maior ad quintam disgregat, minor autem ad unisonum adducit.

6a: Si tenor ascendit, contrapunctus descendere procuret.

Prima enim regula sic declaratur: Cum incipimus organizare, ponamus vocem in quinta vel in octava aut in aliqua alia ab istis composita secundum vocis commoditatem et etiam in unisono; et cum finimus, hoc idem faciendum. Hoc autem est propter hoc, quia aliae consonantiae non sunt tantae perfectionis, quantae sunt istae. Ideo in principio meliorem facere et in fine debemus, in medio vero imperfectiores interserere licitum est.

Secunda regula intelligitur sic: Non debemus dare, hoc est bis perfecte consonare cum tenore ascendente vel descendente simili specie perfecta, quoniam tunc idem processus videretur.

on the same sound, rather it [should be] moved through different steps.

(5) The major sixth ascends to the octave, but the minor [sixth] descends to the fifth. Thus also the major third ascends to the fifth; however, the minor [third] leads to the unison.

(6) If the tenor ascends, let the counterpoint descend.

For the first rule is explained in this way: when we begin to make organum, let us place a note on the fifth or on the octave, or on some other [note] composed from these according to the convenience of the note, and also on the unison; and when we end, the same thing should be done. Moreover, this is [done] for this reason because the other consonants are not of as much perfection as these are. Therefore, we should do [this] at the beginning and at the end in order to make [the song] sweeter;<sup>177</sup> but certainly one is permitted to insert the more imperfect [consonants] in the middle.

The second rule is understood in this way: we should not give--that is, harmonize--two times in a perfect manner with the tenor ascending or descending by a similar perfect species, because

Nam si tenor *d c* et organum *l k* in octava, eadem vox videretur esse; sic et de unisono. Etiam si dicatur *h g*, prohibetur eadem ratione, non quod omnimoda sit similitudo, sed quia magna. *Tristanus* vero de *Silva* in quinta, ut ait, non prohibetur taliter, quoniam potest fieri quinta post quintam, dum tamen una sit semidiapente, alia vero diapente, sicut reperimus in cantilena *Sois emprantis* et in aliis antiquioribus. Sed hoc non est concedendum in integris, bene tamen in fractis, idest in diminutione notularum, de qua paulo post dicemus. Dissimiles tamen perfectae possunt fieri permultae, hoc est post quintam octava aut post octavam quinta hoc modo, ut si tenor *d e c d*, organum vero *l k h*; et sic in aliis.

Tertia regula sic est intelligenda: Si tenor ascendit *c d e*, organum poterit eodem modo ascendere *e f g*. Idem in descensu et eodem modo cum

then it would seem to be the same progression. For if the tenor is *d c* and the organum is *l k* at the octave, it will seem to be the same note; likewise also concerning the unison.<sup>178</sup> Also, if *h g* is sung, it is prohibited for the same reason, not because there is similitude in every way, but because [the resemblance] is great. For as *Tristan de Silva* says, "It is not prohibited in such a manner on the fifth, since a fifth after a fifth can be made as long as one is a semidiapente and the other is a diapente, as we find in the song *Sois emprantis* and in other more ancient [songs]." But this should not be allowed in whole [note values]; nevertheless, it is acceptable in divided [note values]--that is, in the diminution of the notes--which we will discuss a little later. Nevertheless, many dissimilar perfect [consonances] are able to be made--that is, the octave after the fifth or the fifth after the octave--in the following way: if the tenor is *d e c d*, the organum will be *l k h*, and likewise in other [octaves].

The third rule should be understood in this way: if the tenor ascends *c d e*, the organum will be able to ascend in the same way, *e f g*. The same

sexta similiter in aliis locis. Non tamen ex hoc arbitretur organizans, si tenor steterit per duas aut plures notas in eodem sono, duas aut plures in eodem loco imperfectas cum organo [fieri] posse. Et sic declaratur regula quarta, quamquam istud non nimis prohibitum est a multis, praesertim in compositione trium aut quatuor vocum, quoniam ibi licitum est. [52]

Quinta sic declaratur: Si tenor descendit *d c*, nos ascendimus *h k*. [Quod] si descendit ab *e* in *d* vel alio simili loco, non debet facere organum *k l*, quia sexta minor. Quod si facere velimus, oportet nos *k* elevare, si ab inferiori ascendimus parte, aut substinere, si a superiori descendimus voce. Quod si depingatur, debet sic figurari ~~*f e d*~~, ex quo sequitur unum notabile documentum et est: Si cantus descendat *f e d*, organum *k k l* facere non licet, quoniam sequitur unum duorum inconvenientium, videlicet aut a sexta minori in octavam conduci aut in eodem loco voces inaequales pronuntiare, loco cuius decet facere *l k l* aut *h k l*, quoniam tunc in primo modo solum


thing [occurs] in the descent, and likewise in the same way with the sixth at other places. Nevertheless, let not the one making organum think that, because of this, if the tenor remains on the same sound for two or more notes that two or more imperfect [consonances] can be made at the same place with the organum. And thus the fourth rule is explained, although this is not particularly prohibited by many people, especially in the composition of three or four voices, since it is permitted there.

The fifth [rule] is explained in this way: if the tenor descends *d c*, we ascend *h k*. But if [the tenor] descends from *e* to *d*, or at another similar place, the organum must not make *k l* because it is a minor sixth. But if we wish to do [this], it is necessary to raise *k* if we ascend from the lower part [to a higher] note, or to sustain [*e*] if we descend from the higher note [to the lower note--that is, from *c* to *b*]. But if it is written down, it must be depicted in this way: ~~*f e d*~~; from which follows a notable example: if the song descends *f e d*, the organum is not allowed to make *k k l*, since there follows one of two inconsistencies, namely: either it is carried from the minor sixth to the

descendit per semitonium subintellectum, in secundo vero per ditonum ascendit, et si depingatur, signetur ut supra. Unde advertendum est, quod in prima parte diximus de semitono subintellecto, et considerandum, quando nota est elevata a proprio loco vel depressa, et cavendum a speciebus perfectis, si contrariae sint, ut, si tenor *d f g* psallat et tales conditiones habuerit, per quas a loco proprio *f* sit elevata, organum non unisonum neque perfectam speciem [faciat] super eandem. Eodem modo psallens tenor *d c d* immediate reversus supra *c* non sonabit perfecte, secus, si pauset in *c* aut distinctionem ibidem faciat. Quod autem sexta minor disiungat ad quintam, sic probatur: Tenor stans in eodem per duas voculas aut plures uti *d d d*, organum faciat *h b h*. Similiter si cantus descendat per semitonium realiter aut subintellecte, organum stans in quinta maneat in eadem, ut, si tenor sit *f e f*, organum erit *k k k*. Quidam vero istud prohibent scilicet organum per tres notas in eodem sono vagari, quamquam species sint diversae; dicunt propter hoc, quia contrapunctus videretur esse cantus firmus. Sed istud minime obstat, quia utraque vox recte dici posset organum et tenor, cum notulam integram

octave, or it proclaims unequal notes at the same place. Instead, it is suitable to make *l k l* or *h k l*, since in the first way it merely descends by a *semitonus subintellectus*, but in the second way it ascends by a ditone; and if it is written down, let it be marked as above. Whence, what we have said in the first part concerning the *semitonus subintellectus* ought to be noted; and it should be considered that when the note is raised or lowered from [its] proper place, the perfect species should also be avoided if they are opposites, for example: if the tenor sings *d f g* and it has held such conditions by which *f* is raised from [its] proper place, the organum will make neither a unison nor a perfect species above the same. In the same manner, the tenor singing *d c d*, immediately reversed above *c*, will not sound in a perfect way; [it will be] otherwise if it pauses on *c* or makes a distinction at the same place. However, that which causes the minor sixth to descend to the fifth is demonstrated in this way: [when] the tenor is remaining on the same place for two or more notes, such as *d d d*, let the organum perform *h b b h*. Similarly, if the song descends by a semitone in a real or subintellectus manner, the

utrobique ponamus. Sed quia ab usu communi discedere nolumus, quod non faciant cum eis concordantes prohibemus, scilicet quod ultra duas notulas non quiescat organum in eodem sono. Ergo in exemplo praehabito dicat *h k k*. Quod autem tertia maior ad quintam disgreget, sic exemplificatur: Sit tenor *h g f*, organum *k ♯ k*. Quapropter cavendum sicut in sexta; si tenor cantaverit *g e d*, organum non faciet *g g h*, sed potius *e g h* aut *♯ g h*, et *e g* ditonus est et *♯ g* semiditonus. Et sic efficitur tertia maior cum tenore, quoniam *g* elevatur proprio et, si depingitur, signetur ut supra. Idem quoque, si dicatur *f d c*, organum *f f g* non faciet. Poterit tamen hoc facere *h f g* aut *d f g* et tamen *h f* semiditonus est, *d f* vero ditonus. Quod si depingatur, debet sic

signari . Quod autem tertia minor coniungat organum cum tenore, patet; si tenor dicat *f e f*, optime sonat *h g f*. Sic etiam, si tenor sit *f g h*, organum *k b h*, non tamen *k ♯ h*. Quapropter cavendum, si tenor sit *f f g*, organum non faciat *k h g*, aut si tenor sit *g g h*, organum non faciat *l ♯ h*, bene tamen *l b h*. Si autem tenor psallerit hoc modo *g f g*, poterit organum facere *g h g* aut *♯ h g*, quoniam illa tertia, etsi maior videatur,

organum that is fixed at the fifth may remain on the same [note], for example: if the tenor is *f e f*, the organum will be *k k k*. But some prohibit this--that is, they prohibit the organum to be sounded on the same sound for three notes even though the species may be different; they say this for this reason: [because] the counterpoint would appear to be a cantus firmus. But this by no means hinders [it], because both voices--the organum and the tenor--are able to be sung correctly when we place a whole note [value] in both [places]. And since we do not want to depart from common use, agreeing with them we prohibit [the singers] from doing this--namely, that the organum not remain on the same sound for more than two notes. Therefore, in the given example, let [the organum] sing *h k k*. Moreover, the fact that the major third ascends to the fifth may be exemplified in this way: let the tenor [sing] *h g f* [and] let the organum [sing] *k ♯ k*. Wherefore, one should take care just as on the sixth: if the tenor sings *g e d*, the organum will not make *g g h* but rather *e g h* or *♯ g h*; and *e g* is a ditone while *♯ g* is a semiditone. And thus a major third is produced with the tenor, since *g* is raised from its proper place, and if it is written, let it be marked

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subintellecte efficitur minor. Istud tamen de tertia maiori aut minori plerique non observant, propter quod eorum compositiones, etsi prima facie delectent, quia inaudita est cantilena, cum ad frequentiore usum conferuntur, in dies magis ac magis displicent, et ignorant causas cantores et has, quas diximus, et alias, quas de diminutione paulo post dicemus.

as above. Likewise also, if [the tenor] sings  $f d c$ , the organum will not make  $f f g$ .

Nevertheless, the latter will be able to perform  $h f g$  or  $d f g$ ; and still  $h f$  is a semiditone, but  $d f$  is a ditone. But if it is written down, it should be marked in this

manner:  $\begin{array}{c} \text{f} \\ \text{f} \\ \text{f} \\ \text{f} \\ \text{f} \end{array}$ . Moreover, it is clear that the minor third unites the organum with the tenor: if the tenor sings  $f e f$ , optimally [the organum] will sound  $h g f$ . Thus also, if the tenor is  $f g h$ , the organum is  $k b h$  rather than  $k \sharp h$ . Wherefore, one should take care that if the tenor is  $f f g$ , the organum may not perform  $k h g$ ; or if the tenor is  $g g h$ , the organum may not perform  $l \sharp h$ ; still it is acceptable [to perform]  $l b h$ . However, if the tenor sings in this way,  $g f g$ , the organum will be able to perform  $g h g$  or  $\sharp h g$ , since that third, although it appears to be major, is made minor in a subintellectus manner. Nevertheless, most [composers] do not observe this in regard to the major or minor third, because their compositions --although they are pleasing at first because the song is unusual-- become more and more displeasing in time after they are subjected to more frequent use;<sup>179</sup> and the singers are unaware of the

Sic igitur contrapunctus ad speciem propinquiorem debet incedere, ut a sexta in octavam vel in quintam, a tertia in unisonum vel in quintam; et sic de speciebus compositis ac decompositis. Sed aliquando organum psallat per diatessaron et diapente aut etiam diapason et tunc a tertia potest in octavam venire, ut, si tenor sit *f e*, organum *h m*, vel si tenor *g f*, organum *g k*, aut si tenor *d d c d d e d*, organizatio bona haec est *f n m h l k l* et in aliis tropis similiter. Est tamen modus organizandi optimus, quando organum imitatur tenorem in ascensu aut descensu; non in eodem tempore, sed post unam notulam vel plures incipit in eadem voce eundem cantum facere aut similem in diatessaron vel diapente aut etiam diapason vel in suis compositis ac decompositis sub aut supra. Quem modum practici fugam appellant, propterea quod una vox aliam sequitur simili arsi aut thesi, ut, si tenor cantet *l n m l n m o*, organum potest eum sequi in diatessaron inferius post primam notulam et dicere *h k h k h l*. Sic et in diapente supra eadem pausa servata organum dicet *p r q p r q s*. Idem

reasons--both these which we have discussed and others concerning diminution which we will discuss a little later.

Therefore, the counterpoint should advance in this way to the nearest species, such as from the sixth to the octave or the fifth, from the third to the unison or the fifth, and likewise concerning the species of the compound and the decompound [octaves]. But sometimes the organum may sing through a diatessaron and a diapente, or even through a diapason, and then the organum is able to arrive at the octave from the third, for example: if the tenor is *f e*, the organum is *h m*; or if the tenor is *g f*, the organum is *g k*; or if the tenor is *d d c d d e d*, good organum is this: *f n m h l k l*, and similarly in other tropes. Nevertheless, there is an excellent way of making organum: when the organum imitates the tenor in ascent or descent it begins on the same note--not at the same time but after one or more notes--to make the same song or a similar [song] at the diatessaron or the diapente, or even at the diapason or its compound and decompound [octaves] above or below. Practicing musicians call this method *fugue*, because one note follows another with a similar arsis or

quoque de eorum  
 compositis, de unisono aut  
 diapason. Si tenor *d e f*  
*g d c f e d*, organum post  
 duas notulas idem poterit  
 in octava resonare, quod  
 [est] *l m n o l k n m l*.  
 Idem in unisono ac in suis  
 sub et supra octavis. Sed  
 in his exemplis ponimus  
 illas ultimas voces in  
 organo tenore non habente  
 aliquid pro eis, ut  
 similitudo ostenderetur,  
 quia supponimus, quod  
 voces, quae sequentur in  
 tenore, non discordent cum  
 illis, quia, cum fuga  
 incipit discordare, in  
 similitudine fiat  
 immediate dissimilitudo,  
 ita ut non faciat contra  
 regulas supra dictas.

Sexta autem regula sic  
 declaratur: Si cantus  
 intenderit vocem,  
 discantus remittat ad  
 speciem opportunam  
 secundum regulas  
 assignatas et si tenor  
 descenderit, contrapunctus

thesis, for example: if  
 the tenor sings *l n m l n*  
*m o*, the organum is able  
 to follow [the tenor]  
 after the first note at  
 the diatessaron below,  
 singing *h k ♯ h k ♯ l*.  
 Likewise also, the organum  
 will sing *p r q p r q s*  
 with the same rest [of one  
 note] observed at the  
 diapente above. The same  
 also with regard to their  
 compound [octaves], the  
 unison or the diapason.  
 If the tenor is *d e f g d*  
*c f e d*, after two notes  
 the organum will be able  
 to sound the same  
 [pitches] at the octave--  
 that is, *l m n o l k n m*  
*l*. Likewise, at the  
 unison and on its octaves  
 above and below. But in  
 these examples we place  
 those last notes in  
 the organum with the tenor  
 not having anything [to  
 correspond] with them, in  
 order that a similitude  
 may be shown, since we  
 suppose that the notes  
 which will follow in the  
 tenor will not disagree  
 with them. For when the  
 fugue begins to be  
 discordant, let the  
 dissimilitude immediately  
 be made into a similitude,  
 in such a manner that it  
 is not done against the  
 rules mentioned above.

And the sixth rule is  
 explained in this way: if  
 the cantus raises the  
 voice, let the discant  
 descend to a suitable  
 species according to the  
 established rules; and if  
 the tenor descends, let



ascendat. Et hoc est,  
quod frequentius in  
contrapuncto est  
observandum; nam ex hoc  
fertur assumpsisse  
vocabulum.

the counterpoint ascend.  
And this is what should be  
observed more frequently  
in counterpoint;<sup>180</sup> for  
from this the name  
[counterpoint] is said to  
have been taken.

## CAPITULUM SECUNDUM

### IN QUO ERROR QUORUNDAM REPREHENDITUR ET VERITAS DEMONSTRATUR

Omnia autem praedicta intelliguntur fere, quando tenor gradatim intenditur vel remittitur. Sed quid, si per saltus et anfractus? Dicendum, quod, quando taliter incedit, tunc magis organum debet voces suas coadunare, ut si tenor psallat *d h d*, organum faciet *l k l* aut *l m l* sive *l m n*. Sic in aliis modis diapente. Quod si diatessaron hoc modo *d f c*, organum *l k k*, vel si tenor *c f d*, organum *k k l*.

Ugolinus quibusdam barbaris metris regulas posuit communes de omnibus speciebus tam simplicibus quam compositis, quarum aliquae verum tenent, quaedam vero minime. Sed ut veritas elucescat, falsitas autem erubescat et confundatur, easdem breviter hic explicabo, hoc modo dicendo [primo] de unisono [ascendendo]:

## SECOND CHAPTER

### IN WHICH THE ERROR OF SOME IS REFUTED AND THE TRUTH IS DEMONSTRATED

Now everything that has previously been said is understood for the most part to refer to when the tenor is raised or lowered by step. But what if [it is raised or lowered] by leaps and digressions? It should be said that when it proceeds in such a way, then the organum ought to unite its notes more, so that if the tenor sings *d h d*, the organum will perform *l k l* or *l m l* or, if you prefer, *l m n*. Thus in other modes at the diapente. But if [the tenor] sings at the diatessaron in this manner *d f c*, the organum [will perform] *l k k*; or if the tenor sings *c f d*, the organum [will perform] *k k l*.<sup>181</sup>

Ugolino, with some barbarous measures, established common rules concerning all the species,<sup>182</sup> as much for the simple [species] as for the compound, of which some hold true, but certain ones do not hold true at all. But in order that truth may shine forth, and falsehood may blush with shame and be thrown into disarray, I will briefly explain here the same [rules] in this

Tertia sit infra,  
unisonus si tenditur una.  
Tertia vel quarta si  
tendit, infra diapente  
tenebit.

Si quintam ascendit,  
diapason tantum  
terminabit.

Secunda regula de  
unisono descendendo:

Tertia sit supra,  
unisonus si remittitur  
una.

Ad quintam tendit, si  
tertiam quartamve  
remittit.

Octavam petit, si  
quintam vel ultra deponit.

Si plura pertransit,  
rationis ordo docebit.

Tertia regula [de tertia  
ascendendo]:

Unisonus fiat, unam si  
tertia tendat.

Si plures tendat,  
unisonus tandem fiat.

Tertia remittit, si ter  
vel quater ascendit.

manner, speaking first  
about the unison  
ascending:

If the unison is raised  
one [step in the tenor],  
[the organum] is a third  
below.

If [the unison] ascends  
a third or a fourth, [the  
organum] will hold the  
diapente below.

If [the unison] ascends  
a fifth, [the organum]  
will merely end at the  
diapason.<sup>183</sup>

The second rule of the  
unison descending:

If the unison is lowered  
one [step in the tenor],  
[the organum is at] the  
third above.

If [the unison] descends  
a third or a fourth, [the  
organum] ascends to  
[create] a fifth.

If [the unison] descends  
to the fifth or beyond,  
[the organum] seeks the  
octave.

If [the unison] passes  
through several [notes],  
the rule of reason will  
explain [it].

The third rule of the  
third ascending:

If the third ascends one  
[step in the tenor], let a  
unison be made.

If [the third] ascends  
for several [steps], then  
let a unison be made.

If [the third] ascends  
three or four [steps],  
[the organum] descends to  
[create] a third.<sup>184</sup>

Quarta regula de tertia descendendo:

Quinta ter fiet, si tertiam solam remittit.

Si plures fuerint, eas quinta terminabit.

Si tertiam vel quartam, octavam super intendas.

Quinta supra fiet, si cum octava iungatur.

Quinta regula de quinta ascendendo:

Quinta quaerit tertiam, si fit ascensus in unam.

Unisonum dicas, si tertiam vel quintam intendas.

Sexta regula de quinta descendendo:

Octavam quinta petit, si solam unam descendit.

Erit octava; sexta, si alteri sit sociata.

Post quintam octava fiet, si tertiam infra [remittat].

Si quartam vel quintam, decimam intendere sinat.

Septima regula de sexta [ascendendo]:

The fourth rule of the third descending:

If the third descends one [step in the tenor], then the third will be made [into] a fifth.<sup>185</sup>

If there have been several [steps], a fifth will end them.

If [the third descends] a third or a fourth, you [should] ascend to the octave above.

If [the third] is joined with the octave, a fifth will be made above.<sup>186</sup>

The fifth rule of the fifth ascending:

The fifth demands the third if [the tenor] ascends one [step].

If you ascend a third or a fifth, you [should] sing a unison.<sup>187</sup>

The sixth rule of the fifth descending:

The fifth seeks the octave if [the tenor] only descends one [step].

There will be an octave, if the fifth is joined with the second [note being] a sixth.

An octave will be made after the fifth if [the tenor] descends a third.

If [the tenor descends] a fourth or a fifth, let [the organum] be allowed to extend to the tenth.

The seventh rule of the sixth ascending:

Sexta tertiam cupit, si  
supra notam intendit.

The sixth desires the  
third if [the tenor]  
ascends to the note above.

Octava regula de sexta  
[descendendo]:

The eighth rule of the  
sixth descending:

Sexta vult octavam,  
infra si tendit ad unam;  
Et plures fiant, si  
antecedunt octavam.  
Vult [decimam] sexta  
tertia remittens et infra.

The sixth desires the  
octave if [the tenor]  
descends one [note]; and  
several [sixths] may be  
made if they precede the  
octave.

The sixth desires the  
tenth when the tenor  
descends a third and  
beyond.<sup>188</sup>

Nona regula de octava  
ascendendo:

The ninth rule of the  
octave ascending:

Post octavam quinta, si  
cantus intenditur una.  
Si quartam vel quintam  
psallit, tertiam iure  
poscit.

[55]

[One should sing] the  
fifth after the octave if  
the cantus is raised one  
[step].

According to the rules,  
[the octave] demands the  
third if [the tenor] sings  
a fourth or a fifth.

Decima regula de octava  
descendendo:

The tenth rule of the  
octave descending:

Octava decimam, si solum  
deponit unam.  
Tertia si fuerit, tunc  
duodecima fiet.

The octave [demands] the  
tenth if [the tenor] only  
descends one [step].

If the octave [descends]  
a third [in the tenor],  
then a twelfth will be  
made.

Undecima regula de  
decima ascendendo:

The eleventh rule of the  
tenth ascending:

Decima vult octavam,  
unam dumtaxat intensam.  
Plura si transcendit,  
tunc quinta locum habebit.

The tenth desires the  
octave, provided that [the  
tenor] has risen one  
[step].

If [the tenor] passes  
through several [steps],

Duodecima regula de  
decima descendendo:

Decima descendens  
duodecimam cupit habere.

Decima tertia regula de  
duodecima ascendendo:

Unam intendens duodecima  
decimam quaerit.

Octavam tertia  
quartaque, quinta  
quintamque sequentem.

Decima quarta regula de  
duodecima descendendo:

Quinta cum decima post  
duodecimam fiat.

Si societur, tertia cum  
decima detur.

Tertia cum decima  
quintam cum decima poscit.

Prima regula sic  
redarguitur: Si tenor  
psallat *f g*, organum ita  
potest dicere *f c* sicut *f*  
*e*. Quod si tertiam  
ascendit, ut ipse dicit,  
melius organum manet in  
tertia, quam vadat ad  
quintam. Quod si quartam  
hoc modo *g k* tenor,  
organum recte faciet *g c*;  
quod si diapente sicut *f*  
*k*, organum ita recte  
faciet *f f* sicut *f c*.

then the fifth will take  
the place [of the octave].

The twelfth rule of the  
tenth descending:

The tenth [with the  
tenor] descending desires  
to have the twelfth.

The thirteenth rule of  
the twelfth ascending:

[When the tenor] ascends  
one [step], the twelfth  
seeks the tenth; [when the  
tenor] ascends a third and  
a fourth, [the twelfth  
seeks] the octave; and  
[when the tenor] ascends a  
fifth, the twelfth seeks a  
fifth after it.

The fourteenth rule of  
the twelfth descending:

Let the fifteenth be  
made after the twelfth.

If [the twelfth is  
associated with the  
fifteenth], let a  
thirteenth be made  
[between them].

The thirteenth demands  
the fifteenth.

The first rule is  
refuted in this manner:  
If the tenor sings *f g*,  
then the organum can sing  
*f c* as well as *f e*. But  
if [the tenor] ascends a  
third, it is better for  
the organum to remain on  
the third rather than to  
go to the fifth as the  
master [Ugolino] says.  
But if [the tenor] ascends  
a fourth in this manner,  
*g k*, the organum will  
properly perform *g c*; but

Secunda vero regula: Si tenor descendit *f d*, organum ita bene faciet *f f* sicut *f h*. Tertia vero satis bene.

Quarta vero regula: Si tenor psallat *f e d c*, organum ita recte faciet *h g h k* sicut *h g f g*. Similiter si tenor fecerit *f d*, organum ita bene faciet *h h* sicut *h l*.

Quinta regula reprobatur similiter, quia, si tenor psallerit *f h*, organum ita bene faciet et melius *k f* vel *k k* quam *k h*. Et si tenor *d h*, organum ita bene dicet *h f* sicut *h h* et quandoque *h k*, sed raro nisi variationis causa.

Sexta regula satis bene transit. Verum si tenor psallerit *f c*, organum ita bene *k k* sicut *k m*. Similiter si *g c* tenor, organum ita bene *l k* sicut *l m*.

if [the tenor ascends] a diapente such as *f k*, then the organum will properly perform *f f* as well as *f c*.

And [in regard to] the second rule: If the tenor descends *f d*, then the organum will properly perform *f f* as well as *f h*. And the third rule is well enough.

And [in regard to] the fourth rule: If the tenor sings *f e d c*, then the organum will properly perform *h g h k* as well as *h g f g*. Similarly, if the tenor has performed *f d*, then the organum will properly perform *h h* as well as *h l*.

The fifth rule is rejected for a similar reason because if the tenor sings *f h*, then the organum will properly perform *k f* or *k k*, even better than *k h*. And if the tenor [sings] *d h*, then the organum will properly sing *h f* as well as *h h*, and sometimes *h k*, but rarely except for the sake of variation.

The sixth rule passes well enough. Certainly if the tenor sings *f c*, then the organum [will properly sing] *k k* as well as *k m*. Similarly, if the tenor [sings] *g c*, then the organum [will properly sing] *l k* as well as *l m*.

Septima satis bene;  
verum si tenor *e f*,  
organum ita bene *k k* sicut  
*k h*, quia ex sexta minori  
bene tendimus in quintam.

Octava regula bona  
videtur. Sed etiam tenore  
dicente *f d* organum  
poterit dicere *l l* sicut *l*  
*n*.

Nona redarguitur, quia,  
si tenor dixerit *c f*,  
organum poterit *k k* dicere  
sicut *k h*.

Decima reprehenditur,  
quoniam, si tenor psallat  
*e c*, organum melius faciet  
*m m* quam *m o*.

Undecima vero multum  
discedit a veritate, quia,  
cum tenor saltus facit et  
anfractus, organum debet  
voces suas coadunare. Nam  
si ambo per saltus et  
anfractus discurrant,  
certamen potius quam  
harmonia dicetur, ut si  
dicat *c d*, organum melius  
faciet *m h* quam *m l*. Et  
tunc tantum, quantum tenor  
incipiat saltus et  
anfractus facere, (tanto)  
organum incipiat  
coadunare, ut, cum tenor *c*  
*e*, organum *m h*, tenor *c f*,  
organum *m k*, tenor *c g*,  
organum *m l*. In hoc enim  
exemplo, si advertas,  
maxima est convenientia,  
quoniam tenor a secunda

The seventh [rule] is  
well enough. Certainly if  
the tenor [sings] *e f*,  
then the organum [will  
properly sing] *k k* as well  
as *k h*, because we  
properly proceed to the  
fifth from the minor  
sixth.

The eighth rule seems to  
be good. But even with  
the tenor singing *f d*, the  
organum will be able to  
sing *l l* as well as *l n*.

The ninth [rule] is  
refuted, because if the  
tenor has sung *c f*, the  
organum will be able to  
sing *k k* as well as *k h*.

The tenth [rule] is  
refuted, since, if the  
tenor sings *e c*, it will  
be better for the organum  
to perform *m m* rather than  
*m o*.

The eleventh [rule]  
deviates greatly from the  
truth, because when the  
tenor makes leaps and  
digressions, the organum  
should unite its notes  
together. For if both  
[voices] run [in]  
different directions by  
leaps and digressions, it  
will be called *contention*  
rather than *harmony*, for  
example: If [the tenor]  
sings *c d*, it will be  
better for the organum to  
perform *m h* rather than  
*m l*. And then, as the  
tenor begins to make leaps  
and digressions, the  
organum begins to unite  
[its notes], so that when  
the tenor [sings] *c e*, the



usque ad quintam paulatim incipit psallere, organum vero e contra a quinta usque ad secundam voces coadunavit. Hoc enim modo harmonia generat in animos audientium quandam insitam dulcedinem, quae non potest explicari sermone. Verum nostri cantores haec minime considerant, sed illud tantum, quod imaginationi seu fantasiae suae placet, secundam accidentem dispositionem credunt omnibus advenire. Et inde est, quod vulgus ad musicam vel, ut verius loquar, ad harmoniam novam non ita sponte convertitur, sicut solebant antiquitus. Verum de his rationibus in secundo libro evidentissime dicemus. Haec autem diximus, ut quosdam cantores ab opinionibus erroneis abstraheremus et ad veram musices agnitionem reduceremus.

Aliae regulae satis veritati consonant, verum in hoc sunt reprobandae,

organum [sings] *m 4*; [when] the tenor [sings] *c f*, the organum performs *m k*; [when] the tenor [sings] *c g*, the organum performs *m l*. For if you take note [you will find that] there is the greatest harmony in this example, since the tenor begins to sing gradually from the second up to the fifth, but the organum has united [its] notes to the contrary--from the fifth up to the second. For in this way, harmony generates a certain natural sweetness in the souls of the listeners that cannot be explained with words. Certainly our singers do not consider these things at all, but only that which is pleasing to their imagination or fantasy; they believe that a favorable disposition comes to all by chance. And for that reason, the public is not so freely converted to [our] music, or to speak more frankly--to new harmony--as they were accustomed to the old. Truly, we will speak with the greatest evidence concerning these theories in the second book. However, we have said these things in order that we might remove certain singers from erroneous opinions, and draw them back to the true knowledge of music.

The other rules correspond enough with the truth, but they should be

quia superfluae. Nam ultra diapason semper est reiteratio primae. Et si dicatur, quod propter quintam vel quartam, dicemus: propterea dedimus modum componendi quintam a quarta et e contra et reliqua diligenti indagatori relinquimus. His etenim paucis regulis tota ars contrapuncti vel organi poterit constringi. Cetera vero, quae circa organizationem accidere possent, in arbitrio canentium relinquimus, dum tamen contra regulas aliquid facere caveant, quoniam, etsi minime probantur, a veritate tamen non discedunt. Servet quoque modum in arsi et thesi, hoc est, ab inferiori voce ad alticrem sui ipsius sit modus ordinatus ut tropus. Et pneumata servet et pausationes in dandis perfectis speciebus, ut, si tonus sive modus sit primi, consonantiae perfectae in *d*, in *h*, *l* frequententur, quandoque autem in *f* vel in *o*, raro in *g* vel in *k*, numquam tamen in *e* vel in  $\sharp$  quadro. Hoc tamen est intelligendum cum distinctione, quoniam alias ubicumque possunt fieri. Servet etiam organizans pneumata troporum, ut pneumata pneumatibus correspondeant. Nam si pneumata tenoris fuerint primi, et organizantis erunt, ut, si tenor *f d c d g d c g e f d*, organum

rejected for this reason: because they are superfluous. For there is always a reiteration of the first beyond the the diapason. And if it is said that it is on account of the fifth or the fourth, we will respond that we have given a method of composing the fifth from the fourth and vice-versa with that taken into account, and we leave the rest to the diligent researcher. For the entire art of counterpoint or of organum will be able to be drawn together with these few rules. But everything else, which falls into the category of making organum, we will leave to the judgment of the singers, provided that they avoid doing anything contrary to the rules, since although they are not at all demonstrated, at least they do not deviate from the truth.<sup>189</sup> Also, let [the singer] observe the mode in arsis and thesis--that is, let it be an ordered mode from its lower note to its higher [note]--like a trope. And let him observe the neumes and the rests in the given perfect species, so that if the tone or, if you prefer, the mode, is that of the first, the perfect consonants are frequently made on *d*, *h*, and *l*; however, sometimes [they are made] on *f* or *o*, rarely on *g* or *k*, but never on *e* or square  $\sharp$ . Nevertheless, this should

non faciat *h k m l k k k k*  
*k h k* sed potius *h l m l l*  
*n m l m k l*, quoniam prima  
 organizatio est phrygii,  
 secunda vero dorii. Ne  
 quis arbitrari possit ista  
 parva exempla non  
 sufficere ad totam  
 doctrinam capessendam, sub  
 et supra per totam manum  
 damus eis modum  
 subtiliorem, ut per lineas  
 et spatia ista disponant  
 exempla. Deinde idem,  
 quod fuit dorii, ponatur  
 in phrygio et in lydio et  
 in mixolydio; et de suis  
 plagalibus similiter fiat.  
 Et quando species aliqua  
 bonam consonantiam non  
 fecerit, elevetur per  
 signum aut deprimatur, ut  
 consonantia prima totam  
 sui recipiat quantitatem  
 aut dimittat, si quid  
 superfluum habet. Ut  
 autem omnia, quae dicta  
 sunt, facilius teneantur,  
 ante oculos subiiciatur  
 exemplum:  
 organum: *l h k l l m h l*  
*m l k l h k l l k k h k l*  
*h g h k l*  
 tenor: *d d e d f e f d c*  
*d e d f g f g h g h h d f*  
*e f g e d*

be understood with  
 discretion, since at other  
 times they can be made  
 elsewhere. Let the one  
 making organum also  
 observe the neumes of the  
 tropes, so that neumes  
 correspond to neumes. For  
 if the neumes of the tenor  
 have been of the first  
 [mode], [neumes of  
 the first mode] will also  
 be made in the organum,  
 for example: If the tenor  
 [sings] *f d c d g d c g e*  
*f d*, the organum will not  
 perform *h k m l k k k k*  
*h k*,<sup>190</sup> but rather  
*h l m l l n m l m k l*,  
 since the first [way of  
 making] organum is that of  
 the Phrygian [mode], but  
 the second [way of making  
 organum] is that of the  
 Dorian [mode]. And in  
 order that no one can  
 think that these few  
 examples are not  
 sufficient for the entire  
 doctrine to be grasped, we  
 give to them a more  
 refined method of making  
 use of the whole hand--  
 both the upper part and  
 the lower--so that they  
 may arrange these examples  
 by means of lines and  
 spaces. Then let the same  
 that was the Dorian's, be  
 established on the  
 Phrygian, and on the  
 Lydian, and on the  
 Mixolydian; and let it be  
 done in the same manner on  
 their plagals. And when  
 any species has not made a  
 good consonance, it is  
 raised or lowered by means  
 of a sign, so that if what  
 the first consonance holds  
 is superfluous, it may

accept or dismiss all of its quantity. And now, so that everything which has been said may be grasped more easily, let this example be placed before [your] eyes:

organum: l h k l l m h l  
 m l k l h h l l k h k l  
 h g h h k l  
 tenor: d d e d f e f d  
 c d e d f g f g h g h h d  
 f e f g e d

Liquet his paucis exemplis praemissis tota ars contrapuncti concludi per variationem exemplorum per diversa loca; per fictam per rectamque musicam eadem variata sicque per idem exemplum in diversis tropis parva facta mutatione nimietas varia crescit. Quod si unum pneuma tot modis variatur, ut dictum fuit, in tropis, quanto magis cum consonantiis diversis variabitur. Et sic praedicta in hac parte sufficerent. Sed cum tot et tanta supervacanea incommoda, inutilia, prolixa atque superflua in prima parte artem Guidonis musicae tribuisse monstratum sit, sequaces eius caeco ducatu claudicantes, subtilia se credentes investigasse peiora, prolixiora, inutiliora tribuerunt.

[57] With these few proposed examples, it is clear that the entire art of counterpoint is made up of a variety of examples in diverse places; the same is varied by means of *musica ficta* and *musica recta*, and thus by making a small change, the variations are exceedingly increased by the same example [occurring] in different tropes. But if one neume is varied in so many ways--as it has been said [in the section] on the tropes--how much more it will be varied with diverse consonants. And thus [those things which were] previously discussed in this part will be sufficient. But since it has been shown in the first part that the theory of Guido has ascribed so many unnecessary, useless, tedious, and superfluous inconveniences to music, his followers--having been crippled by blind leadership [and] believing themselves to have made a precise investigation--ascribe [even] worse, more

Est autem, ut ipsi dicunt; qui contrapunctare procurat, hexachordum non exeat cantu plano supra vel subter psallente, quod dicunt ipsi *gamma*, hoc est quod tota manus illorum *gamma* et *e la* contenta est. Cum uno hexachordo in thema assumpto concordet, et sic septem *gammata* faciunt iuxta septem hexachorda; et primum appellant *♯ bassum*, secundum naturam *bassam*, tertiam *b molle bassum*, quartum *♯ medianum*, quintum naturam *altam*, sextum *b molle altum* et septimum *♯ altum*. Hoc autem superfluum esse atque diminutum rationibus firmissimis demonstrabimus. Ipsi ponunt *gammata*, quae per alia poterunt investigari, et dimittunt alia, quae sunt necessaria, videlicet coniunctarum. Nos vero, qui ambages fugere et veritatem in lucem adducere falsitatemque confundere et prolixitatem evitare curamus, omnia *gammata* reperiendi et diminutionem eorum adimplendi falsitatemque evitandi facillimum dabimus modum.

tedious, [and] more useless things to music.

However, it is as they say: Whoever attempts to make counterpoint does not avoid the hexachord in plain song by singing above or below that which they call *gamma*; this is because their entire hand is contained [between] *gamma* and *e la*. One harmonizes with a hexachord taken on the theme, and they make seven *gammata* along with the seven hexachords in this manner; they call the first *low ♯*, the second *low natural*, the third *low soft b*, the fourth *middle ♯*, the fifth *high natural*, the sixth *high soft b*, and the seventh *high ♯*. However, we will demonstrate with the firmest reasons that this is superfluous and of little importance. They arrange the *gammata* which will be able to be investigated by other [means], and they leave out other things that are necessary--namely, [matters] of the coniuncta. But we, who take care to flee digressions and avoid tediousness, and bring the truth into the light and confound falsehood, will give a very easy method for learning all the *gammata*, completing their diminution and avoiding their falsehood.

Accipiamus igitur primum hexachordum scilicet *retropolis*, [quod] terminatur in *d sol re*. Loquimur enim per terminos ipsorum. Respiciemus igitur per totam manum, quae voces eius concordant, et sic istud componemus. *Γ ut* igitur ex isto hexachordo habebit *re*, quia unisonus, *fa* quia tertia, *la* quia quinta, *a re ut* tertia subtus, *mi* unisonus, *sol* tertia supra, *b mi re* tertia sub, sed unisono carebit, *la* tertia supra; *c fa ut ut*, *mi, sol*; *d sol re ut, re, fa, la*; *e la mi re, mi, sol*; *f fa ut ut, mi, fa, la*; *g sol re ut re, fa, sol*; *a la mi re ut, mi, [sol] la*; *b fa re, fa, la*; *♯ mi re, la*. Et hucusque differentia fuit in quolibet loco. Postea vero *c sol fa ut* sicut *c fa ut, ut, mi, sol* obtinebit; sic *d la sol re*, sicut *d sol re, ut, re, fa, la*; nec differunt, nisi quod, si illorum sunt simplices, istorum compositae sunt, quod si priorum compositae, istorum decompositae erunt, de qua compositione iam diximus supra. Idem quoque de reliquis locis seriatim dicendum.

Therefore, let us take the first hexachord--that is, *retropolis*--which ends on *d sol re*. For we [will] discuss them according to their boundaries. Therefore, by means of the entire hand we will consider which of its notes are concordant, and in this manner we will make this [hexachord]. Accordingly, in conformity with this hexachord *Γ ut* will hold *re*, which is the unison [in respect to *Γ ut*]; *fa*, which is a third [from *Γ ut*]; *la*, which is a fifth [from *Γ ut*]; *ut*, which is the third below a *re*; *mi*, [which is] a unison [in respect to a *re*]; *sol* [which is] the third above [a *re*]; [and] *re* [which is] a third below *b mi*. But it will lack the unison [in respect to *b mi*]; *la* [will be] the third above [*b mi*]; *c fa ut* [will have] *ut, mi, sol*; *d sol re* [will have] *ut, re, fa, la*; *e la mi* [will have] *re, mi, sol*; *f fa ut* [will have] *ut, mi, fa, la*; *g sol re ut* [will have] *re, fa, sol*; *a la mi re* [will have] *ut, mi, sol, la*; *b fa* [will have] *re, fa, la*; [and] *♯ mi* [will have] *re, la*. Up to this point, the difference was on any position whatsoever. But after that, *c sol fa ut* just as *c fa ut* will possess *ut, mi, sol*; likewise, *d la sol re* just as *d sol re* will possess *ut, re, fa, la*; and they do not

differ except that if those of the former are simple, [then] those of the latter are compound, but if those of the first are compound, then those of the latter will be decompound, whose arrangement we have already discussed above. The same also should be said concerning the remaining positions in succession.

Quod si facillime volumus et alia gammata sine magno labore componere, disposito primo sic faciemus: *c fa ut* quinto loco sedet ab ista coniuncta; sic ergo quinis in locis se rendebunt. Arguemus igitur sic: tanta distantia est inter gamma et gamma, quanta inter *F ut* et *d sol re*; ut ergo se habuit illud gamma cum *F ut*, ita istud cum *d sol re*. Quoniam *re, fa, la* est utrobique, consonantiae eadem sunt. Sic *e la mi* cum *a re*, quia [58] in utroque *ut, mi, sol*. Ratio est demonstrativa, quoniam tantum distat *e la mi* a suo gammate quantum *a re* ab eo, cui comparatur. Sed cum pervenimus ad *f fa ut* et *b mi*, non tanta distantia est, quia aliud per semitonium, aliud vero per tonum distare monstratur nec similiter signa inter se distant per diapente, quemadmodum ipsa hexachorda sive gammata. Unde in hoc non eodem modo procedit argumentum. Quapropter cavendum et in his et in aliis, cum ita

But if we want to make other gammas in the easiest possible way and without great labor, we will do the following with the first arrangement: *c fa ut* sits on the fifth place from this coniuncta; consequently, they will express themselves in fifths in this manner. Therefore, we will show [them] in this way: There is as much distance between gamma and gamma as between *F ut* and *d sol re*; accordingly, as the former gamma was held [in relation] to *F ut*, so the latter gamma [*c*] is to *d sol re*. Since *re, fa, la* are on both, the consonances are the same. Thus the consonances are the same between *e la mi* and *a re*, because *ut, mi, sol* are on both. The reason is demonstrative, since *e la mi* is as distant from its gamma as *a re* is from that to which it is compared. But when we arrive at *f fa ut* and *b mi*, there is not as great a distance, because one is shown to be distant

contingerit, ne consonantia perfecta in altero illorum signorum ponatur. Sic ergo *b mi* tantum habebit *re, la*, tertia sub et supra; sed in *b fa ♯ mi* loco sive signo, qui duplicem locum habet, idem semper faciendum, quoniam primum gamma perfectum habet cum *fa*, secundum vero cum *mi*. Ita et in suis octavis. Tertium gamma ponimus hoc modo: diatessaron remissa ab isto secundo venit in *Γ ut*. Qualiter ergo se habet gamma ad gamma, ita et signa, quae in eadem locata fuerint differentia. Unde sicut secundum in *d sol re*, ita tertium in *a re* et in aliis quoque. Unde *f fa ut ac b fa re sol* tantum tenent, sed *♯ mi* insuper *mi* obtinet quintam. Sic, cum ad *e la mi* acutum pervenit, *♯ mi* et *e la mi ut mi sol la* tenent. Sed *b fa la*, quia quinta, *mi*, quoniam octava, perfectis carebit. Unde vulgatum est a practicis *mi* contra *fa* nec e contrario in specie perfecta numquam fiendum; in imperfectis autem bene, quia recipiunt maioritatem et minoritatem. Errant tamen in hoc per defectum, quoniam illud idem et de aliis potest dici vocibus, ut paulo post ostendemus.

by a semitone, but the other [is distant] by a tone, and in a similar way the signs between them are not distant by means of a diapente as the hexachords themselves or, if you prefer, the gammas. Whence, the argument on this does not proceed in the same manner. Therefore, one should take care, both on these and others, when it happens in such a manner, that the perfect consonance is not placed on the second of those signs.<sup>191</sup> Thus *b mi* will only have *re* [and] *la*--the third above and below. But the same always should be done on the position or, if you prefer, the sign *b fa ♯ mi*, which holds a double position, since it holds the first perfect gamma with *fa*, but the second [gamma] with *mi*. Likewise also at their octaves. We arrange the third gamma in this way: Descending a diatessaron from the second [gamma], one arrives at *Γ ut*. Therefore, just as gamma to gamma is held, thus also the signs will have been placed by the same difference. Whence, as the second [gamma is] on *d sol re*, the third [gamma is] on *a re*, and on others also. Whence, *f fa ut* and *b fa* only hold *re* [and] *sol*, but [with] *♯ mi* moreover, *mi* holds the fifth. Thus, when one arrives at high *e la mi*, *♯ mi* and *e la mi* hold *ut*,



*mi, sol, la*. But *b fa* will lack the perfect [species] *la*, because it is the fifth, and *mi* because it is the octave. Whence, it is common knowledge among the practicing musicians that *mi* should never be made against *fa* in the perfect species, nor vice-versa; however, it is acceptable in the imperfect [species], because they receive [the quality of] major and minor. Nevertheless, they err in this by their deficiency, since the same thing can also be said about the other notes, as we will show a little later.

Cum autem quartum gamma ex istis componere velis, a tertio diapente intensa in *d sol re* cadit; unde signa diapente distantia easdem consonantias habebunt. Nam sicut in tertio est *a re*, ita et in quarto *e la mi*, quia *re, fa, la*. Sed cum *b mi ac f fa ut* diapente non differant, *f fa ut* perfecta carebit. Sed quartum in  $\sharp$  *mi* sicut tertium in *e la mi*, quia *ut, re, fa, la*; *b fa* autem perfectis carebit.

Quod si quintum creare gamma procuras, diatessaron ab isto

When you wish to make the fourth gamma from these, a diapente ascending from the third [gamma] falls on *d sol re*; whence, the signs at a distance of a diapente will hold the same consonances. For just as there is a *re* in the third gamma, likewise also [there is] *e la mi* in the fourth [gamma] because of *re, fa, la*. But since *b mi* and *f fa ut* do not differ by a diapente, *f fa ut* will lack the perfect [species]. But  $\sharp$  *mi* is to the fourth gamma as *e la mi* is to the third [gamma] because of *ut, re, fa, la*; however, *b fa* will lack the perfect [species].

But if you attempt to create a fifth gamma, you may descend a diatessaron

remittas, quod a re notatur. Igitur signa, quae diatessaron distant, easdem consonantias habebunt. Unde sicut quartum in e la mi, ita quintum in b mi et in aliis eodem modo distantibus. Sed in ♯ mi quintum habebit, quod quartum in e la mi tenuit acuto. At tamen b fa, quia nulli proportionatur in istis duobus hexachordis sive gammatibus, ideo maxime ab omnibus differt, quoniam tantum habebit mi fa sextam maiorem atque minorem et in alio ab illis compositas.

Cumque sextum hexachordum creare procures, a primo diatessaron intendas, quod inter a re b mi locatur coniuncta. Ergo sicut Γ ut in primo, ita c fa ut in sexto. Et sic de aliis locis diatessaron distantibus, et sicut f fa ut b fa ut mi, fa, la. Sed ♯ mi perfectis carebit.

Quod si septimum gamma iam complere desideras, quartam a sexto intendas, quae inter e la mi ac d sol re cadet. Signa ergo, quae diatessaron ab isto

from this [fourth gamma], which is marked a re. Therefore, the signs which are distant by a diatessaron will have the same consonances. Whence, just as the fourth [gamma is] to e la mi, thus the fifth [gamma is] to b mi, and in the same manner with the other distances. But the fifth [gamma] will hold on ♯ mi that which the fourth [gamma] held on high e la mi. But nevertheless, b fa, since it is not related to these two hexachords or, if you prefer, gammas, differs the most of all, since it will only hold mi [and] fa--the major and minor sixth--and in another place, the compounds from these.

And when you attempt to create the sixth hexachord, you ascend a diatessaron from the first [gamma], because this coniuncta is arranged between a re [and] b mi. Therefore, just as Γ ut is to the first [gamma], thus c fa ut is to the sixth [gamma]. And likewise concerning other positions with the distances of a diatessaron, and b fa is as f fa ut, [containing] ut, mi, fa, la. But ♯ mi will lack the perfect [species].

But if you desire to complete the seventh gamma, you ascend a fourth from the sixth [gamma], which will fall between e la mi and d sol re.

altiora distarent, taliter  
se habebunt: ergo, sicut  
*c fa ut* in sexto, ita *f fa* [59]  
*ut* in septimo et sicut  
sextum in *f fa ut*, ita  
septimum in *b fa*, quia  
utrobique *ut, mi, sol*; sed  
♯ *mi* cassus perfectis *mi*  
solam tenebit.

Sic enim inspectis  
documentis poteris omnia  
gammata sine labore  
complere. Nec credas hoc  
superflue positum, si  
documenta Guidonis  
necessaria ponis tu, qui  
sequeris ipsum. Nam et  
crebrius veniunt semitonia  
subintellecta quam realia,  
quibus cavendum est a  
perfectis, nisi per istas  
coniunctas suppleantur.  
Unde bene componentes  
videbis immediate signare.  
Sed bene quidem a parte  
superiori perfici gammata  
possunt modo praedicto.  
Dices verum ab inferiori,  
qualiter sit tibi  
documentum generale. Unde  
aspicias pro unoquoque  
loco implendo eius octavam  
et habita formatione  
praedicta habes intentum.  
Quod si simplices fuerint,  
videlicet unisonus,  
tertia, [quarta], quinta,  
sexta, octava, rendebunt  
hoc modo: pro sexta  
[tertiam], pro octava  
[unisonum] realiter semper  
habebis, sed pro [quarta]

Therefore, the signs,  
which would be higher from  
this [sixth gamma] by the  
distance of a diatessaron,  
will be considered in this  
manner: Consequently, as  
*c fa ut* is to the sixth  
[gamma], so *f fa ut* is to  
the seventh [gamma], and  
as the sixth [gamma] is to  
*f fa ut*, thus the seventh  
[gamma] is to *b fa*,  
because on both [there is]  
*ut, mi, sol*; but ♯ *mi*  
lacking the perfect  
[species] will hold  
only *mi*.

For once you have  
studied the examples in  
this way, you will be able  
to complete all the gammas  
without effort. And those  
of you who follow [Guido]  
may not think that this  
was established  
superfluously, if you  
consider the examples of  
Guido [to be] necessary.  
For the subintellectus  
semitones also appear more  
frequently than the real  
semitones, which should be  
avoided by the perfect  
[species] unless they are  
completed by means of  
these coniunctae. Whence,  
you will see that those  
who compose properly, mark  
them immediately.  
Certainly the gammas can  
be completed properly from  
the higher part with the  
previously-mentioned  
method. But still you  
will sing from the lower  
[part], in order that it  
may serve as a general  
example for you. Whence,  
you may observe its octave  
in place of completing

[quintam] et e contra.  
 Unde animadvertas oportet,  
 quod, si in signo  
 composito habes *fa*,  
 quintam in componendo  
 sequentem vocem accipias  
 scilicet *sol*, quoniam  
 illud *fa* [quarta] vox est.  
 Sic et de aliis vocibus  
 faciendum, ut in gammate  
 secundo *c fa ut* carenti  
 aspecto *c sol fa ut ut mi*  
*fa la* perornato habebimus  
*c fa ut ut mi sol la*  
 adimpletum. Sed scias  
 oportet ut, cum pro *mi fa*  
 est accipienda, poni non  
 debere; sed ille locus  
 quinta carebit, ut in  
 eodem gamma  $\sharp$  *mi re mi sol*  
 compositum est. Sed *b mi*  
 solas *re sol* obtinebit,  
 quoniam *fa*, quae loco *mi*  
 erat accipienda, diapente  
 non est. Sed *a la mi re*  
*ut re fa la*, *a re* vero *ut*  
*mi fa la*; sic et  $\Gamma$  *ut re*  
*mi sol*, quia *g sol re ut*  
*ut mi sol* obtinere visum  
 est. Sic ergo habes  
 completum gamma secundum.  
 Sicut enim istud gamma  
 completum est, ita et alia  
 complenda tibi relinquo.  
 Item notandum est, quod,  
 quemadmodum locus  
 componendus caret  
 diapente, cum *fa* pro *mi*  
 est accepturus, ita cum  
 compositus cassus sit  
 perfecta, quia *mi*  
 componendus obtinebit ut  
 in gammate [quarto],  
 scilicet *d sol re*, locus *c*  
*sol fa ut* caruit *mi*  
 quinta, quoniam contra *fa*  
 fieri non potuit. Ideo  
 tantum *re sol* obtinuit,  
 verum *c fa ut re fa sol*  
 sibi vendicat inhaerere.  
 Sed si contingat *la*

each position, and you  
 have an end with the  
 above-mentioned formation  
 maintained. But if they  
 are simple [species]--  
 namely, the unison, the  
 third, [the fourth], the  
 fifth, the sixth, [and]  
 the octave--they will  
 render them in this way:  
 In reality, you will  
 always have the third for  
 the sixth, the unison for  
 the octave, the fifth for  
 the fourth, and vice-  
 versa. Whence, it is  
 necessary that you pay  
 attention, because if you  
 have *fa* on the compound  
 sign, you take the  
 following note--that is,  
*sol*--when composing the  
 fifth, since that *fa* is  
 the fourth note. Likewise  
 also, it should be done  
 with the other notes, so  
 that [when] *c fa ut* is  
 observed to be  
 lacking in the second  
 gamma, having added *ut*,  
*mi, fa, la* to *c sol fa ut*,  
 we will have *ut, mi, sol*,  
*la* added to *c fa ut*. But  
 it is important for you to  
 know that when *fa* must be  
 taken for *mi*, it should  
 not be placed [there];  
 however, that position  
 will lack the fifth, just  
 as in the same gamma *re*,  
*mi, sol* is composed on  
 $\sharp$  *mi*. But *b mi* will only  
 hold *re* [and] *sol*, since  
*fa*--which is not a  
 diapente--should have been  
 taken in place of *mi*. But  
*a la mi re* [holds] *ut, re*,  
*fa, la* and *a re* [holds]  
*ut, mi, fa, la*; thus also  
 $\Gamma$  *ut* [holds] *re, mi, sol*,  
 because *g sol re ut* has

quintum compositum locum  
habere, componendus  
carebit eadem, quoniam  
ultima *la* nulla vox est in  
ista doctrina confusa.  
Cum igitur alia gammata  
componere velis, signis 8  
comparatis idem eveniet,  
ac etiam in complemento  
idem faciendum. Quae  
omnia in subiecta figura  
continentur.

been seen to hold *ut*, *mi*,  
*sol*. Therefore, in this  
manner you have completed  
the second gamma. For  
just as this gamma is  
completed, thus also I  
leave the others to be  
completed by you. Also,  
it should be noted that  
just as [that] place about  
to be composed is lacking  
the diapente whenever *fa*  
is going to take the place  
of *mi*, thus also when it  
is composed it is without  
the perfect, because *mi*,  
which is about to be  
composed, will hold *ut* on  
the fourth gamma--that is,  
*d sol re*--the place where  
*c sol fa ut* lacked the  
fifth--*mi*, since [*mi*] was  
not able to be made  
against *fa*. Therefore, it  
only held *re* [and] *sol*;  
but *c fa ut* claims to  
adhere for itself *re*, *fa*,  
[and] *sol*. But if it  
turns out that *la* has  
composed a fifth place,  
[that which] is about to  
be composed will lack the  
same, since the last *la* is  
not a note in this  
confused doctrine.  
Therefore, when you wish  
to compose other gammas,  
the same will happen with  
the eight signs provided,  
and the same should also  
be done in the complement.  
All these things are  
contained in the figure  
below [see Figura 8].

Patet ex hoc, quod nec  
*fa* nec *ut* contra *re* fieri  
potest; ut tertium gamma  
et septimum in *a re*. Nec  
*re* nec *la* contra *fa* fieri  
posse patet ex

From this it is clear  
that neither *fa* nor *ut* can  
be made against *re*, even  
though the third and the  
seventh gamma [are] on a  
*re*. And it is clear from

comparatione tertii  
 hexachordi ad *f fa ut*.  
 Sic et aliae voces contra  
 alias in diversis  
 hexachordis fieri non  
 poterunt, quod diligenti  
 lectori relinquimus  
 indagandum.

Animadvertite igitur,  
 lector, quanta a  
 sequacibus Guidonis secuta  
 mira videntur. Totum  
 istud tamen asservendi  
 potest recte  
 intelligentibus nostram  
 doctrinam. Ipsi autem,  
 postquam doctrinam unius  
 gammatis cognoscunt, multa  
 se scire  
 arbitrantur, nedum cum duo  
 ut ab uno in alium  
 invicem.

a comparison of the third  
 hexachord with respect to  
*f fa ut* that neither *re*  
 nor *la* can be made against  
*fa*. Thus also, some notes  
 cannot be made against  
 others in different  
 hexachords, which we leave  
 to be investigated by the  
 diligent reader.

Therefore, notice  
 reader, what great  
 miracles seem to have  
 followed from Guido's  
 followers. Nevertheless,  
 all this can be helpful to  
 those who understand our  
 teaching. However, after  
 [Guido's followers] are  
 acquainted with the  
 doctrine of one gamma,  
 they believe themselves to  
 know a great deal;  
 however, [they will know]  
 much more when [they  
 become acquainted with]  
 two as [they move] in turn  
 from one to another.



g sol-re-ut	8 6 5 re fa sol	5sub 3 1 ut mi sol	8 6 5 3 ut mi fa la	3sub 1 3 re fa la	6 3 re sol	6 5 3 1 ut re fa la	3sub 1 3 ut mi sol
f fa-ut	8 6 5 3 ut mi fa la	3 1 3 re fa la	6 3 re sol	3sub 3 ut sol	6 3 ut fa	5sub 3 1 ut mi sol	1 3 5 re fa la principium
e la-mi	6 5 3 re mi sol	3sub 1 3 ut mi sol	6 5 3 1 ut re fa la	1 3 5 re fa la principium	5sub 3 1 ut mi sol	3sub 3 re la	augmentum 3 5 6 mi sol la
d sol-re	6 5 3 1 ut re fa la	1 3 5 re fa la principium	5sub 3 1 ut mi sol	augmentum 1 3 5 6 ut mi sol la	3[sub] 1 3 re fa la	3sub 1 3 ut mi sol	3 6 re sol
c fa-ut	5sub 3 1 ut mi sol	1 3 5 6 ut mi [sol] la augmentum	3sub 1 3 re fa la	3 5 6 re fa sol	3sub 3 ut sol	1 3 5 re fa [la] principium	3 5 6 8 ut mi fa la principium
b mi	3sub 3 re la	3 6 re sol	3sub 1 3 ut mi sol	3 5 6 8 ut mi fa la	1 3 5 re fa la principium	augmentum 3 5 6 mi sol la	augmentum 5 6 [re] mi
a re	3sub 1 3 ut mi sol	3 5 6 8 ut mi fa la	1 3 5 re fa la principium	5 6 8 re mi sol	augmentum 1 3 5 6 ut mi sol la	3 5 6 re fa sol	6 10 re la
r ut	1 3 5 re fa la	5 6 8 re mi sol	augmentum 1 3 5 6 ut mi sol la	6 8 10 re fa la	3 5 6 re fa sol	3 5 6 8 ut mi fa la	6 8 10 ut mi sol
Gammata septem	primum retropolis	secundum c fa-ut	tertium r ut	quartum d sol-re	quintum a re	sextum b mi	septimum e (b) la-mi

Figure 29. --continued--



TERTIA PARS, IN QUA DE  
NUMERIS HARMONICIS  
COPIOSE PERTRACTATUR

TRACTATUS PRIMUS

CAPITULUM PRIMUM

Binas longas maximam  
binasque breves longam  
atque brevem duas  
semibreves, sed et  
semibreve duas minimas  
intra se continere iam  
liquido monstravimus per  
geometricam  
demonstrationem in prima  
parte tertio tractatu  
capitulo de notulis. In  
ista vero parte, quae tota  
numerorum est, qualiter  
eadem nota tres aut plures  
possit valere dicendum  
restat. Consideratione  
temporis accepta, quae in  
pulsus noscitur  
palpitatione, scire nos  
oportet, utrum duplari aut  
triplari aut quadruplari  
eam contingat aut etiam  
dimidiare aut trifariam  
sive quadrifariam  
dividere.

Prima enim consideratio  
modus dicitur non a  
modulando vel a movendo,  
ut supra dictum est, sed a  
temporum modificatione vel  
computatione dictum  
arbitramur. Secundum vero  
magistrum Franconem est

THIRD PART, IN WHICH THE  
HARMONIC NUMBERS ARE  
COPIOUSLY TREATED

FIRST TREATISE

FIRST CHAPTER

[61] We have already clearly  
shown by means of a  
geometric demonstration in  
the chapter about the  
notes [that appears] in  
the first part, the third  
treatise, that the maxima  
contains two longs within  
itself, the long contains  
two breves, the breve  
contains two semibreves,  
and the semibreve contains  
two minims.<sup>192</sup> Certainly  
in this part, which is  
entirely [dedicated to]  
the rhythms, it remains to  
be discussed just how the  
same note can be worth  
three or more [values].  
With the consideration of  
the *tempus* understood  
(which is recognized in  
the beat of the pulse), it  
is necessary for us to  
know whether it is  
concerned with being  
doubled or tripled or  
quadrupled, or also being  
divided into two, three  
or, if you prefer, four  
parts.

For the first  
consideration is called  
*modus*, not from *modulari*  
or *movere*, as it was said  
above, but we believe that  
it is named from  
*modificatio* or the  
computation of the

coniunctio soni  
temporisque longis notulis  
mensurati, quod nihil  
aliud est quam quod modus  
est coniunctio  
proportionis, quae  
consurgit ex notis longis  
et brevibus viam mensurae  
mensurando scilicet tempus  
ipsum.

Prolatio enim a  
proferendo, quia, cum  
tempus dividitur in  
partes, melius profertur,  
ut in versuum contingit  
scansione. Egidius vero  
de Marino dicit, quod ideo  
dicitur prolatio, quia  
tempus [dividitur] in  
partes minutiores, ut  
melius proferatur; nam  
absurdum esset, ut ait,  
quod potest pronuntiari  
non posse scribi.

Inde in hac parte tertia  
numerorum species habemus  
tres, ut sit modus, tempus  
et prolatio. Et sicut  
modus potest duplicari,  
ita prolatio medio dividi.  
Cum igitur modos  
coniungimus invicem, modum  
maiolem appellamus. E  
contra vero, cum prolatio  
secatur, maior prolatio  
nuncupatur. Si enim  
tempus pro unitate in  
medii digiti ponamus  
summitate, modus in indice  
correspondebit ex augmento  
minori prolationi in medio  
posita ex divisione. Sic

*tempus*.<sup>193</sup> Indeed,  
according to the master  
Franco, it is a  
conjunction of the sound  
and of the *tempus* measured  
by long notes, because the  
*modus* is nothing other  
than the conjunction of  
the proportion which rises  
out of longs and breves by  
measuring the means of the  
measure, that is, the  
*tempus* itself.<sup>194</sup>

For the *prolatio* [is  
taken] from  
*proferendo*,<sup>195</sup> because  
when the *tempus* is divided  
into parts it is better  
articulated, as it occurs  
in the scansion of verses.  
Truly, Egidius de Marino  
says that it is called  
*prolatio* for this reason,  
because the *tempus* is  
divided into smaller  
parts, so that it may be  
better articulated; for as  
he says: "It would be  
absurd that what can be  
sung cannot be  
written."<sup>196</sup>

Whence, in this third  
part concerning the  
rhythms, we have three  
species--that is, the  
*modus*, the *tempus*, and the  
*prolatio*. And just as the  
*modus* can be doubled, thus  
the *prolatio* [can be]  
divided in half.  
Therefore, when we unite  
the *modi* in relation to  
one another, we call it  
the *modus maior*. But on  
the other hand, when the  
*prolatio* is divided, it is  
called the *prolatio maior*.  
For instance, if for  
unity's sake we arrange

et in pollice modus maior,  
in auriculari prolatio  
maior recte collocabuntur  
et cum maxima rei  
similitudine.

Supra quidem tactum est  
notulam simplicem dici  
tempus. Modus ergo minor  
habebit longam, maior vero  
maximam, quae duplex longa  
a plerisque est appellata;  
prolatio minor semibreve,  
quae et minor est  
nuncupata, sed maior  
minimam, post quas  
scilicet odas ponitur  
punctus augmentans,  
dividens aut reducens;  
post quam diminutae  
notulae scilicet  
[semiminima], [cursea],  
[minarea], fusea. Harum  
autem nomina et quot modis  
unaquaque notula  
figuretur, in capitulo de  
notulis latius diximus.  
Hic vero strictim et per  
modum corollarii earum  
notitiam breviter  
ostendemus, quarum  
cognitio a brevi procedit.  
Quae notula est quadrata  
sic ♯; sed si ad latus  
dextrum tractum in sursum  
aut deorsum habuerit hoc

the *tempus* on the apex of  
the middle finger, the  
*modus* will correspond on  
the index [finger] on  
account of the  
augmentation to the  
*prolatio minor* [which is]  
placed on the middle  
[finger] according to the  
division. Thus also the  
*modus maior* will be  
properly arranged on the  
thumb, and the *prolatio  
maior* [will be arranged]  
on the little finger; and  
[this is done] with the  
greatest similitude of the  
theory.

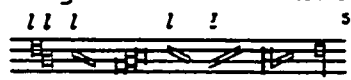
Certainly the simple  
sign called *tempus* was  
touched upon above.  
Therefore, the *modus minor*  
will have a long, but the  
[*modus*] *maior* will have a  
maxima which is called a  
*duplex long* by many  
[people]; the *prolatio  
minor* will have a  
semibreve,<sup>197</sup> which is  
also called *minor*, but the  
[*prolatio*] *maior* will have  
a *minim*, after which--that  
is, [after these] figures  
--a point is placed [for  
the purpose of]  
augmenting, dividing, or  
reducing; after this the  
diminished [signs] are  
placed--that is, the  
*semiminim*, the *cursea*, the  
*minarea*, [and] the *fusea*.  
However, in the chapter  
concerning the signs we  
have discussed the names  
of these [signs] in  
greater detail, and [we  
have also discussed in]  
how many ways each sign is

modo  $\text{H} \text{H}$ , efficitur  
 longa. Quod si  
 longae corpus fuerit  
 duplicatum sic  $\text{H} \text{H}$ ,  
 maxima nuncupatur a  
 modernis; ab antiquis  
 rectius duplex longa  
 dicebatur. Hoc enim  
 accidit in augmento ipsi  
 brevi. Quod si ab angulo  
 in angulum secetur  
 diametraliter hoc pacto  $\text{H}$ ,  
 duae semibreves  
 efficiuntur, quae ab  
 antiquis minores  
 dicebantur, sic  $\diamond \diamond$ . Verum  
 si semibrevis in sursum  
 aut deorsum habuerit  
 tractum sic  $\downarrow \uparrow$ , efficitur  
 minima. Quod si minima  
 fuerit denigrata  $\blacktriangledown \blacktriangleup$ ,  
 semiminima; quae, si ad  
 caput si retorta  $\blacktriangledown \blacktriangleup$ ,  
 curseae sive cursuta aut  
 crocea, quae, si fiat sic  
 $\blacktriangledown \blacktriangleup$ , [minarea], quae, si  
 hoc modo  $\blacktriangledown$ , fusea est  
 appellata. Et isto modo  
 omnes notulae  
 cognoscuntur, verum  
 semibrevis, brevis et  
 longa aliis modis.  
 Dabimus igitur modum  
 longam et semibreve  
 cognoscendi, et sic brevis  
 cognoscetur, quae diversis  
 et variis modis figuratur  
 in ligaturis.

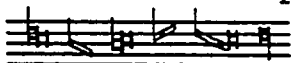
represented. But here,  
 superficially and by means  
 of a corollary, we will  
 briefly show a notion of  
 those [signs] whose  
 recognition proceeds from  
 the breve. The sign [of  
 the breve] is square in  
 this way  $\text{H}$ , but if it has  
 a line above or below on  
 [its] right side in this  
 way  $\text{H} \text{H}$ , a *long* is made.  
 But if the body of the  
 long has been doubled in  
 this way  $\text{H} \text{H}$ , it is  
 called a *maxima* by the  
 moderns; [although] it was  
 more correctly called a  
*duplex longa* by the  
 ancients.<sup>198</sup> For this  
 occurs in an augmentation  
 to the breve itself. But  
 if it is divided  
 diametrically from angle  
 to angle in this way  $\text{H}$ ,  
 two semibreves are made,  
 which were called *minor*  
 [semibreves] by the  
 ancients, such as  $\diamond \diamond$ .  
 Truly, if a semibreve  
 contains a line above or  
 below in this way  $\downarrow \uparrow$ , a  
*minim* is made. But if a  
*minim* has been colored  
 black  $\blacktriangledown \blacktriangleup$ , a *semiminim* [is  
 made]; on the chance that  
 it is twisted at the top  
 [like this]  $\blacktriangledown \blacktriangleup$ , it is  
 called a *cursea* or, if you  
 prefer, a *cursuta*, or a  
*crocea*; if it is made in  
 this way  $\blacktriangledown \blacktriangleup$ , [it is  
 called] a *minarea*; if [it  
 is made] in this way  $\blacktriangledown$ ,  
 [it is called] a *fusea*.  
 And in this manner all  
 of the signs are

acknowledged; however, the semibreve, the breve, and the long are [also] acknowledged in other ways. Therefore, we will give the method of recognizing the long and the semibreve; and likewise the breve, which is represented with ligatures in diverse and various ways.

Ligatura duarum pluriumve notarum habens primam altiorem [sequente] se carentem [tractu] ex parte sinistra sursum aut deorsum longa dicitur. Sed si aliqua istarum defuerit conditionum, longa non erit. Verum si quadrata non fuerit, sive altior sive inferior fuerit carens tractu aliquo, semper est longa. Ultima vero, contrarias si habuerit conditiones, longa dicitur. Exemplum:

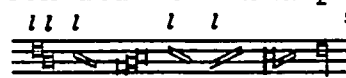


Ligatura vero duarum pluriumve notularum in arsi aut thesi quadratarum sive non, aut primae quadratae et aliarum non, habens tractum ascendens ex parte sinistra, duae semper primae, etsi fuerint solae, semibreves dicuntur. Exemplum:

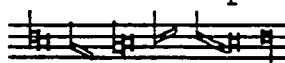


Signabimus igitur longas littera l, semibreves vero signo s consignabimus, ut, cum postea in cantibus similes ligaturas reperimus, quae sint

The ligature of two or more notes having the first [note] higher than the following [note and] lacking a line from the left part above or below is called a *long*. But if any of these conditions are absent, it will not be a long. Indeed, if it is not square or if it is higher or lower--lacking any line--it is always a long. But the last [note] will be called a *long* if it has contrary conditions. Example:



But the ligature of two or more notes in arsis or thesis--of squares or not, or of the first square and of the others not--having a line ascending from the left side, are called *semibreves* even though the first two will always be alone. Example:



Therefore, we will mark the longs with the letter l, but we will indicate the semibreves with the sign s, so that when we

longae, quae vero semibreves, facile cognoscamus. Ceteras vero odas, quae nec semibreves nec longae fuerint, relinquuntur esse breves. Dubitaret tamen aliquis nec immerito, quare istae notuiae sic appellatae sint? Dicemus: quia breve est tempus, notula temporis brevis appellatur. Unde illud, quoniam *mille anni ante oculos tuos tamquam dies hesternae quae praeteriit*. Longa vero, quia maior est ipsa brevi. Semibrevis vero nomen habet ex re, cum brevis in duas semibreves secetur; cum vero in tres, appellantur minores. Maxima vero et minima dictae sunt per comparationem. Nam posita brevi in positivum respectu fractionum magna dicitur. Quod si magna, longa maior necesse est, et sic sequitur maxima in superlativo. Sed eadem brevis parva dicitur respectu longae et etiam maximae. Quod si parva, minor est semibrevis et sequitur minima in superlativo.

[63]

find similar ligatures in the songs after that, we may easily recognize which ones are longs and which ones are semibreves. But the remaining figures, which will be neither semibreves nor longs, are left to be breves. Nevertheless, some may doubt--and not without reason--why these signs are named in this way. We will say: because the *tempus* is a breve, the sign of the *tempus* is called a breve. Whence because "a thousand years in Thy sight are like yesterday, which has already gone by."<sup>199</sup> Truly, the long [receives its name] because it is greater than the breve. And the semibreve has [its] name on account of the fact that a breve is divided into two semibreves, but when [a breve is divided] into three [semibreves] they are called *minor* [semibreves].<sup>200</sup> But the maxima and minim were named by comparison. For when the breve is placed into the positive in respect to degrees, it is called great. But if [the breve is] great, it is necessary for the long to be greater, and thus the maxima follows as the superlative. Yet the same breve is called *small* with respect to the long and the maxima. But if [the breve is] small, the semibreve is smaller, and the minim follows as the superlative.<sup>201</sup>

Nomina autem fractionum a modernis inventa sunt; ideo non sunt tantae auctoritatis. Ut dicatur semiminima, quoniam media minima, sic et [cursea] a cursu simili modo derivata, [minarea] idest area minima, quia in valore minor praecedentibus est. Fuseam vero quidam dicunt a similitudine figurae, quia ad modum fusi facta; alii vero, quia cantum neemus [circumvolventes] cum fuis. Sed de his hactenus, et ipsa diximus capitulo de notulis.

Nunc autem, ut valorem istarum notarum comprehendere valeamus, sciendum nobis est tres numeros esse, quibus utimur in hac parte: perfectum scilicet, imperfectum et diminutum. Perfectus est, cum notula trium sequentium valoris est, imperfectus, cum duas continet, diminutus, cum pro una tantum ponitur subsequenti. Perfectum dicimus ternarium non persuasive nec ex comparatione, ut Johannes de Muris dicit, quia trinitas in divinis et in anima intellectiva. Nam defectus est in matheseos disciplinis per

The names of the fractions were invented by the moderns; therefore, they are not of much authority. Inasmuch as it may be called a semiminim because it is half a minim, thus also the cursea is derived in a similar way from *cursus*; [it is called] the minarea--that is, the *minim area*--because it is lesser in value than the preceding [values]. But some [people] name the fusea according to the resemblance of [its] figure, because it is made in the manner of a spindle; but others [name it thus] because we weave a song by circling with fuseas. But enough concerning these things, and those things [which] we have spoken of in the chapter about the notes.

And now, so that we may be able to understand the value of these signs, it should be known by us that we make use of three rhythms in this part, namely: perfect, imperfect, and diminutive. [The rhythm] is perfect when the sign is of the value of the three following [notes], [it is] imperfect when it contains [the value of] two, [and it is] diminutive when it is placed on behalf of only one of the [notes] that follows. We say that the number three is perfect--not by persuasion or comparison--[but] as Johannes Muris says,

comparationem aliqua probare. [Ista] mutatio terna corporis, dimensio linearum aliquantulum est naturalis. [Sed] tamen eam etiam improbamus, quoniam eodem modo senarius prior et perfectior dici poterit, quia sex punctis terminatur et punctum prius est in mathematica abstractione. [Ratio] vero, quam tradimus nos, mathematica est, scilicet [quod] perfectus numerus dicitur ternarius, quoniam partibus aliquotis et quotis simul sumptis est aequalis. Excedit ergo senarium in perfectione; nam pars quota dicitur quaelibet pars infra ipsum numerum contenta, quod omnis ergo pars aliquota potest dici quota, non tamen e contra. Quando igitur aliqua in aliis scientiis debent probari, ad mathematicas necesse est recurrant demonstrationes, quoniam hic demonstratur, illic autem comparatio sufficiet. Illi igitur, qui in musica perfectionem dicunt per comparisonem, perfectionem suam auferunt ab ea. Haec de numero perfecto.

"because the number three is [found] in the divine and intellective soul."<sup>202</sup> For in the mathematical disciplines it is [considered] a defect to prove something by comparison. That triple mutation of the body--a dimension of lines--is somewhat natural. But nevertheless, we also reject it, since by the same method the number six will be able to be called better and more perfect because it is limited by six points, and [because] the point is first in mathematic abstraction. But the reason that we teach that it is mathematic--that is, [the reason] that the number three is called a perfect number--is because it is equal to the aliquot and quota parts taken together. Therefore, the number six exceeds in perfection; for whichever part is contained below the number itself is called a quota part. Wherefore, every aliquot part can be called a quota, nevertheless, the opposite is not [true]. Therefore, when something must be proven in other sciences, it is necessary for them to resort to mathematic demonstrations. Since it is demonstrated here, a comparison will be sufficient there. Therefore, those who say that there is perfection in music by comparison take its perfection away



Imperfectus autem numerus dicitur binarius, quia per unitatem distat a perfectione; sed diminutus, quia per binarium, qui vix numerus dici deberet, nisi quia in hac facultate notulae franguntur, et per respectum ad duas medietates verum tenebit. Aliter autem in arithmetica ponitur numerus triplex: perfectus scilicet, superfluous et diminutus per comparationem ad partes aliquotas. Unde senarius, cuius partes aliquotae sunt 1. 2. 3, quae simul iunctae senarium implent nec excedunt, dicitur perfectus. Sed 12, cuius partes 1. 2. 3. 4. 6 simul sumptae suum totum excedunt, superfluous habetur, diminutus numerus 10, quia eius partes scilicet 1. 2. 5 ad totius summam non accedunt, et 8 similiter, cuius partes scilicet 1. 2. 4 septem non excedunt. Itaque omnis inaequalitas aut in maioribus, aut in minoribus terminis consideratur. Illi enim immoderata quodammodo plenitudine proprii corporis quantitatem partium suarum numerositate excellunt. Illos autem velut paupertate inopes oppressosque quadam naturae suae inopia minor quam ipsi sint partium

from it. [But] enough about the perfect number.

Now the number two is called an imperfect number, because as a unit it is far from perfection; but [it is] diminutive because by means of the number two (which hardly ought to be called a number except in this instance), the notes are divided, and certainly it will hold in respect to the two halves. However, in arithmetic the triple number is arranged in another way--that is, perfect, superfluous, and diminutive by comparison to [its] aliquot parts. Whence, the number six is called perfect whose aliquot parts are 1:2:3, which joined together complete the number six and do not exceed [it]. But [the number] 12, whose parts taken together exceed its whole--1:2:3:4:6--will be held superfluous; the number 10 is diminutive because its parts--that is, 1:2:5--do not reach the sum of the whole, and similarly [with the number] 8, whose parts--that is, 1:2:4--do not exceed seven. For that reason, every inequality is considered either in major or minor limits. For those [limits], in a certain unrestrained plenitude of their proper body, excel in number the quantity of their parts. However, those [limits], as by poverty--powerless and

[64]

summa componit. Sed de  
his hactenus. Nunc vero  
differentias numerorum  
colligamus.

oppressed by a certain  
weakness of their nature--  
are composed of the sum of  
the parts lesser than  
themselves. But enough of  
these things. Now let us  
consider the differences  
of the rhythms.

CAPITULUM SECUNDUM

IN QUO SIGNA PER QUAE  
[NUMERI] DISTINGUUNTUR

Ad veram igitur istorum numerorum cognitionem quaedam signa, quae ab antiquis ex geometricis figuris fuerunt adinventata, declaremus. Deinde alia, quae neotericis ponunt, subiungemus. Quadrangulus cum tribus tractibus hoc modo  $\square^m$  pro modo perfecto ponebatur et cum duobus sic  $\square^n$  pro imperfecto. Sed pro tempore cum prolatione perfectis ponebatur  $\circ$  cum tribus punctis in medio sic  $\odot$  et pro imperfectis  $\subset$  cum duobus punctis in medio sic  $\Subset$ . Quod si  $\subset$  cum tribus sic  $\Subset$ , tempus erat imperfectum et prolatio perfecta. Sed si  $\circ$  cum duobus ponitur sic  $\odot$ , tempus perfectum et prolatio imperfecta credebatur.

SECOND CHAPTER

IN WHICH THE SIGNS  
[ARE TREATED] BY WHICH THE  
RHYTHMS ARE DISTINGUISHED

Therefore, for a true knowledge of these rhythms, let us explain some signs which have been invented by the ancients from the geometric figures. Then we will add others which the moderns propose. A quadrangle with three lines was established for the *modus perfectus* in this way  $\square^m$ , and with two [lines] for the [*modus*] *imperfectus* in this way  $\square^n$ . But a  $\circ$  with three points in the middle was established for the *tempus perfectum* with *prolatio perfecta* in this manner  $\odot$ , and a  $\subset$  with two points in the middle [was proposed] for the *tempus imperfectum* with *prolatio imperfecta* in this manner  $\Subset$ . But if a  $\subset$  [was established] with three [points] in this way  $\Subset$ , the *tempus* was imperfect and the *prolatio* was perfect. But if a  $\circ$  [was established] with two [points] in this way  $\odot$ , the *tempus* was believed to be perfect and the *prolatio* was thought to be imperfect.

Alii vero figurabant Indorum figuris hoc modo  $\overset{3}{3} \overset{3}{2} \overset{2}{2}$ , inferior denotans tempus, superior vero prolationem. Nostri vero contemporanei partim geometricis partim Indorum utuntur figuris; namque unum modi cum tempore ponunt, aliud vero temporis cum prolatione, utrumque vero quadrupliciter factum. Modi cum tempore sic  $\bigcirc_3 \subset_3 \bigcirc_2 \subset_2$ , sed temporis cum prolatione hoc modo  $\bigcirc \subset \bigcirc \subset$ . Hic modus signandi hac ratione compertus est, quia circulus figura perfecta perfectam denotat speciem. Sed cum duae circuli tantum partes ponuntur, duas illius speciei partes amissa tertia denotant. De hoc vero signo 3 vel de isto 2 non est ambiguitas: primum esse perfectum, secundum vero imperfectum. In primo etenim signo quadripartito circulus aut semicirculus modum ostendunt minorem, 3 aut 2 tempus. Subtilis igitur lector per ea, quae posuimus, sive modi sive temporis perfectionem poterit invenire. In secundo vero signo, quod in alio modum, in hoc tempus designat, si enim punctus in centro ponatur, [65] prolationis demonstrat perfectionem; quod si non, imperfectionem. Ita et in semicirculo, ut patet in figuris.  $\bigcirc_3$  figura modi cum tempore,  $\subset$  figura temporis cum prolatione.

Truly, other [people] represented [them] with the figures of the Hindu's in this way:  $\overset{3}{3} \overset{3}{2} \overset{2}{2}$ ; [with] the lower [number] denoting the *tempus* and the upper [number] denoting the *prolatio*. But our contemporaries use the geometric figures in part and the figures of the Hindu's in part; for they arrange one with the *tempus* of the *modus*, but the other with the *prolatio* of the *tempus*, both made in four ways: [that] of the *modus* with the *tempus* in this way  $\bigcirc_3 \subset_3 \bigcirc_2 \subset_2$ , but [that] of the *tempus* with the *prolatio* in this way  $\bigcirc \subset \bigcirc \subset$ . This manner of designating is established for this reason, because the circle--a perfect figure--denotes the perfect species. But when only two parts are arranged within the circle, they denote two parts of that species with the third [part] missing. Truly, there is no ambiguity concerning this sign 3 or this [sign] 2, [for] the first is perfect and the second is imperfect. Indeed, in [regard to] the first sign with four parts, the circle or semicircle indicates the *modus minor*; the 3 or the 2 [indicates] the *tempus*.<sup>203</sup> Therefore, the discerning reader will be able to find the perfection of the *modus* or of the *tempus* by those

things which we have established. Indeed, that which designates the *modus* on the first sign [that is divided into four parts], designates the *tempus* on this second sign [that is divided into four parts], for if the point is placed in the center it demonstrates the perfection of the *prolatio*;<sup>204</sup> but if not, it [indicates] imperfection. Likewise also with the semicircle, as it appears in the figures.  $\bigcirc 3$  is a representation of the *modus* with the *tempus*;  $\subset$  is a representation of the *tempus* with the *prolatio*.

Has igitur figuras sic dispositas hac ratione [repperimus], quia contrarias numerorum passiones inter se custodientes cognovimus. Nam in primo signo quadripartito signum superius, [quod] sinistram tenet legentis, et temporis et modi perfectionem affirmat. In sua vero contraria modi, qui universalior est, perfectio denegatur idemque in subcontrariis reperitur. Inferius vero, quod dextram tenet legentis, contrarias omnino recipit passiones. Sic et sinistrum inferius contra dextrum superius; nam id quod negatur in una, affirmatur in alia sua contradictoria et e contra. Quodsi utrumque negatur in una, ambo

Therefore, we have found that these figures were arranged in this manner for this reason, because we have recognized the opposites [while] observing the proportions of the rhythms among themselves. For on the first sign [that is] divided into four parts, the upper sign which is to the left of the reader, confirms both the perfection of the *tempus* and [the perfection] of the *modus*. But on its opposite [side], which is more universal, the perfection of the *modus* is denied, and the same is found on the opposite [sides] below. But the lower [sign], which is to the right of the reader, receives entirely opposite proportions. Likewise

affirmantur in altera sua  
 contradictoria.  
 Subalternae vero poterunt  
 dici, eo quod modus, qui  
 universalior est, idem  
 esse [videtur]. Sic et de  
 alio signo quadripartito  
 dicendum est, ut patuit in  
 figuris.

Verum quia in hac parte  
 quidquid per varias  
 fractiones diversasque  
 diminutiones canitur ad  
 quandam certam  
 integritatem  
 determinatamque mensuram  
 reducitur, scire nos  
 oportet per signa diversa,  
 in quibus notulis mensuram  
 integram debemus tenere.  
 Mensura enim, ut diximus,  
 est illud tempus sive  
 intervallum inter  
 diastolen et systolen  
 corporis eucraton  
 comprehensum. De cuius  
 inaequali alteratione  
 insurgunt inaequales  
 musicae proportionales, de  
 quibus paulo post dicturi  
 sumus. Cum igitur cantor  
 recte et commensurate  
 cantare desiderat, instar  
 pulsus istius pedem aut  
 manum sive digitum tangens  
 in aliquem locum canendo  
 moveat. Et cum per primum  
 cecinerit signum  
 quadripartitum, mensuram

also the lower left [sign]  
 opposite the upper right  
 [sign]; for what is  
 negated on one [sign] is  
 confirmed on the other--  
 its contradictory--and  
 vice-versa. But if both  
 are negated on one [sign],  
 both are confirmed on the  
 other--its contradictory.  
 And they will be able to  
 be called *subalterns*  
 because the *modus*, which  
 is more universal, appears  
 to be the same. Likewise  
 also it should be said  
 concerning the other sign  
 [that is] divided into  
 four parts, as it was  
 revealed in the figures.

Certainly, in this part  
 it is necessary for us to  
 know by means of different  
 signs on which notes we  
 must have the entire  
 measurement, since  
 whatever is sung by  
 various divisions and  
 diverse diminutions is  
 reduced to a certain  
 proven integrity and a  
 determined measurement.  
 For as we have said, the  
 measurement is the *tempus*  
 or, if you prefer, the  
 space--*eucraton*--  
 comprehended between the  
 diastole and the systole  
 of the body. From its  
 variable alteration arise  
 variable proportions of  
 music, which we are going  
 to speak about a little  
 later. Therefore, when  
 the singer wishes to sing  
 correctly and  
 commensurately, while  
 singing he may move the  
 foot or the hand or, if  
 you prefer, the finger,

istam ponat in brevi; tunc enim longa in istis  $\circ_3 \circ_2$  tribus temporis morulis mensurabitur, in istis vero  $\subset_3 \subset_2$  duabus. Duplex vero longa in his  $\circ_3 \circ_2$  sex, sed in istis  $\subset_3 \subset_2$  4 tantum valebit. Ipsa vero mensura in istis duobus  $\circ_2 \subset_2$  per medium in duo tantum semibreves secatur quatuorque minimas. In istis vero  $\circ_3 \subset_3$  aequaliter in tres dividitur semibreves sex quoque minimas, nisi comparatio inaequalis fiat cum tenore, quoniam tunc insurgit quaedam inaequalitatis habitudo, de qua in proportionibus dicemus.

Sin vero per secundum cecinerit signum quadripartitum, morulam ponet in semibreui et tunc brevis tres mensuras valebit in istis  $\odot \circ$ , duas vero tantum in his  $\subset$   $\subset$ ; et sicut in aliis divisa fuit aequaliter in [66]

touching upon some place [for] the value of that pulse. And when he has sung according to the first sign [that is] divided into four parts, let him place this measurement on the breve; for then with three divisions of the *tempus*, the long will be measured on these [signs]  $\circ_3 \circ_2$ , but with two [divisions of the *tempus* the long will be measured] on these [signs]  $\subset_3 \subset_2$ . And the duplex long on these [signs]  $\circ_3 \circ_2$  will be worth six, but on these [signs]  $\subset_3 \subset_2$  it will only be worth four. Indeed, the same measurement on these two [signs]  $\circ_2 \subset_2$  is divided in half [resulting] in merely two semibreves and four minims. But on these [signs]  $\circ_3 \subset_3$  it is equally divided into three semibreves and also six minims, unless the comparison is made unequal with the tenor, since then a certain condition of inequality arises, which we will discuss [in the section] on the proportions.<sup>205</sup>

And if one sings according to the second sign [that is] divided into four parts, he will place the division on the semibreve, and then the breve will be worth three quantities on these [signs]  $\odot \circ$ , but only two on these [signs]  $\subset \subset$ ; and

duas aut in tres  
semibreves, ita in istis  
[in] duas minimas aut in  
tres, prout signum  
perfectionem aut  
imperfectionem denotat,  
dividetur. Sic et in 4  
aut in sex semiminimis, et  
istud est, quod  
frequentius observatur.

Aliquando autem propter  
cantus nimiam diminutionem  
cantores mensuram, quae in  
brevis erat observanda,  
ponunt in semibrevis, et si  
erat in semibrevis tenenda,  
transferunt illam in  
minima taliter, quod iam  
pro maiori parte omnes  
tenent et scribunt in  
compositione pro hoc signo  
⊙ vel hoc ℄, quod  
mensurae morula in minima  
teneatur integra. Et si  
in tenore signum diversum  
ab aliis ponatur, ut si ⊙ ℄  
in tenore et hoc ○ in  
aliis, minima tenoris  
tantum valet, quantum  
aliarum valet semibrevis,  
quia morulam integram, et  
si in aliis istud ○<sup>2</sup>  
ponatur, quantum brevis.  
Et istud servat  
[Ockeghem], Busnois, Dufai  
et Johannis de Monte et  
alii viri in hac facultate  
famosi. Tinctoris vero  
viam veritatis ignorans  
quaedam ponit, quae in  
lucem non essent  
deducenda. Verum in  
proportionibus aliqua  
dicam de eis, ne rectus  
ordo perturbetur  
ignorantis opinione.  
Namque Busnois et isti

just as in the others it  
was divided equally into  
two or three semibreves,  
thus on these it will be  
divided into two or three  
minims as the sign denotes  
the perfection or  
imperfection. Likewise  
also into four or into six  
semiminims, and this is  
what is observed more  
frequently.<sup>206</sup>

However, sometimes on  
account of the excessive  
diminution of a song, the  
singers place the  
measurement, which should  
have been observed on the  
breve, onto the semibreve,  
and if [the measurement]  
should have been held on  
the semibreve, they pass  
that onto the minim in  
such a way which they all  
hold to now for the  
greater part; and in  
composition they write  
according to this sign ⊙  
or this [sign] ℄, because  
the entire division of the  
measurement is contained  
in the minim. And if a  
sign is placed in the  
tenor distinct from the  
others, as for example if  
⊙ [or] ℄ [is placed] in  
the tenor and this [sign]  
○ [is placed] in the  
other [voices], the minim  
of the tenor is worth as  
much as the semibreve of  
the other [voices], since  
it is worth an entire  
division; and if this  
[sign] ○<sup>2</sup> is placed in  
the other [voices], it is  
[worth] as much as the  
breve.<sup>207</sup> And this



magni viri fundantur in antiquitate; et sicut quantitas ex uno latere crescendo augmentatur, sic ex alio dividendo minuitur. Si enim antiqui ponebant mensuram in brevi, in longa et quandoque in maxima, ita nos in brevi, semibreui et aliquando in minima. Sed de mensuris hactenus. Nunc de perfectione aliarum specierum dicamus.

[procedure] is observed by Ockeghem, Busnois, Dufay, Johannes de Monte, and other famous men in this discipline. But Tinctoris, ignorant of the path of truth,<sup>208</sup> establishes certain things which should not be brought to light. Lest the correct order be disturbed by the opinion of an ignoramus, I will say something about them [in the section] on the proportions. For Busnois and these great men base their ideas upon antiquity, and just as the quantity is augmented by increasing from one side, thus [the quantity] is diminished by dividing from the other [side]. For if the ancients placed the measurement on the breve, on the long, and at times on the maxima, thus we [will place the measurement] on the breve, the semibreve, and at times on the minim.<sup>209</sup> But enough about the measurements. Now let us speak about the perfection of the other species.

### CAPITULUM TERTIUM

#### IN QUO SIGNA ALIARUM SPECIERUM

Restat, quoniam sumus  
numeros in omnibus  
speciebus divisuri,  
perfectum ab imperfecto in  
modo prolationeque  
maioribus, quibus figuris  
distinguatur, declarare.  
Hoc autem melius  
assequemur, si prius  
pausarum notitiam, quam in  
prima parte posuimus, ad  
memoriam breviter  
revocemus. Quarum quidem  
cognitio sicut in notulis  
ab ipsa incipit temporis  
pausa, quae a linea in  
lineam totum spatium  
implens figuratur hoc modo  
⊖. Quae si duo vel  
[tria] spatia occupet sic  
⊖̄, pausa longa dicitur;  
si vero quatuor spatia  
amplectitur hoc modo ⊖̄̄,  
pausa maximae, ultra quam  
nulla maior. Appellatur  
et pausa generalis, quando  
generaliter omnes  
adveniente ita cantu non  
terminato quiescunt.  
Appellatur quoque finalis,  
quoniam semper in fine  
cantus ponitur. Quod si  
pausa brevis dividatur,  
medietas, quae a linea  
pendet superiori, est  
semibrevis; si pars vero,  
quae ab inferiori  
erigitur, pausa minimae  
nuncupatur. Quae si ad  
caput sit hoc modo ⊖̄

### THIRD CHAPTER

#### IN WHICH THE SIGNS OF THE OTHER SPECIES [ARE TREATED]

Since we are going to  
distribute the rhythms  
within all the species,  
there remains [for us] to  
explain by which figures  
the perfect is  
distinguished from the  
imperfect in the *modus*  
*maior* and the *prolatio*  
*maior*. However, we will  
understand this better if  
first we briefly recall to  
memory the concept of the  
rests which we established  
in the first part. Indeed,  
a knowledge of the rests--  
as in the notes--begins  
with the rest of the  
*tempus* itself which is  
represented [by] filling  
the entire space from line  
to line in this way: ⊖̄.  
If this occupies two or  
three spaces in this way  
⊖̄̄, it is called a *long*  
*rest*; but if it  
encompasses four spaces in  
this way ⊖̄̄̄, [it is  
called] a *maxima rest*--  
beyond which there is  
nothing greater. It is  
also called a *general*  
*rest*, when everyone rests  
as a group at such a pause  
occurring in a song that  
has not ended. It is also  
called *final*, since it is  
always placed at the end  
of a song. But if the  
breve rest is divided, the

retorta, pausa  
 semiminimae nominatur.  
 Aliarum vero [fractionum]  
 ob nimiam sui brevitatem  
 pausa non reperitur.  
 Verum quidam ut Johannes  
 Urede, [carissimus] noster  
 regis Hispaniae capellae  
 magister, pausas posuit  
 curseae hoc modo  
 perscriptas ꝑ fundatus in  
 hoc, quod notulis accidit.  
 Semiminima enim, si caput  
 habet retortum efficitur  
 cursea, medietas scilicet  
 minimae. Quod si cursea  
 dupliciter sit retorta,  
 efficitur minarea ꝑ,  
 medietas scilicet curseae.  
 Sic igitur de pausa  
 fiendum: quia, si pausa  
 minimae ad caput sit  
 retorta, efficitur  
 semiminimae; ergo si bis  
 sit retorta, curseae. Nos  
 autem illud posse fieri  
 non negamus, quia ratione  
 fundatum arte cognovimus,  
 verum non debuisse fieri  
 conclusimus, quia, cum  
 notula illa tantae sit  
 levitatis, quaevis potest  
 in cantu comprehendi,  
 quomodo in pausatione  
 spiritus in ea quiescet.  
 Non ergo illud esse  
 fiendum concedimus, sed  
 evitandum fore proponimus.

[67]

half which hangs down from  
 the upper line is a  
 semibreve; but if it is  
 the part which is erected  
 from the lower [line], it  
 is called a *minim rest*.  
 But if it is twisted at  
 the top in this way ꝑ, it  
 is called a *semiminim*  
*rest*. But a rest is not  
 found for the other  
 fractions due to their  
 excessive brevity.  
 Nevertheless, certain ones  
 [have done] as Johannes of  
 Urreda,<sup>210</sup> our dearest  
 friend [and] Kapellmeister  
 for the King of Spain,  
 [who] established rests of  
 the cursea written down in  
 this manner: ꝑ, based  
 upon that which happens  
 with the notes. For if  
 the semiminim has [its]  
 top twisted, a cursea is  
 produced--that is, half of  
 a minim.<sup>211</sup> But if the  
 cursea is twisted twice, a  
 minarea is produced ꝑ--  
 that is, half of a cursea.  
 Therefore, the [rhythmic]  
 rest should be done in  
 this way, because if a  
 rest of a minim is twisted  
 at the top, [a rest] of a  
 semiminim is produced;  
 accordingly, if it is  
 twisted twice, [a rest] of  
 a cursea [is produced].  
 However, we do not deny  
 that it can be done,  
 because we have recognized  
 that it is based in theory  
 upon [principles of] art,  
 but we have concluded that  
 it should not be done,  
 since that note is of so  
 little consequence--as  
 [when] one rests while  
 pausing for a breath--it  
 cannot be detected by

His ergo pausis sic  
 cognitis facile  
 perfectionem et  
 imperfectionem in aliis  
 speciebus cognoscimus.  
 Cum enim tres pausas  
 longae positas simul aut  
 una praecedente alias duas  
 simul vel omnes tres  
 solutas in aliquo cantu  
 inspexerimus, procul dubio  
 maiorem modum et exinde  
 maximam longas tres valere  
 via artis intelligimus.  
 Quod si binae ponantur et  
 binae, imperfectum esse  
 iudicamus. Verum si eadem  
 pausa longae tria occupet  
 spatia, minorem perfectum  
 et ex hoc longam tres  
 breves valere arte  
 cognoscimus; imperfectum  
 vero, si duo tantum  
 occupet spatia. Sic ergo  
 minore existente  
 imperfecto maior perfici  
 poterit et e contra sicut  
 in aliis signis.  
 Perfectio etiam temporis  
 pausis brevium denotatur  
 aliter secundum nos,  
 aliter vero secundum  
 antiquos, quoniam, ut ait  
 magister Franciscus, si  
 pausa temporis occupat  
 totum spatium, totum  
 tempus denotat perfectum.  
 Sin vero duas spatii  
 partes occupaverit, duas  
 temporis partes  
 demonstrat; si autem  
 tantum unam, unicam partem  
 morulae, quia unam minorem  
 ostendit. Neoterici vero

anyone in the song.  
 Therefore, we do not  
 concede that it should be  
 done, but rather we  
 propose that it ought to  
 be avoided.

Therefore, now that we  
 have become acquainted  
 with these rests, we [can]  
 easily recognize the  
 perfection and  
 imperfection in the other  
 species. For when we have  
 observed three rests of a  
 long placed together  
 within some song, or one  
 [rest] preceding another  
 two together, or all three  
 [rests placed] separately,  
 without doubt we  
 understand that it is the  
*modus maior via artis*,<sup>212</sup>  
 and thus the maxima is  
 worth three longs. But if  
 two [rests] are  
 established and then two  
 more, we conclude that it  
 is imperfect.<sup>213</sup>  
 Furthermore, if the same  
 rest of a long occupies  
 three spaces, we recognize  
 the *modus minor perfectus*  
*via artis*, and according  
 to this a long is worth  
 three breves; but if it  
 only occupies two spaces,  
 it is the [modus minor]  
*imperfectus*. Thus the  
 [modus] maior will be able  
 to be perfected from the  
 existing [modus] minor  
*imperfectus* and vice-versa  
 as with the other  
 signs.<sup>214</sup> Certainly, the  
 perfection of the *tempus*  
 with the rests of the  
 breves is indicated by one  
 way according to us, but  
 by another way according  
 to the ancients, since, as

non sic, sed, quando duas  
temporis tertias volunt  
insinuare, duas pausas  
semibrevis unam iuxta  
aliam hoc modo  $\equiv$   
disponunt; et tunc  
perfectum esse tempus  
recte cognoscimus, quia  
totam pausam brevis tres  
minores valere  
intelligimus, ex quo ibi  
duae tertiae et non tota  
integra posita sunt. Nam  
quando tempus est  
imperfectum, pausa  
temporis tantum valet  
quantum pausae duarum  
semibrevium. Ad quid ergo  
deberent poni duae sic  $\equiv$ ,  
si una hoc modo  $\equiv$   
sufficeret? Frustra fit  
per plura, quod potest  
fieri per pauciora.

Eodem modo deducitur de  
prolatione perfecta,  
quoniam, si duae pausae  
minimae hoc modo  $\equiv$   
reperiantur, perfectam  
[denotas] prolationem,  
etiam si aliud non fuerit  
signum. Nam quando

the master Franco says:  
"If the rest of the *tempus*  
occupies an entire space,  
it denotes a whole perfect  
*tempus*. But if it  
occupies two parts of a  
space, it demonstrates two  
parts of the *tempus*;  
however, if [it occupies]  
only one, [it indicates] a  
single part of the  
division, since it  
expresses minor." But the  
moderns do not [arrange  
it] in this way, for when  
they desire to work in  
two-thirds of the *tempus*,  
they arrange two rests of  
the semibreve--one next to  
the other in this way  $\equiv$ ;  
and then we properly  
understand that the *tempus*  
is perfect, because we  
comprehend that the entire  
rest of the breve is worth  
three minor [semibreves],  
since two-thirds have been  
placed there rather than  
the entire whole. For  
when the *tempus* is  
imperfect, the rest of the  
*tempus* is worth as much as  
the rests of two  
semibreves. Therefore,  
for what reason should two  
be placed in this way  $\equiv$   
if one would be sufficient  
in this way  $\equiv$ ? For there  
is no real purpose for  
things to be done by many  
means which can be done by  
fewer means.

Concerning the *prolatio*  
*perfecta*, it is deduced in  
the same way, since, if  
two rests of a minim are  
found in this way  $\equiv$ , you  
denote the *prolatio*  
*perfecta* even if there has  
not been another sign.

prolatio est imperfecta,  
 tantum valet pausa  
 semibrevis sic  $\equiv$   
 quantum duae pausa  
 minimae hoc modo  $\equiv$ ,  
 igitur sicut de tempore  
 figurandum. Et per quod  
 perfectio aut imperfectio  
 in maiori prolatione  
 distinguatur, non omnibus  
 cantoribus constat nec  
 musicis quibusdam ut  
 Tristano de Silva amico  
 nostro, qui crassam  
 Iohannis de Muris  
 opinionem affirmat dicens  
 prolationem perfectam esse  
 maiorem imperfectamque  
 minorem. Quam et  
 antiquorum auctoritate et  
 novorum provectorum  
 exemplo et mathematica  
 demonstratione volumus  
 improbare primum sic:

Egidius de Marino de  
 minima tractans ait  
 merito: tertiam debet  
 amittere partem, punctum  
 vero, quia nihil habet sub  
 se, tantum medietatem. Si  
 igitur minima tertiam  
 potest amittere partem,  
 quaero, quid aliud quam  
 semiminima illa pars  
 tertia est? Tres ergo  
 tertiae totum integrum  
 implent. Relinquitur ergo  
 minima tres semiminimas  
 posse valere, quod patet  
 exemplo Io. [Ockeghem] in  
 missa [*L'homme arme*], ubi,  
 quando debebat semiminimas  
 duas pro una minima  
 scribere, ut volunt  
 cantores cum musico

[68] For when the *prolatio* is  
 imperfect, the rest of a  
 semibreve is worth as much  
 in this way  $\equiv$  as two  
 rests of a minim in this  
 way  $\equiv$ ; therefore, it  
 should be represented just  
 as the *tempus* [was  
 represented]. And it is  
 not known by all the  
 singers how the perfection  
 or imperfection is  
 distinguished in the  
*prolatio maior*, nor [is it  
 known] by some musicians,  
 such as our friend Tristan  
 de Silva, who affirms the  
 vulgar opinion of Johannes  
 de Muris [by] saying:  
 "The *prolatio perfecta* is  
 major and the [*prolatio*]  
*imperfecta* is minor." We  
 wish to reject this, first  
 with the authority of the  
 ancients and [then] with  
 an example and  
 mathematical demonstration  
 of the progressive  
 moderns.

Egidius de Marino [in]  
 dealing with the minim,  
 says with merit: "[The  
 minim] should throw away  
 the third part, but the  
 point, since it holds  
 nothing below itself,  
 [should] only [throw away]  
 the half." Therefore, if  
 the minim is able to throw  
 away the third part, I  
 ask: What is that third  
 part other than a  
 semiminim?<sup>215</sup> Therefore,  
 three thirds complete an  
 entire whole.  
 Consequently, it remains  
 that a minim can be worth  
 three semiminims which  
 appear in Johannes  
 Ockeghem's example in the

Tristano de Silva, ponit minimas evacuatas ad caput retortas hoc modo ♪, quas diximus appellari curseas. Ex quo musici speculantur minimam tres valere semiminimas, nedum quia auctoritas ipsius Egidii et antiquorum clare incontrarium monstratur, cum dicit: sunt et aliae figurae, quae vocantur minimae imperfectae hoc modo factae ♫ et habent maiorem effectum quam semiminima, quia sunt plenae, et minorem effectum, quam si caput haberent erectum. Ex quibus verbis patet, quod nos e converso facimus nigrum scilicet pro albo ponentes, cum pro minima duas ponimus albas curseas, ut ipse Io. [Ockeghem] facit, quia maioris valoris est haec ♫ alba quam ista ♫ nigra. Si curseae duae minimam implent, semiminimas tres fore necessarias mathematice vero probatur, supposito quod ipsimet faciunt, scilicet quod mensura in prolatione perfecta ponatur in minima. Si enim integra temporis morula in minima est et tempus perfectionem et imperfectionem recipiat, sequitur ipsam minimam quandoque in duas, quandoque in tres partes aequales dividi posse; quod si non, nec semibrevis, cum ponitur in ipso, nec brevis eadem ratione.

Mass *L'homme arme*, where he places hollow minims twisted at the top in this way ♫ (which we have said are called curseas) when he should have written two semiminims for one minim, as the singers along with the musician Tristan de Silva desire. From this, musicians speculate that a minim is worth three semiminims, not to speak of [the fact] that the authority of Egidius himself and of the ancients is clearly shown to be to the contrary when he says: "There are also other figures which are called *imperfect minims* made in this way ♫, and they have a greater effect than the semiminim, because they are filled [in] and [have] a lesser effect than if they had an erect top. From these words it is clear that we do the opposite--that is, placing the black for the white when we place two white curseas for a minim, as Johannes Ockeghem himself does, because this white [sign] ♫ is of greater value than this black [sign] ♫. If two curseas complete a minim (indeed it is proven mathematically that three semiminims are going to be necessary), it is assumed that they do the same--that is, that the measurement in the *prolatio perfecta* is established on the minim. For if the whole division

of the *tempus* is on the *minim* and the *tempus* receives perfection and imperfection, it follows that the *minim* itself can be divided at times into two [equal parts] and at times into three equal parts;<sup>216</sup> but if [this is not the case], the *semibreve* [will not be able to be divided] when it is established on [the *tempus*] itself, and neither will the *breve* for the same reason.

Aliis autem modis illa duo signa quadripartita a quibusdam perfigurantur antiquis ut puta modi cum tempore sic  $\circ\circ \subset \circ \circ\subset$   
 $\subset\subset$ . Hic autem modus ab illo non differt; nam id, quod denotatur per 3, patefacit  $\circ$ , et quod intelligimus per 2, per  $\subset$  cognoscimus. Si igitur haec signa in prima disponantur figura, idem erit, quod fuit in illa.

Alii vero ut magister meus Iohannes de Monte, qui fuit primus qui me musices imbuit rudimentis, [69] ad latus signum unum, ut disposuimus, negabat esse ponendum et unum sub alio concedebat hoc modo

However, those two signs that are divided into four parts are represented by certain ancient authorities in other ways; consider this example: [the signs] of the *modus* with the *tempus* [are represented] in this way:  $\circ\circ \subset \circ \circ\subset \subset\subset$ . Moreover, this method does not differ from that [which we have already discussed]; for what is indicated by [the number] 3 reveals a  $\circ$ , and what we understand by [the number] 2, we recognize by means of  $\subset$ .<sup>217</sup> Therefore, if these signs are arranged in the first figure, [the result] will be the same as it was in that [figure].

But others, such as my teacher Iohannes de Monte, who was the first to instruct me in the rudiments of music, said that a sign should not be placed to the side as we have arranged [ours], and



○ C ○ C  
 ○ ○ C C vel, si  
 geometricae figurae  
 Indorum characteribus  
 misceantur, hoc modo  
 ○ C ○ C  
 3 3 2 2, ita tamen ut  
 superius signum istorum  
 teneat vicem prioris  
 aliorum antiquorum ratione  
 [fundati]. Nam si ipsi  
 disponunt tempus cum  
 prolatione hoc modo  $\frac{3}{3} \frac{3}{2} \frac{2}{2}$ ,  
 cum nihil aliud sit 3 quam ○  
 nec C quam 2, rationabile  
 videtur, ut similiter de  
 modo cum tempore faciamus.  
 Tempus vero cum  
 prolatione, quod diximus  
 sic figurandum ○ C ○ C,  
 dicebat sic esse ponendum  
 ⊕ ⊕ ⊕ ⊕, quoniam tunc  
 recte monstratur prolatio  
 intra tempus reclusa;  
 perfectio et imperfectio  
 utriusque clariori modo  
 cognoscitur. Nos vero  
 diximus illi primum modum  
 esse subtiliorem.

Fundati enim in hoc  
 unamquamque notulam duarum  
 sequentium valorem tenere  
 natura geometrica

he conceded that one  
 should be placed below  
 the other in this way  
 ○ C ○ C  
 ○ ○ C C, or, if the  
 geometric figures are  
 mixed with the characters  
 of the Hindu's, in this  
 ○ C ○ C  
 way 3 3 2 2; nevertheless,  
 [it should be done] in  
 such a manner so that,  
 basing our theory upon  
 that of the ancients, the  
 sign of those [characters]  
 above may take the place  
 of the earlier [sign] of  
 the others.<sup>218</sup> For if  
 they arrange the *tempus*  
 with the *prolatio* in this  
 way  $\frac{3}{3} \frac{3}{2} \frac{2}{2}$ ,  
 (since 3 is nothing other  
 than ○ and C is nothing  
 other than 2), it seems  
 reasonable that we may do  
 [this] in a similar way  
 concerning the *modus* with  
 the *tempus*. But he  
 [Johannes de Monte] said  
 that the *tempus* with the  
*prolatio*--which we said  
 should be represented in  
 this way ○ C ○ C--  
 should be arranged in this  
 way ⊕ ⊕ ⊕ ⊕, since then  
 the *prolatio* is properly  
 shown enclosed within the  
*tempus* [and] the  
 perfection and  
 imperfection of both is  
 recognized in a clearer  
 manner. But we have told  
 him that the first method  
 is more precise.

Basing [our theory] upon  
 this, we have proven with  
 a geometric demonstration  
 that *via naturae* each note

demonstratione probavimus. Cum igitur aliud signum non reperiretur contrarium, natura sua canendus est cantus, scilicet per binarium numerum. At cum via artis ternarium facimus, aliquo signo perscribimus, ita quod, etsi notula duas tantum valebat natura, per artem facimus tres. Cum igitur alterum istorum  $\bigcirc \subset$  ponimus signum, prolatio, quoniam signum eius non est, imperfecta iudicatur. Cum vero signum idest punctum in medio circuli aut semicirculi ponitur, perfectio circuli designatur prolationis perfectionem denotantis.

Magister vero Robertus Anglicus proprietatem notularum in geometria ignorans contrarium dicebat, hoc est: quando signum temporis non reperitur, perfectum esse tempus arbitrabatur. Omnes fere cantus signis carentes male compositos esse dicebat. Ipse enim inscius doctrinae artem praeponere naturae, cuius contrarium manifestum est, quia ars imitatur naturam in quantum potest. Non tamen dicitur, quod natura artem imitetur, cum saepe artem aberare videmus, naturam vero raro vel nunquam.

has the value of the two following [notes]. Therefore, when another sign would not be found to the contrary, the song should be sung according to its nature--that is, by a binary number. But when we make [it] ternary via artis, we write [it] with another sign in such a manner that even if by nature the note was only worth two, by means of art we make [it worth] three. Therefore, when we place one of these signs--that is,  $\bigcirc \subset$ --the prolatio is considered to be imperfect, since there is no sign for it. But when a sign is set down--that is, a point in the middle of a circle or a semicircle--the perfection of the circle indicates the perfection of the designated prolatio.<sup>219</sup>

But the teacher Robertus Anglicus, unaware of the property of the figures in geometry, said the opposite--that is: "When the sign of the tempus is not found, the tempus was thought to be perfect." He said that for the most part all of the songs lacking signs are poorly composed. For he himself, ignorant of the doctrine, placed art before that of nature, to which it is clearly shown to the contrary, because art imitates nature inasmuch as it is able. Nevertheless, it is not said that nature imitates

Aliis autem adhuc signis perfectum discernimus ab imperfecto; utputa si notulae nigrae inter albas in aliquo cantu sine societate propinqua reperiantur, signum est, quod ponitur nigra, ut tertiam partem amittat. Non ergo tertiam partem haberet, nisi tres valeret. Ergo cum notulas reperimus nigras sine societate propinqua, illarum speciem dicimus esse perfectam. Notanter tamen sine societate dicimus propinqua, quoniam, si aliquae nigrae [70] eam sequantur, ita quod tres pro duabus ponantur, non clare distinguitur. Namque potest hoc in utroque accidere numero perfecto scilicet et imperfecto. Priores vero musici atque cantores notulas nigras, ut nos albas, rubeas vero ut nos ponimus nigras, depingere solebant. Ponebant etiam albas, idest in medio vacuas, ut nos facimus, modo quando scilicet in promptu rubeum colorem, ut placet Egidio de Marino, non habebant. Ugolinus vero ista non bene scrutatus in eodem melo nigras rubeasque notulas posuit et vacuas, quoniam videbatur sibi, ut nigrae essent perfectae, rubeae vero imperfectae, vacuae autem diminutae. Sed hoc, quia nec ab aliquo alio

art, since we often see art go astray, but rarely or never [do we see] nature [go astray].

However, in addition, we distinguish the perfect from the imperfect with other signs; consider this example: if black notes are found in some song among white [notes] without a union nearby, it is the sign which is set down as black that dismisses the third part. Therefore, it would not have a third part unless it were worth three. Consequently, when we find black notes without a union nearby, we say that the species of those [notes] is perfect. Nevertheless, notice that we say "without a union nearby," since, if some black [notes] follow it in such a manner that three are established in the place of two, it is not clearly distinguished. For this can occur in both--that is, in the perfect number and in the imperfect [number]. But earlier musicians and singers were accustomed to portraying black notes where we place our white ones, and red [notes] where we place our black ones. They also placed white ones--that is, notes which are] hollow in the middle--just as we make ours--that is, only when they did not have the color red on hand, as Egidius de Marino prefers to do.<sup>220</sup> But Ugolino,

factum repperimus umquam,  
a nullo esse fiendum  
censemus.

Alio etiam modo secundum  
magistrum Franconem  
perfectum discernebant ab  
imperfecto antiquiores  
ponentes scilicet supra  
notulas binarias *b*, supra  
ternarias vero *t*; et sic  
clare ostendebatur valoris  
notularum differentia.  
Sed cum notae modi  
imperfecti de tempore  
canebantur perfecto et  
notae modi perfecti de  
tempore imperfecto,  
prios signabantur *b*,  
binaria scilicet  
[divisione] inventae;  
sequentes vero  
figurabantur circulo  
oppositum scilicet  
praecedentium denotante.

Sicut igitur errant per  
defectum, qui sine aliquo  
signo perfectam eam  
speciem male praevidentes  
diudicant, sic etiam per  
excessum, qui, cum uno  
possit dignosci perfecta,  
aliud subiungunt; ut, si

who did not properly  
examine these facts,  
placed black, red, and  
hollow notes in the same  
song, since it seemed to  
him that the black [notes]  
were perfect, but the red  
[notes] were imperfect,  
and the hollow notes were  
diminished.<sup>221</sup> But we do  
not think that this should  
be done by anyone, since  
we have not found it to  
have ever been done by any  
other [person].<sup>222</sup>

According to the master  
Franco, the ancients also  
distinguished the perfect  
from the imperfect by  
another way--that is, [by]  
placing [the letter] *b*  
above binary notes [and  
the letter] *t* above  
ternary [notes]; and thus  
the difference in the  
value of the notes was  
clearly shown.<sup>223</sup> But  
when the notes were sung  
in the *modus imperfectus*  
with the *tempus perfectum*,  
and in the *modus perfectus*  
with the *tempus*  
*imperfectum*, the first  
[notes] were marked [with  
the letter] *b*--that is,  
acquired by a binary  
division; but the latter  
[notes] were represented  
with a circle--that is,  
denoting the opposite of  
the preceding [notes].

Therefore, just as those  
who, lacking foresight,  
err by defect [when they]  
decide that the species  
without any sign is  
perfect, thus also, those  
who add another [sign] err  
by excess, since the

in cantu pausa longae tria  
 occupet spatia, errant qui  
 hoc signum  $\circ 2$  adiungunt,  
 sic et, si [pausae binae]  
 semibrevis hoc modo  $\equiv$   
 reperiantur, superflue  
 ponitur istud  $\circ$ , vel hoc  
 $\odot$ , si minimae pausae sic  
 disponantur  $\equiv$ , maxime si  
 utrumque reperiat,ur,  
 quoniam aliter posset quis  
 dicere ad id quod defuit  
 denotandum positum fuisse.  
 Haec de figuris hactenus.

perfect can be distinguished by one [sign].<sup>224</sup> For example, if a rest of a long occupies three spaces within a song, they err who add this sign  $\circ 2$ ; likewise also if two rests of a semibreve are found in this way  $\equiv$ , [then] this  $\circ$  or this  $\odot$  is placed superfluously if minim rests are arranged in this way  $\equiv$ ; especially if both are found, since otherwise, anyone could say it was placed for the purpose of indicating that which was lacking.<sup>225</sup> This is enough concerning the figures.

CAPITULUM QUARTUM

IN QUO CANONES  
ET SUBSCRIPTIONES  
SUBTILITER DECLARANTUR

Tacite praetermittendum esse non arbitror, si quis auctor velit sub cantu, per quod perfectum aut imperfectum vel diminutum possit sine aliquo signo dignosci, aliquid subscribere vel etiam, si aliter signatum fuerit per canonem aut subscriptionem, contrarium ediscere. Dicitur enim subscriptio, quia semper sub tenore scribitur, canon vero, quia est quaedam regula voluntatem componentis sub quadam ambiguitate obscure et in enigmate insinuans, ut in missa *Se la face ay pale*, ubi ponitur *Crescit in triplo et in duplo et ut iacet*. Quandoque etiam canon docet cantare per contrarium; incipientes a fine in principio finiunt, ut fecit Busnois: *Ubi alpha ibi omega et ubi omega finis esto*. Etenim nos simile clandestinis verbis in quodam carmine posuimus dicentes: *In voce quae dicitur contra, contra sic canitur*. Canone mutatur etiam locus, ut Busnois: *Ne sonites c a c e fa tono, [sume] lichanos hypaton*. Notula enim prima est in *g*, quae lichanos est meson, et tamen canon ponit illam in *d*, qui

FOURTH CHAPTER

IN WHICH THE CANONS AND  
[THEIR] SUBSCRIPTIONS ARE  
EXPLAINED IN GREAT DETAIL

I do not believe that it should be quietly overlooked if any composer wishes to write something below the song, by means of which the perfect or the imperfect, or even the diminished can be distinguished without any sign; or also if the song has marked in another way by means of a canon or a subscription [in order] to learn [the song] to the contrary. For it is called a subscription because it is always written below the tenor; and [it is called] a canon because there is a certain rule insinuating the will of the composer, obscurely and enigmatically with a certain ambiguity, as in the Mass *Se la face ay pale* where *Crescit in triplo et in duplo et ut iacet* is established.<sup>226</sup> At times the canon also teaches [one] to sing in retrograde, [for] beginning from the end, they end at the beginning as Busnois did [in] *Ubi alpha ibi omega et ubi omega finis esto*.<sup>227</sup> Indeed, in a similar manner we established [the same thing] in a certain song with secret words, saying: *In voce quae dicitur contra, contra sic*

[71]

locus est lichanos  
hypaton.

Mutatur etiam canone  
modus procedendi, ut  
tantum, quantum vox  
debebat elevari,  
[deprimatur], ut fecit  
Busnois: *Antiphraſis  
thenorizat ipos, dum  
epiptonzizat, cuius  
sententia est: fiat  
subtus, quod supra erat  
fiendum et e contra.*  
Similiter: *Ibi thesis  
assint ceptra, ubi arſis  
et e contra, ubi in tantum  
vox elevatur, in quantum  
deprimenda videbatur.*  
Aliquando ex una voce  
aliae insurgunt in fuga  
aut in unisono vel in  
diatessaron aut diapente  
etiam in diapason, ut  
diximus nos in quodam  
versu magnificat: *Fuga  
duorum unisona numero  
salvato perfecto.* Est  
enim tantum vox una et  
post morulas sex in eodem  
sono eam sequitur altera.  
Diximus etiam in missa,  
quam [Salmantiae]  
composuimus, dum Boetium  
in musica legeremus:  
*medietas harmonica fiat et  
quaelibet vox suum numerum  
salvet.* Praecedit enim  
prima vox, alia vero octo  
pausatis in unisono  
sequitur illam, quae non

canitur.<sup>228</sup> The position  
is also changed by a  
canon, as [in this song  
of] Busnois's: *Ne sonites  
c a c e fa tono, sume  
lichanos hypatōn.*<sup>229</sup> For  
the first note is on *g*,  
which is the *lichanos  
mesōn*; and nevertheless,  
the canon places it on *d*,  
which is the position of  
the *lichanos hypatōn*.

By means of a canon, the  
method of proceeding is  
also changed, so that the  
voice is lowered as much  
as it should have been  
raised, as Busnois did  
[in] *Antiphraſis  
thenorizat ipos, dum  
epiptonzizat*, whose  
meaning is: "Let there be  
done below what should  
have been done above and  
vice-versa." Similarly  
[in the song] *Ibi thesis  
assint ceptra, ubi arſis  
et e contra*,<sup>230</sup> where it  
seemed that the voice  
should be lowered as much  
as it is raised. At  
times, other [voices]  
arise from one voice in  
the fugue, either at the  
unison, the diatessaron,  
the diapente, or even at  
the diapason, as we  
ourselves have sung in a  
certain verse of [our]  
Magnificat: *Fuga duorum  
unisona numero salvato  
perfecto.*<sup>231</sup> For there  
is only one voice [in this  
song], and after six  
divisions a second [voice]  
follows it on the same  
sound. We have also sung  
*Medietas harmonica fiat et  
quaelibet vox suum numerum  
salvet*<sup>232</sup> in the Mass

habet proportionem cum  
[alia], ad quam fieret  
relatio. Quam sequitur  
alia post sex inchoans in  
diatessaron inferius.  
Alia vero quatuor  
spectando inchoat diapente  
sub ista, diapason vero  
sub prima. Et sic quatuor  
flumina ex uno fonte  
emanabant. Sed in moteto  
*Tu lumen*, ubi posuimus:  
*In perfectione minimorum  
per tria genera canitur  
melorum*, quod Bononiae,  
dum publice legeremus,  
composuimus, insinuavimus  
quamlibet [voculam] per  
syllabas in lineis et  
spatiis denotatas 6  
mensuras valere, sicut si  
hoc  $\odot$  esset signum,  
quoniam pausa temporis in  
principio ponitur, et ideo  
unaquaque syllaba unum  
tempus denotat. Quae vero  
sint tria genera melorum,  
diximus in prima parte  
tractatu 4. Nam canitur  
ter: prima vice notula  
secunda elevatur a prima  
per trihemitonium, in  
secunda vice per tonum et  
in tertia per semitonium.

which we composed in  
Salamanca while we were  
lecturing on Boethius's  
[views] on music. For the  
first voice goes before,  
and after eight rests  
another [voice], which  
does not have a proportion  
with the other, follows it  
at the unison, creating a  
relationship with it.  
Another [voice] follows  
after six [rests],  
beginning on the  
diatessaron below. But  
another [voice] waiting  
for four [rests], begins  
the diapente below this,  
[creating] a diapason  
below the first [voice].  
And thus four rivers were  
emanating from one source.  
But in the motet *Tu lumen*  
where we have established  
*In perfectione minimorum  
per tria genera canitur  
melorum*<sup>233</sup> (which we  
composed while we were  
lecturing publicly in  
Bologna),<sup>234</sup> we  
recommended that any note  
be worth six measurements  
by means of syllables  
designated on lines and  
spaces, just as if this  
were the sign:  $\odot$ , since  
a rest of the *tempus* is  
established at the  
beginning and on that  
account each syllable  
indicates a *tempus*. And  
[the results] are the  
three genera of melody  
that we have mentioned in  
the first part, the fourth  
treatise.<sup>235</sup> For it is  
sung three [different]  
ways: on the first time,  
the second note is raised  
above the first by a



Alios vero quam plurimos canones terminis musicae utentes composuimus. Hoc enim maiores nostri consueverunt facere, ut suam doctrinam et intelligentiam demonstrarent. Quos indocti imitari volentes canones ponunt sua fantasia fulcitos, quorum nullum hic ponam, ut memoria careat, quod non est imbutum doctrina.

Alii vero sacrae scripturae appropriant modum procedendi ut: *Descendant in profundum quasi lapis*. Profundum in musica est cuiuslibet vocis sua octava inferius. Sed e contra cum dicit: *Suspendimus organa nostra*. Nos etiam sacrae scripturae canones attribuendo quam plurimos posuimus, ut in *Requiem aeternam* canon: *Ut requiescant a laboribus suis* insinuamus, quod *ut* et *re* sileant, ceterae vero cantent. Sed etsi quiescant numero, tamen [computamus] valorem notarum in pausis. Sed cum secundo dicitur: *Si tenes cum domino* [Agamemnon], *de capite nullos amittes capillos in*

trihemitone; on the second time [it is raised] by a tone; and on the third [time it is raised] by a semitone.

[72] However, we have composed many other [songs] by using canons with musical terms. For our ancestors were accustomed to doing this so that they could demonstrate their knowledge and their intelligence. The untrained, wishing to imitate these [men], establish canons supported by their own fantasy. [However], I will not place any of these here, so that there may be no memory of that which is not imbued with knowledge.

But others appropriate a method of procedure to the sacred scripture, such as [the song] *Descendant in profundum quasi lapis*.<sup>236</sup> The abyss in music is any voice's lower octave. But [it should be done] to the contrary when one sings *Suspendimus organa nostra*.<sup>237</sup> We also have established as many canons as possible by attributing [them] to sacred scripture as in *Requiem aeternam*.<sup>238</sup> [where] we insinuate [in] the canon *Ut requiescant a laboribus suis*<sup>239</sup> that *ut* and *re* are silent, but that they may sing the rest [of them].<sup>240</sup> However, although they may be silent with regard to melody, nevertheless, we calculate the value of the

*paranete neteque  
 synemmenon; illorum  
 scilicet opera  
 [sequuntur] illos, illas  
 notulas in canone priori  
 dimissas esse resumendas  
 intimatur. Itaque nota,  
 quae fuit dimissa in ut,  
 notulam in ut positam  
 sequatur, et quae in re  
 quievit, post notulam re  
 laborando reclamet, ut  
 verba consonent rebus. Et  
 cum ex superioribus  
 habeamus paraneten  
 synemmenon esse *k* in  
 coniuncto, neten vero *l* in  
 eodem, sequitur, quod  
 opera illorum sequuntur  
 illos in diapente  
 reclamando. Et sic, cum  
 notulae in secunda parte  
 sic disponantur *f g h*,  
 debet facta operum  
 additione *f k g l l h*  
 cantari, ita quod valor  
 praecedentium notularum  
 integre resumatur. Sic et  
 in alio, ubi diximus: *Ut  
 quiescat, donec optata  
 veniat, volumus ostendere:  
 notula, quae fuerit in f  
 scilicet, quae dicitur ut  
 per vulgarium dictiones,  
 quiescat idest sileat  
 numerando, donec ad finem  
 fuerit perventum. Sed cum  
 in parte sequenti diximus:  
 Et sicut mercenarii dies  
 eius, ut supra volumus  
 ostendere, id, quod  
 inconcinnum remansit in  
 prima, in paraneten  
 synemmenon resumatur in  
 secunda, ut in alio  
 fecimus canone Ad modum  
 mercenarii, cuius dies in  
 fallo ad satisfactionem in  
 aliis computantur.**

notes in the rests. Yet  
 when *Si tenes cum domino  
 Agamemnon, de capite  
 nullos amittes capillos in  
 paranētē nētēque  
 synēmmenōn; illorum  
 scilicet opera sequuntur  
 illos omnes*<sup>241</sup> is sung,  
 it announces that those  
 notes dismissed in the  
 first canon should be  
 taken up again. Therefore,  
 the note that was  
 dismissed on *ut* may follow  
 the note placed on *ut*, and  
 that one which rested on  
*re* reclaims [it] by  
 laboring after the sign  
*re*, so that the words  
 correspond with the  
 events. And since we have  
*paranētē synēmmenōn* from  
 the upper [strings] to be  
*k* in the conjunct  
 [tetrachord], but *nētē* to  
 be *l* on the same, it  
 follows that their efforts  
 follow them by reclaiming  
 [it] on the diapente. And  
 thus, when notes in the  
 second part are arranged  
 in this way--*f g h*--[and]  
 the addition of their  
 labors have been made, it  
 should be sung *f k g l l  
 h*, so that the value of  
 the preceding signs are  
 completely resumed.  
 Likewise also in another  
 [canon] where we sang *Ut  
 quiescat, donec optata  
 veniat*,<sup>242</sup> we desire to  
 show that the note which  
 will be on *f*, namely that  
 which is called *ut* through  
 the utterances of ordinary  
 [singers], rests--that is,  
 it is silent--while  
 counting until it has  
 arrived at the end. But  
 when in the following part

we sang *Et sicut mercenarii dies eius*<sup>243</sup> as we wish to show above-- that which remained awkward in the first [part] may be resumed on *paranētē synēmmenōn* in the second [part], as we have done in another canon [called] *Ad modum mercenarii*<sup>244</sup> whose days in deceit are calculated to satisfaction in others.

Cum vero dicitur *Ne recorderis*, clare ostenditur, quod re non ponatur in chorda. Idemque [de] re et *mi* intelligimus, cum *neque reminiscaris* ponimus computatis tamen morulis canendis. Cum vero penultimo [dicimus] *Requiescant in pace*, clare monstramus re neque in cantu neque in pausa esse ponendum, sed intacto dimisso ad aliam vocem nos transferamus. Cum vero ultimo dicitur *Amen*, intelligimus eodem modo fiendum.

Alios aliorum canones vidimus permultos, alios et nos posuimus quam plurimos. Verum quia de particularibus scientia non poterit haberi, aut si aliqua minima pars confusa semper extat, de canonibus ad ingenia subtilianda et acuenda dicta sufficient.

But it is clearly shown when *Ne recorderis*<sup>245</sup> is sung that re is not placed on the string. And we understand the same thing concerning re and *mi* when we establish [the song] *Neque reminiscaris*;<sup>246</sup> nevertheless, with the divisions to be sung having [already] been calculated. But in the next to the last song, when we sing *Requiescant in pace*,<sup>247</sup> we clearly show that re should not be established in the song nor on a rest; but with it having been dismissed intact, we may pass on to another voice. And when *Amen* is sung in the last [voice], we understand that it should be done in the same way.

We have seen many canons of others and we have established as many as possible ourselves. Truly, since the knowledge concerning the particulars will not be able to be retained, or if some small part always remains confusing, may [these] words concerning the

canons be sufficient for  
sharpening and refining  
the wits of talented men.

TRACTATUS [SECUNDUS]

CAPITULUM PRIMUM

IN QUO DE TRIPLICI  
PROPORTIONALITATUM GENERE  
SUBTILITER DISPUTATUR

Sicut igitur ex numerorum multiplicatione relata proportionum genera redundarunt, ita proportionum commixtione perspecta proportionalitas concreat. Est enim proportio duorum numerorum ad se invicem habitudo. Proportionalitas autem est duarum proportionum ad se invicem relatio. Cum igitur hucusque de proportionibus aliqua fuerimus perscrutati, restat, ut de proportionalitatibus ad huius primi voluminis complementum quaedam practicas necessaria discutiamus.

Proportionalitas haec secatur in continuam et separatam. Est enim continua, cum numerus medius bis sumitur ad extrema comparatus, ut 4. 6. 9. Dicimus enim: sicut se habet 4 ad 6, ita 6 ad 9, quia sesquialtera est utrobique. Cum autem non unus sed duo medii sunt numeri, dicitur separata aut discontinua,

SECOND TREATISE

FIRST CHAPTER

IN WHICH THE THREE  
GENERA OF PROPORTIONS ARE  
DISCUSSED IN GREAT DETAIL

[73] Therefore, just as it is said that the genera of ratios flow forth freely from the multiplication of the numbers, thus it is clearly perceived that the proportion is created by the mixture of the ratios.<sup>248</sup> For a ratio is the reciprocal relationship between two numbers. However, a proportion is the reciprocal relationship between two ratios. Therefore, since up to this point we have examined some aspects concerning the ratios, in order to complete this first volume there remains for us to discuss certain things about the proportions that are necessary for the practicing musicians.

This "proportion" is divided into continuous and separated. For it is *continuous* when the mean number is taken twice in comparison to the extremes, such as 4:6:9. For we say: just as 4 is to 6, thus 6 is to 9, because there is a sesquialter [proportion] in both. However, when there are not one but two

ut in his numeris 4. 6. 8. 12 fit discursus hoc modo: sicut se habet 6 ad 4, ita 12 ad 8. Si igitur terminos permutamus, concludimus sic: ergo sicut 8 ad 4, ita 12 ad 6. In primo enim discursu sesquialtera utrobique, in conclusione vero dupla.

Si igitur hoc modo in vocibus arguere voluerimus, quatuor voces ex monochordo, quae hoc modo se habeant, sumere debemus. Sint autem *a c d f*, in quibus discursum faciemus hoc modo: sicut *a* ad *c*, ita *d* ad *f*. Permutatis vero litteris concludimus: ergo sicut *a* ad *d*, ita *c* ad *f*. In antecedente trihemitonii est ambarum intercapedo, sed diatessaron in consequenti utriusque proportionis est intervallum. Possunt et in hac disiuncta proportionalitate plures iungi proportiones, ut in his numeris 2. 3: 4. 6: 8. 12, et tunc fit discursus hoc modo: sicut 2 ad 3, ita 4 ad 6 et 8 ad 12, quia in omnibus sesquialtera proportio custoditur. Coniungendo vero numeros minores a maioribus separatos concludimus hoc modo:

mean numbers, it is called *separated* or *discontinuous*, as for example with these numbers, 4:6:8:12, a discourse is made in the following manner: just as 6 is to 4, thus 12 is to 8. Therefore, if we exchange the terms, we conclude in the following manner: consequently, just as 8 is to 4, thus 12 is to 6. For in this first discourse the sesquialter [proportion is found] in both, but in the conclusion [the proportion is] duple.

Therefore, if we wish to make it clear with the notes in this manner, we should take four notes from the monochord that relate to one another in this way. Moreover, let there be these notes, *a c d f*, with which we will make a discourse in the following manner: just as *a* is to *c*, thus *d* is to *f*. But when the letters are exchanged we conclude [the following]: consequently, just as *a* is to *d*, thus *c* is to *f*. In the first situation, the interval of both [ratios] is that of a trihemitone, but in the following situation, the interval of both ratios is a diatessaron. Several ratios can also be joined in this disjunct proportion, as for example in these numbers: 2:3, 4:6, 8:12, and then the discourse is made in this manner: just as 2 is to

ergo sicut 2. 3. 4 inter se, ita 6. 8. 12 inter se. Et in vocibus hoc pacto, si sint *c d e f* et *g h*, arguimus: sicut *c* ad *f*, ita *d* ad *g*, sic et *e* ad *h*; nam in omnibus diatessaron est consonantia. Coniunctis autem primis vocibus tribus a superioribus separatis concludimus: ergo sicut *c d e* inter se, ita *f g h* inter se. In omnibus enim his tonus differentiam facit. Multis et variis etiam aliis modis ista proportionalitas variatur, de quibus paulo post idest volumine secundo latius dicemus.

[74]

3, thus 4 is to 6, and 8 is to 12, because the sesquialter ratio is preserved in every [interval]. But by combining the smaller numbers separated from the larger [ones], we conclude in this manner: consequently, just as 2:3:4 [are related] among themselves, thus 6:8:12 [are related] among themselves. And if the notes are *c d e f* and *g h*, we argue with the notes in this way: just as *c* is to *f*, thus *d* is to *g*, likewise also *e* [is in relation] to *h*; for the consonance of the diatessaron is in every [interval]. However, when the first three notes are combined [and then] separated from the upper [three notes] we conclude [the following]: consequently, just as *c d e* [are related] among themselves, thus *f g h* [are related] among themselves. For in all these [notes], the tone makes the difference. Still, this proportion is varied in many and various other ways, which we will discuss a little later in more detail--that is, in the second volume.

Rursus ea, quae continua est, triplicem recipit variationem: aut enim numerorum excessus consideratur aut in utrisque proportio, conspicitur aut excessuum et terminorum comparatio coaequatur. Prima enim

Again, that which is continuous receives a threefold variation: for either the excess of the numbers is considered, or the ratio is observed in both, or the comparison of excesses and of terms is equalized. For the first

arithmetica est, secunda  
geometrica dicitur.  
Tertia vero dulcem ac  
delectabilem facit  
harmoniam. His igitur  
tribus discussis huic  
primo practicorum volumini  
finem imponemus.

Cum igitur numeros tres  
continuos aut aequali  
distantia separatos  
invenerimus,  
proportionalitatem  
arithmetica inter eos  
esse dicemus, ut in his  
numeris 1. 2. 3. Eadem  
enim quantitate, qua  
medius minorem excellit,  
vincitur a maiori, quod  
est per unitatem. Ergo  
est arithmetica proportio,  
quoniam aequalitas  
attenditur excessus et non  
proportionum. Similiter  
in his numeris 2. 4. 6  
binarius differentiam  
facit et in istis 3. 6. 9  
ternarius et deinceps ad  
hunc ordinem. Talibus  
enim vestigiis inhaerentem  
nullus ab eadem  
similitudine error  
abducet. Ex hac tamen  
medietate notatur, quod in  
minoribus terminis maiores  
proportiones, in maioribus  
minores comparationes  
necesse est inveniri, ut  
in his: 4. 6. 8. In  
minoribus terminis  
sesquialtera, in maioribus  
vero sesquitertia  
reperitur.

is called *arithmetical* [and]  
the second is called  
*geometric*. But the  
third<sup>249</sup> makes sweet and  
delightful harmony.  
Therefore, after these  
three discourses, we  
will set an end to this  
first volume for the  
practicing musicians.

Therefore, when we find  
three continuous numbers  
or [three numbers]  
separated by an equal  
distance, we will say that  
an arithmetic proportion  
is among them, as in these  
numbers: 1:2:3. For with  
the same quantity by which  
the mean surpasses the  
smaller [term], [the mean]  
is exceeded by the larger  
[term]--that is, by means  
of unity. Therefore, it  
is an arithmetic  
proportion, since the  
equality of excess is  
observed and not [the  
equality] of  
proportions.<sup>250</sup>  
Similarly, there is a  
difference of two in these  
numbers: 2:4:6, and [a  
difference] of three in  
these [numbers]: 3:6:9;  
and successively according  
to this order. Anyone  
adhering to such steps by  
the same similitude will  
not be led to error.  
Nevertheless, on account  
of this mean it is noted  
that it is necessary for  
larger ratios to be found  
in the smaller terms [and]  
for smaller comparisons  
[to be found] in the  
larger [terms], as for  
example in these  
[numbers]: 4:6:8. In the



Geometrica vero medietas, quae hanc sequitur, expediatur. Ipsa sola vel maxime proportionalitas appellari potest, propterea quod in eisdem proportionibus terminorum vel in maioribus vel in minoribus speculatio ponitur, in qua quidem aequa semper proportio custoditur numerorum quantitate neglecta, contraria enim arithmeticae medietati. Ut in his 1. 2. 4 vel in his 6. 12. 24. dupla est utroque, sic et in tripla ut in his 1. 3. 9 aut in his 2. 6. 18 et in quadrupla et in ceteris similiter. In hac autem proportionalitate notatur proprietas, quod in maioribus vel in minoribus terminis semper aequales sunt proportiones.

smaller terms the sesquialter [proportion] is found, but in the larger terms the sesquitertian [proportion] is found].

But [now], let the geometric mean that follows this be explained. It alone, or rather to a very large extent, can be called a proportion because the speculation is placed on the same ratios of the terms in the larger as well as in the smaller --where certainly an equal ratio of the numbers is always kept with the disregarded quantity--for it is contrary to the arithmetic mean. For example: the duple [proportion] is [found] in both of these: 1:2:4 or 6:12:24. Likewise also with the triple [proportion], as for example in these: 1:3:9 or 2:6:18; and similarly with the quadruple [proportion] and the rest. However, the property is noted in this proportion, because the ratios are always equal in larger or smaller terms.

## CAPITULUM SECUNDUM

### IN QUO MEDIETAS HARMONICA DISCERNITUR

Harmonica vero medietas est, quae neque eisdem differentiis neque aequis proportionibus constituitur, sed illa, in qua, sicut maior numerus ad minimum se habet, sic differentia maximi et medii contra differentiam medii atque minimi comparatur, ut in his terminis 3. 4. 6.

Senarius enim quaternarius sua tertia parte superat idest binario, quaternarius vero ternarius sua quarta idest uno, quare in his neque eadem proportio terminorum reperitur neque eadem differentiae inveniuntur. Est autem quemadmodum maximus terminus ad minimum sic differentia maximi et medii ad differentiam medii atque postremi. Patet hoc, quoniam differentia inter medium et minimum unitas est et medii ad maiorem binarius differentiam facit. Ergo dupla inter eos proportio reperitur, quam tenuit maximus idest senarius ad minimum idest ternarium. Proprietas autem huius medietatis contraria est arithmeticae medietati. In illa enim

## SECOND CHAPTER

### IN WHICH THE HARMONIC MEAN IS DISTINGUISHED

The harmonic mean is that which is constituted neither by the same differences nor by equal ratios; rather, just as the larger number holds itself [in relation] to the smallest, so the difference of the largest [number] and of the mean is compared against the difference of the mean and that of the smallest [number], as for example in these terms: 3:4:6.

For the number six exceeds the number four by its third part--that is, by two, but the number four [exceeds] the number three by its fourth [part]--that is, by one. Consequently, in these [numbers] neither the same ratio of the terms is found, nor the same differences discovered. However, just as the largest term is to the smallest, thus the difference of the largest [term] and of the mean is to the difference of the mean and [that] of the following [term]. This is clear, since the difference between the mean and the smallest [term] is one, and the number two represents the difference of the mean [with respect] to the

[75]

in minoribus terminis  
 maior erat proportio et in  
 maioribus minor, in hac  
 vero e contra, quoniam in  
 maioribus terminis maior  
 proportio et in minoribus  
 numeris minor habitudo  
 reperitur. Atque ideo  
 arithmetica medietas ei  
 rei publicae comparatur,  
 quae paucis regitur.  
 Idcirco quod in minoribus  
 eius terminis maior  
 proportio custoditur,  
 geometrica  
 proportionalitas popularis  
 quodam modo est; namque in  
 maioribus vel in minoribus  
 aequali omnium  
 proportionalitate  
 componitur et est inter  
 omnes paritas quaedam  
 medietatis, [aequum] ius  
 in proportionibus  
 conservatis. Musicam vero  
 medietate optimatum dicunt  
 esse rem publicam--rideo--  
 quod in maioribus terminis  
 maior proportionalitas  
 invenitur.

Quare istae  
 proportionalitates sic  
 appellatae sunt, alia  
 scilicet arithmetica, alia  
 geometrica, alia  
 harmonica, ratio est,

larger [term]. Therefore,  
 a duple ratio is found  
 between them, as the  
 largest--that is, the  
 number six--is held [in  
 relation] to the smallest  
 --that is, the number  
 three. However, the  
 property of this mean is  
 contrary to the arithmetic  
 mean. For in that [mean]  
 the ratio was greater in  
 the smaller terms and  
 smaller in the greater  
 terms, but in this [mean]  
 the opposite is true,  
 since the ratio is greater  
 in the greater terms and a  
 smaller relation<sup>251</sup> is  
 found in the smaller  
 numbers. And therefore,  
 the arithmetic mean is  
 compared to that state  
 which is governed by the  
 few.<sup>252</sup> On that account,  
 since a greater ratio is  
 kept in its smaller terms,  
 the geometric proportion  
 is in a certain way  
 "democratic,"<sup>253</sup> for it  
 is composed in greater or  
 smaller [terms] with an  
 equal proportion for all;  
 and there is a certain  
 equality of the mean among  
 all [of them]--that is, an  
 equal right in the ratios  
 that are preserved. But  
 [some] say that music is a  
 state with an aristocratic  
 mean--I laugh--because the  
 greater proportion is  
 found in the greater  
 terms.

Therefore, these  
 proportions are named in  
 the following manner:  
 that is, one [is called]  
 arithmetic, another [is  
 called] geometric, [and]

quoniam arithmetica dispositio aequas tantum per differentias dividit quantitates, geometrica vero terminos aequa proportione coniungit; sed harmonica ad aliud refertur, quia neque solum in terminis speculationem proportionis habet neque solum in differentiis, sed in utrisque communiter. Ipsarum enim musicarum consonantiarum, quas symphonias nominant, proportiones in hac paene sola medietate frequenter invenies. Ipsa enim symphonia diatessaron in epitrita proportione consistit ut est 4 ad 3, diapente consonantia in hemiolia proportione ut 6 ad 4. At ipsa omnium concordia diapason in dupla consistit ut 6 ad 3. In hac igitur medietate has tres simplices symphonias terminorum comparatione reperimus. Quod si ad differentias terminorum comparatio fiat, alias symphonias non simplices procreabimus, ut, si minimi ad differentiam inter minimum et medium fiat habitudo, triplam custodiet proportionem, ex qua diapason et diapente consonantia redundabit. Sed si medii ad differentiam inter ipsum et minimum fecerimus relationem, quadruplam proportionem reperiemus, quae bisdiapason consonantia resonabit. Quod si idem numeri binario ducantur, ut efficiantur 6. 8. 12,

another [is called] *harmonic*; the reason is [this]: because the arithmetic arrangement only divides the quantities by equal differences, but the geometric [arrangement] unites the terms with an equal ratio. The harmonic [arrangement] is related to another [matter], because it has the speculation of the ratio not only in the terms and in the differences, but in both at the same time. For frequently you will find the ratios of these musical consonants--which they call *symphonies*--almost only in this mean-- [that is, the harmonic]. For the symphony of the diatessaron itself exists in the sesquitercian ratio,<sup>254</sup> such as 4:3; the consonance of the diapente [exists] in the hemiola ratio, such as 6:4. But the concord of all--the diapason--exists in the duple [ratio], such as 6:3. Therefore, in this mean we find these three simple symphonies by a comparison of the terms. But if a comparison to the differences of the terms is made, we will produce other symphonies [which are] not simple. For example: if a relation is made of the smallest to the difference between the smallest and the mean, it will preserve a triple ratio, from which will proceed the consonance of the diapason plus the diapente.<sup>255</sup> But if we

eadem consonantiae  
 manebunt. Sed inter 8. 12  
 potest alius numerus  
 interseri, qui ad extrema  
 comparatus eas quas tenuit  
 octonarius proportiones  
 conservabit, contrario  
 tamen modo, quia hic  
 scilicet novenarius ad  
 gravem partem diatessaron  
 et ad acutam servat  
 diapente, octo vero per  
 contrarium. Ad se invicem  
 vero sesquioctavam  
 custodiunt proportionem,  
 ex qua species quae  
 dicitur tonus redundat.  
 Haec enim species est  
 excessus diapente supra  
 diatessaron. Si autem 9  
 et 8 binario ducamus,  
 habebimus 18 et 16, quos  
 in sesquioctava  
 proportione esse  
 cognoscimus. Inter quos,  
 ut ait Boetius, medius  
 numerus collocatur  
 scilicet 17, qui ad  
 maiorem comparatus  
 semitonium reddit minus,  
 ad minimum vero maius.  
 Maior enim proportio est  
 sesquidecimae sextae  
 sesquidecimae septimae  
 collatione. Quomodo autem  
 symphonias ex  
 proportionibus redundare  
 intelligamus, propter  
 novos cantores licet  
 rursus clarius discutere.

make a relation of the  
 mean to the difference  
 between the same and the  
 smallest, we will find a  
 quadruple ratio, which  
 will sound the consonance  
 of the bisdiapason. But  
 if the same numbers are  
 multiplied by two, so that  
 [the ratio] 6:8:12 is  
 produced, the consonances  
 will remain the same. But  
 another number can be  
 inserted between 8:12,  
 which compared to the  
 extremes will preserve  
 those ratios that the  
 number eight held.  
 Nevertheless, [this will  
 be done] in a contrary  
 manner, because this--that  
 is, the number nine--  
 preserves the diatessaron  
 in the low part and the  
 diapente in the high  
 [part], but [the number]  
 eight does the opposite.  
 Truly, they preserve for  
 themselves the reciprocal  
 ratio of the sesquioctave,  
 from which proceeds the  
 species that is called a  
 tone. For this species is  
 the excess of the diapente  
 above the diatessaron.  
 However, if we multiply 9  
 and 8 by two, we will have  
 18 and 16, which we  
 acknowledge to be within  
 the sesquioctave ratio.  
 Between these [two  
 numbers]--as Boethius  
 says<sup>256</sup>--a mean number is  
 arranged--that is, 17--  
 which renders a minor  
 semitone [18:17 when] it  
 is compared to the larger  
 [number]; however, it  
 renders a major semitone  
 [17:16 when] it is  
 compared to the smallest

[number]. For the ratio of the sesquidecima sexta [17:16] is greater in comparison to the [ratio] of sesquidecima septima [18:17]. Moreover, for the sake of the inexperienced singers, permit us to discuss again more clearly how we perceive the symphonies to proceed from the ratios.

### CAPITULUM TERTIUM

#### IN QUO PRIMARIAE MONOCHORDI DIVISIONES AD NUMERORUM RATIONES APPLICANTUR

In prima monochordi nostri regularis divisione Boetium numeris et mensura suum monochordum regulare subtiliter divisisse diximus. Nos vero propter novos per continuam quantitatem vulgaribus fractionibus nostrum divisimus, ne et arithmetica et geometria addiscentem prius cognovisse esset necessarium; nam esset incidere in errore, quem prohibuimus. Diximus enim nihil horum illi ad nostram doctrinam capescendam esse necessarium, modo primis rudimentis esset edoctus. Propter quod diximus, chordam medio esse dividendam aut quantitatem duplicandam, triplicandam aut per tria fore secandam, qui termini notissimi vulgaribus sunt. Nunc vero, quia de quantitate discreta, hoc est de numeris et numerorum proportionibus, aliqua, quae magis cantoribus esse necessaria cognoscebamus, determinavimus, easdem quas posuimus chordae vulgares divisiones ad rationem numerorum applicantes, in quibus

### THIRD CHAPTER

#### IN WHICH THE PRIMARY DIVISIONS OF THE MONOCHORD ARE APPLIED TO THE NUMERICAL RATIOS

In the first division of our regular monochord we have said that Boethius accurately divided his regular monochord by numbers and measurement. However, for the sake of the inexperienced [singers], we have divided our [monochord] with common fractions by means of a continuous quantity, so that it would not be necessary for the student to have previously learned both arithmetic and geometry; for, without a doubt, he would fall into error, which we have prevented. Indeed, we have said that neither of these things is necessary in order for our doctrine to be understood--provided that [the student] has been thoroughly instructed in the beginning rudiments. For that reason we have said that a string should be divided in half, or the quantity should be doubled, tripled, or divided into three; these are terms that are very well-known to everyone. But now, since we have determined some aspects concerning the divided quantity--that is, concerning the numbers

proportionibus consistant,  
ostendemus hoc modo.

Est enim chorda in tota  
sui longitudine exempli  
gratia quatuor cum viginti  
digitorum, quae *q* a  
punctis terminatur. Cum  
igitur eam medio secamus  
littera *h* sectionem  
signantes, *q* *h* duodecim  
digitorum ad *q* a viginti  
quatuor in dupla  
collatione respondent. Si  
igitur chordam in tota sui  
longitudine percusseris et [77]  
sono perpenso digitum in  
puncto *h* [superponens]  
chordam *h* *q* impuleris,  
consonantiam diapason  
resonare deprehendes. Sic  
igitur diapason in dupla  
dicitur esse habitudine.  
Cum vero *h* a mediam  
dividimus quantitatem  
littera *d* in medio  
consignantes, chorda *d* *q*  
18 digitorum esse constat,  
quae ad totam comparata  
sesquiertiam servit  
proportionem. Inde ergo  
est, quod *a* *d* diatessaron  
est symphonia. At vero,  
cum quantitatem *h* *q* medio  
secamus litteram *p* in  
sectionis medio  
configentes, constat *p* *q*  
sex tantum esse digitorum,  
qui numerus quater ductus  
24 implet. Ergo quadrupla  
erit habitudo necessario.  
Inde ergo est, quod *p*

and the numerical ratios--  
which we know to be more  
necessary for the singers  
--by applying the same  
common divisions of the  
string which we have  
established in the theory  
of the numbers, we will  
thus show what ratios  
[these divisions]  
consist of.

For example, there is a  
string in its entire  
length of twenty-four  
inches<sup>257</sup> that is limited  
by the points *q*-*a*.  
Consequently, when we  
divide it in half, marking  
the section with the  
letter *h*, [the segment]  
*q*-*h* of twelve inches  
corresponds to the twenty-  
four of *q*-*a* in a duple  
comparison. Now you will  
perceive the consonance of  
the diapason to resound if  
you will strike the string  
in its entire length, and  
after the sound has been  
carefully considered, you  
will strike the string *h*-*q*  
[by] placing your finger  
on the point *h*. Therefore,  
by this method the  
diapason is said to be in  
a duple relationship  
[2:1]. But when we divide  
the quantity *h*-*a* in half,  
marking the letter *d* in  
the middle, the string *d*-*q*  
consists of 18 inches,  
which, compared to the  
whole, is governed by the  
sesquiertian ratio [4:3].  
Whence, it is [done]  
accordingly, because *a*-*d*  
is the symphony of the  
diatessaron. But truly,  
when we divide the  
quantity *h*-*q* in half,



littera ad a bisdiapason  
 resonat melodiam cumque h  
 p medio divisa littera l  
 sectio signatur, 9 esse l  
 q digitorum quantitatem  
 recte conspiciamus. Quam  
 si ad totam comparemus,  
 duplam superbipartientem  
 collationem inveniemus  
 diapason et diatessaron  
 consonantiam conservantem,  
 quam ut ait Boetius, solus  
 Ptolemaeus inter  
 consonantias admittit.  
 Sed de his, quia et in  
 compositione trium  
 quatuorque vocum  
 experientia aliqua  
 monstrabimus et ratione  
 paulo post in speculatione  
 permulta dicturi sumus,  
 hic supersedemus.

Cum igitur totam chordam  
 per tria dividentes et a  
 littera q versus a  
 venientes in trienti  
 litteram ponimus m et in  
 besse e, m q 8 esse  
 digitorum clare  
 monstrabimus, quae ter  
 ducta 24 integre metitur  
 et sic triplam servans  
 proportionem diapente et  
 diapason ad totam chordam

marking the letter p in  
 the middle of the section,  
 p-q consists of only six  
 inches, a number which  
 multiplied by four equals  
 24. Therefore, it is  
 inevitable that the  
 relationship will be  
 quadruple [4:1]. Whence,  
 it is [done] accordingly,  
 because the letter p to  
 the [letter] a produces  
 the melody of the  
 bisdiapason, and when h-p  
 is divided in half, the  
 section is marked by the  
 letter l [and] we  
 correctly perceive that  
 the quantity l-q is of 9  
 inches. But if we compare  
 [it] to the whole, we will  
 find a duple  
 superbipartient ratio  
 [8:3], preserving the  
 consonance of the diapason  
 plus the diatessaron,  
 which, as Boethius  
 says,<sup>258</sup> only Ptolemy  
 admits among the  
 consonances. But we pass  
 over these matters here  
 because we are going to  
 show some proofs in the  
 composition of three and  
 four voices, and a little  
 later we are going to  
 discuss many things in a  
 theoretical speculation.

Therefore, dividing the  
 entire string into three  
 [parts], and advancing  
 from the letter q toward  
 [the letter] a, when we  
 place the letter m at the  
 one-third [part] and [the  
 letter] e at the two-  
 thirds [part], we will  
 clearly show m-q to be of  
 8 inches, which [when]  
 multiplied by three

resonat symphoniam. Sed e q 16, qui sesquialter totius reperitur ac per hoc diapente resonat cum a [q]. Verum in h d quantitatem medio secamus littera f sectionem configurantes. Quoniam [q d] vero 18 digitos habere monstratum est, [q] f quindecim esse digitorum indubitanter cognoscimus, quos si ad [q] d referamus, sesquiquintam habitudinem comprehendimus. Excedit enim 18. 15 ternario, qui quinta pars minoris est. Verum si ad [q] h comparetur, in sesquiquarta collatione esse deprehendimus. Et ex ista comparatione ditonus sive bitonus consonantia fit, ex illa vero semiditonus sive trihemitonium species generatur, quam ex tono perfecto et imperfecto constare manifestum est. Quod si eiusdem [q] f ad [q] a fiat comparatio, supertripartiens quintas reperitur habitudo. Excedit enim 24 numerus numerum quindenarium in tres quintas minimi partes. Ex hac enim collatione diapente cum semitonio sive sexta minor aut hexas minor consonantia resonabit. Quod si eiusdem [q] f ad [q] l fecerimus relationem, superbipartientem inter eas repperimus proportionem. Superatur enim novenarius a quindenario numero senario, qui ex duabus

correctly measures 24 inches; and thus [by] observing the triple ratio [3:1], the symphony of the diapente plus the diapason resounds [in relation] to the entire string. But e-q is 16 [inches], which is found to be the sesquialter of the whole [3:2], and by this means the diapente resounds with a-[q]. But now let us divide the quantity h-d in half, marking the section with the letter f. But since q-d was shown to have 18 inches, certainly we recognize [q]-f to be of 15 inches, which we perceive to be the sesquiquintan relationship [6:5] if we relate it to [q]-d. For 18 exceeds 15 by three, which is a fifth part of the smaller [term]. But if it is compared to q-h, we perceive [it] to be in the sesquiquartan relationship [5:4]. And the consonance of the ditone or, if you prefer, the bitone is made from this comparison,<sup>259</sup> and from that the semiditone or, if you prefer, the trihemitone species is produced,<sup>260</sup> which, it is clear, consists of a perfect and an imperfect tone.<sup>261</sup> But if a comparison is made of the same [q]-f to [q]-a, a relationship of the supertripartient fifths is found [8:5]. For the number 24 exceeds the number 15 by three-fifths parts of the smallest [term]. Certainly, the consonance

[78]

novenarii partibus integre conficitur. Ista autem habitudo sextam sive hexadem creat maiorem.

Sic igitur omnes nostras, quia vulgares et non difficiles sunt fractiones, facillimas fecimus divisiones. Guido vero per novem passus monochordum docet dividere suum, quod laboriosum et taediosum esse intuentibus liquido patet hoc ideo, quia, ut diximus, tonus in sesquioctava consistit proportione. Difficilius enim est alicuius integri octavam quam medietatem aut tertiam sumere partem. Et per nostram divisionem sicut et per suam tonus efficaciter reperitur ut d e quam 18 et 16 numeri implent aut l m, quae 9 et 8 numerorum ambitu conscribitur.

of the diapente plus a semitone or, if you prefer, the minor sixth or the minor hexad will resound from this comparison. But if we make the relation of the same  $[q]-f$  to  $[q]-l$ , we find the superbipartient [thirds] ratio [5:3] among them. For the number nine is exceeded by the number fifteen by six, which is entirely composed from two parts of the number nine. However, this relation creates the major sixth or, if you prefer, the major hexad.<sup>262</sup>

Therefore, in this manner we have made all our divisions very easily, because the fractions are common and not difficult. But Guido teaches to divide his monochord by means of nine steps, which clearly appears to be laborious and tedious to anyone contemplating this, because, as we have said, the tone exists in the sesquioctave ratio [9:8]. For it is more difficult to take the eighth part of some whole than to take a half or a third part.<sup>263</sup> And the tone is effectively found by means of our division, just as it is by means of his, for example: [the interval] d-e which the numbers 18 and 16 fulfill, or l-m, which is expressed within the ambitus of the numbers 9 and 8.

Sed de his hactenus.  
Nunc autem quae semitonia  
monochordi canenda sint,  
quae vero evitanda  
videantur, quoniam unum  
maius, aliud minus  
reperitur, discutiamus.

But enough concerning  
these things. And now,  
let us discuss which  
semitones of the monochord  
should be sung, and which  
[ones], it seems, must be  
avoided, since it is  
ascertained that one is  
major [and] the other is  
minor.<sup>264</sup>

CAPITULUM [QUARTUM]

IN QUO SEMITONIA  
CANENDA AUT EVITANDA

Quoniam dictum est [tonum] in duo aequa non dividi semitonia et omnia tonorum spatia instrumenti perfecti in duo semitonia monstravimus esse divisa, dicendum restat, quod illorum sit canendum et quod evitandum, sic et de aliis speciebus, quae per semitonia variantur. Et ita huius primi voluminis complementum practicis principaliter deputatum ordinate perficiemus.

In arte igitur prima imperfecta, in prima scilicet monochordi divisione unum tantum est semitonium, quod evitari debet, illud scilicet quod apotome a Platone dictum fuisse constat. Igitur cantores aut instrumentorum pulsatores numquam faciant transitum a voce sive chorda *b* in *♯* nec e contra, quoniam illud semitonium in symphonia non ponitur, cum neque in diatessaron neque in diapente neque in

FOURTH CHAPTER

IN WHICH [IT IS EXAMINED]  
WHICH SEMITONES SHOULD BE  
SUNG AND WHICH SEMITONES  
SHOULD BE AVOIDED

Since it has been said [by others] that the tone is not [to be] divided into two equal semitones, and [since] we have shown that all the spaces of the tones of a perfect instrument are divided into two [unequal] semitones, there remains to be discussed which of them should be sung and which should be avoided. Likewise [we will discuss] the other species that differ by means of a semitone.<sup>265</sup> And thus in an orderly manner we will bring to an end that which completes this first volume, considered principally for the practicing musicians.

Therefore, in [our] first incomplete theory--that is, in the first division of the monochord--there is only one semitone that should be avoided--namely, that which is known to have been called *apotome* by Plato.<sup>266</sup> Therefore, the singers or players of instruments never make a transition from the note or string *bb* to *b♯*, nor vice-versa, because that semitone is not established as a symphony.

diapason aut in aliis imperfectis speciebus aut discordantibus simul et concordantibus successive convenire umquam visum sit. In monochordo vero perfecto multa loca sunt, in quibus transitus in cantu evitandus est. Per modum igitur doctrinae ea practicis assignabimus. Theoricis vero in sequenti volumine rationibus firmissimis veritatem demonstrabimus.

Ad mensuratam igitur figuram, quae in prima parte tractatu secundo capitulo quinto posita fuit, redeamus. Est enim [79] prima vox sive chorda *a*, secunda vero prima *b* idest prima *b* mollis coniuncta. Hic enim transitus bonus est, quoniam per semitonium, quod symphoniis adaptatur, distare visae sunt. Sed a prima *b* in  $\sharp$  transitus non fit, quoniam illud semitonium non cantatur, quod apotome vocatum est. A qua *b* in *c* bonum semitonium est, sed a *c* in prima  $\sharp$  malum; ab ista in *d* bonum, a qua in secunda *b* similiter bonum; a qua in *e* malum, sed ab *e* in *f* bonum. Ab *f* vero in secunda  $\sharp$  malum, sed ab ista in *g* bonum, a qua in

For it has never been seen to come about in the diatessaron, nor in the diapente, nor in the diapason, nor in the other imperfect species, nor in discords [that are played] at the same time,<sup>267</sup> nor in concords [that are played] successively.<sup>268</sup> But there are many places on the complete monochord where a transition [from one step to another] should be avoided within the song. Therefore, by means of [our] teaching, we will impress these things upon the practicing musicians. But we will demonstrate the truth to the theorists in the following volume with the firmest reasoning.

Now let us return to the measured figure which was established in the first part, the second treatise, the fifth chapter. For the first note or string is *a*, but the second [note] is the first *b* [*bb*]--that is, the first conjunct soft *b*. For this transition is good, since that which is adapted to the symphonies are seen to be distant by a semitone. But a transition is not made from the first *b* [*bb*] to  $\sharp$  [*b\sharp*], since that semitone which is called apotome is not sung. There is a good semitone from this *b* [*b\sharp*] to *c*, but from *c* to the first  $\sharp$  [*c\sharp*] is bad; from this [*c\sharp*] to *d* is good, [and] similarly from this [*d*] to the second *b* [*eb*] is good;

tertia *b* similiter bonum.  
 A tertia *b* in *h* malum, ab  
*h* in *i* sive in *b* bonum, ab  
*b* in *♯* malum et deinceps.  
 Ad hunc modum in suis  
 octavis mala malis, bona  
 vero bonis correspondent.

[the semitone] from this  
 [*eb*] to *e* is bad, but from  
*e* to *f* is good. Now [the  
 semitone] from *f* to the  
 second *♯* [*f♯*] is bad, but  
 from this [*f♯*] to *g* is  
 good; similarly [the  
 semitone] from this [*g*] to  
 the third *b* [*ab*] is good.  
 [The semitone] from the  
 third *b* [*ab*] to *h* is bad;  
 from *h* to *i* or, if you  
 prefer *b* [*bb*] is good;  
 from *b* [*bb*] to *♯* [*b♯*] is  
 bad, and so forth. [And]  
 they correspond in this  
 manner at their octaves--  
 that is, the bad  
 [semitones correspond] to  
 the bad [semitones] and  
 the good [semitones  
 correspond] to the good  
 [semitones].

Transitus autem tonorum  
 bonorum atque malorum, qui  
 non ad sequentem sed una  
 [scilicet voce] semper in  
 hoc instrumento medio  
 dimissa fit, sic  
 declaratur: Ab *a* in *b*  
 tonus bonus est, quia ex  
 semitono maiori atque  
 minori componitur, et a  
 prima *b* mollis coniuncta  
 in *c* similiter. Eodem  
 modo a littera *b* in prima  
*♯*, a qua ad secundam *b*  
 malus. Eodem modo a  
 secunda *♯* ad tertiam *b* et  
 in suis octavis similiter.  
 Ceteri vero transitus  
 tonorum una intermissa  
 semper singuli sunt boni.  
 Trihemitonia vero duabus  
 intermissis ubique sunt  
 bona, nisi cum ordo  
 accidentalis alteri  
 accidentali miscetur, ut a  
 prima *b* in prima *♯* et a  
 secunda *b* ad secundam *♯*.

However, the transition  
 of the good and of the bad  
 tones<sup>269</sup>--which is made  
 not on the following  
 [note], but rather with  
 one [note] always  
 dismissed in the middle on  
 this instrument --is  
 explained in this way:  
 There is a good tone from  
*a* to *b* [*♯*], because it is  
 composed of a major and a  
 minor semitone; and  
 similarly from the first  
 conjunct soft *b* [*bb*] to *c*.  
 In the same way [the tone  
 is good] from the letter *b*  
 [*b♯*] to the first *♯* [*c♯*],  
 but [the tone] is bad from  
 this [*c♯*] to the second *b*  
 [*eb*]. In the same way  
 [the tone] from the second  
*♯* [*f♯*] to the third *b* [*ab*]  
 [is bad], and similarly at  
 their octaves.<sup>270</sup> But  
 the remaining transitions  
 of the tones [consisting

Ideoque tertia *b* non est bona cum  $\sharp$ . Ditonus vero, qui quatuor fit intermissis, ubique est bonus, nisi a littera *b* in secundam *b* et a prima  $\sharp$  in *f* nec ab *e* in tertiam *b* nec a secunda  $\sharp$  in *b* vel in *i* et ita in istorum octavis. Diatessaron vero, quae ad sextam in hoc instrumento fit semper vocem, ubique est bona nisi a tertia *b* in tertiam  $\sharp$  et in suis octavis. Diapente vero, quae fit ad octavam, ubique est bona praeter quam a prima  $\sharp$  quadro in tertiam *b*, quoniam ad quartam *b* est diapente perfecta. De sexta vero minori, quae ad nonam semper fit chordam, sicut de tertia minori sentimus. Chorda enim, quae trihemitonio cassa fuit, hexade carebit minori. Sic sexta maior et tertia maior; nam chorda, quae ditono caruit, hexade maiori privatur. Sic et septima maior aut minor sicut tonus et semitonium; namque sicut istae ad fontem sic heptas maior aut minor ad eius octavam se habent.

of] only one interval, taken separately, are always good. But the trihemitones [consisting of] two intervals are good anywhere except when the accidental order is mixed with another accidental order, for example: from the first *b* [*bb*] to the first  $\sharp$  [*c* $\sharp$ ], and from the second *b* [*eb*] to the second  $\sharp$  [*f* $\sharp$ ]. In like manner the third *b* [*ab*] is not good with  $\sharp$  [*b* $\sharp$ ]. But the ditone, which is made with four intervals, is good anywhere except from the letter *b* [*b* $\sharp$ ] to the second *b* [*eb*], and from the first  $\sharp$  [*c* $\sharp$ ] to *f*, and [also] from *e* to the third *b* [*ab*], and from the second  $\sharp$  [*f* $\sharp$ ] to *b* [*bb*] or *i*; and likewise at their octaves. But the diatessaron (which on this instrument is always made up to the sixth note), is good anywhere except from the third *b* [*ab*] to the third  $\sharp$  [*c* $\sharp$ ], and at its octaves. But the diapente, which is made on the eighth [string], is good anywhere except from the first square  $\sharp$  [*c* $\sharp$ ] to the third *b* [*ab*], since there is a perfect diapente [from *ab*] to the fourth *b* [*eb*]. But in regard to the minor sixth, which is always made on the ninth string, we reason just as [we did] about the minor third. For the string that was lacking the trihemitone will [also] lack the minor hexad; likewise [also] the major sixth and the major



third. For the string which lacked the ditone is [also] deprived of the major hexad. Thus the major or minor seventh also behaves just as the tone and the semitone; for just as the latter hold themselves to the source, thus the major or minor heptas [hold themselves] to their octave.

Has etenim chordas sive tractus, quibus chordae percutiuntur, qui vulgariter [taedae] sunt nuncupati, in monochordo sic disponunt contemporanei nostri, ut tractus ordinis naturalis recto modo [procedant] abiecto synemmenon, ut in prima mensurata ostendimus figura. At vero [taedae] synemmenon et ordinum accidentalium aliquantulum super his elevatae ponuntur diverso depinctae colore, ut patet in figura. Sed notandum est et valde notandum de illa chorda inter *h* et *g* collocata. Quidam enim practicorum minus bene praevidentes ita illam disponunt, ut cum *h* sit bonum semitonium, cum *g* vero malum. Et sic diapente cum prima  $\sharp$  quadro illam faciunt resonare, quae diapente inutilis est, quoniam raro fit et, ut verius loquar, numquam fieri debet. Verum si quis dicat: ad hoc ponitur, ut, cum tenor descendit ad *a* per *b*, discantus habeat sextam maiorem in illa tendens ad diapason *h*, respondemus,

[80]

For these strings or, if you prefer, these courses on which the strings are struck, are commonly called *taedae*,<sup>271</sup> [and] are arranged by our contemporaries on the monochord in such a way that the courses of the natural order may proceed in a correct manner with the *synemmenon* omitted, as we show in the first measured figure. But indeed, the fingerboards of the *synemmenon* and of the accidental orders are arranged somewhat elevated above these, [and] they are depicted with a different color, as it appears in the figure. But that string [which is] arranged between *h* and *g* should be noted and given a great deal of attention. For some of the practicing musicians with less foresight arrange it in such a way that it is a good semitone with *h*, but a bad [semitone] with *g*. And thus they make that [note] resound a diapente with the first square  $\sharp$  [*c*♯], which is a useless diapente, since it is rarely made and, to tell

quod nunc in tenore debet fieri variatio, hoc est descendere per primam *b* mollis coniunctam, quae sexta maior est ad *g*. Et sic fiet transitus non solum ita bonus, verum melior, dulcior atque suavior; et si media vox interponatur, habet tertiam maiorem in *d*, a qua veniet in quintam scilicet *e* regulam supra positam servans, quam non habet, si alio modo descendat. Namque secunda *b* non coniungitur huic ratione signata.

Et si quis vellet dicere, quod ibi renascitur protus et condiciones, quas habuit *d*, debet et *h* obtinere et cum *d* semitonium sub se et supra se habere monstratum sit, eodem modo et *h*, respondebimus dicentes argumentum non procedere, quoniam illud habuit *g*, quae totalem similitudinem sub et supra in synemmenon tetrachordo vendicat sibi, non tamen *h*, quia sub se duos tonos habet. Licet

the truth, should never be made. Truly, if anyone should say: "It is placed there whenever the tenor descends to *a* from *b* in order that the discant may hold a major sixth at that [place] extending to the diapason *h*"--we respond that a variation should be made in the tenor now--that is, it [should] descend by means of the first conjunct soft *b* [*bb*], which is a major sixth with *g*. And not only will a good transition be made under these circumstances, but [it will be] better, sweeter, and smoother; and if a middle note is inserted, it holds a major third on *d*. From here, observing the rule presented above, it will advance to the fifth -- that is, *e*--which it does not hold to if [the tenor] descends in another manner. For the second *b* [*eb*] is not joined to this for the reason [that has been] indicated.

And if anyone wishes to say that there [on *h*] the protus is born again, and the conditions which *d* held to should also be obtained on *h*, and [that] since *d* was shown to have a semitone below and above itself, *h* also [ought to proceed] in the same way, we will respond by saying that the argument does not proceed [logically], since the former held *g*, which claims all similitude to itself below and above in

prima diapente sit in  
 disiuncto intensa, sic et  
 diatessaron, verum tamen  
 diatessaron supra diapente  
 primam non habet sed  
 secundam. Igitur illa  
 chorda in coniuncto  
 deuterus est tam  
 authenticus quam plagalis.

Alii vero practici  
 dicunt: si hoc fieret,  
 diapente e  $\sharp$  quadro non  
 haberet tertiam mediam,  
 quae maior ad inferiorem  
 et minor sit ad  
 superiorem, ut in parte  
 diximus secunda tractatu  
 tertio compositionis. Sed  
 hoc non obstat, quia, cum  
 illa phrygii sit  
 incitativa, non refert, si  
 tertia careat media vel si  
 maior ad superiorem et  
 minor ponatur ad  
 inferiorem.

the *synēmmenōn* tetrachord.  
 Nevertheless, [this is not  
 true] with *h*, because it  
 contains two tones below  
 itself. Even though the  
 first diapente may ascend  
 toward the disjunct  
 [tetrachord], and likewise  
 the [first] diatessaron;  
 nevertheless, it does not  
 hold the [first]  
 diatessaron [a-d] above  
 the first diapente [d-h]  
 but the second  
 [diatessaron instead].  
 Therefore, that string [*h*]  
 is the *deuterus* in the  
 conjunct [tetrachord, and  
 it is] as much authentic  
 as it is plagal.

But other practicing  
 musicians say: "If this  
 [tuning of the note  
 between *g* and *h*] were to  
 be made, the diapente  
 e-square  $\sharp$  would not have  
 an intermediate third  
 [*g* $\sharp$ ]," which is a major  
 [third] in relation to the  
 lower [note] and a minor  
 [third] in relation to the  
 upper [note], as we have  
 said in the second part,  
 the third treatise [in the  
 chapter] concerning  
 composition. But this is  
 not an obstacle, because  
 when that [harmony] of the  
 Phrygian is aroused, it  
 does not matter if it  
 lacks the intermediate  
 third, or if the major  
 [third] is established in  
 relation to the upper  
 [note] and the minor  
 [third] is established in  
 relation to the lower  
 [note].<sup>272</sup>

Quidam vero volentes  
 utrique satisfacere parti  
 aliam chordam inter  
 tertiam *b* et *h*  
 interserunt, quam a tertia  
*b* per commatis spatium  
 distare faciunt. Hoc  
 tamen non laudatur propter  
 hoc, quia esset tunc aliud  
 genus mixtum et non  
 diatonicum simplex.  
 Tristanus [vero] de Silva,  
 amicus noster, inter *f* et  
 secundam  $\sharp$  aliam chordam  
 dicebat esse  
 interponendam. Sic et per  
 numeros se reperisse  
 testabatur. Credimus enim  
 error illi sic emergerit,  
 ut *gama*, vox quae addita  
 fuit a nostris, fore  
 credidit proslambanomenon.  
 Neque igitur hoc neque  
 illud in diatonico genere  
 nostro admittendum esse  
 arbitramur. Nam tunc in  
 illum incidere errorem,  
 in quem Timotheum Milesium  
 teste Boetio incidisse  
 legimus genus scilicet  
 diatonicum in chromaticum,  
 quod melius est,  
 convertentem, propter quod  
 illum Lacedaemonii de  
 [Laconica] exegere  
 civitate, quoniam puerorum  
 animos, quos acceperat  
 erudiendos, [officiebat]  
 et a virtutis modestia ad  
 [mollitiem] declinantes  
 effeminatos efficiebat.  
 Non igitur tantum  
 utilitatem illa tertia  
 media nobis adducit,  
 quantam discrepantiam  
 atque discordiam in toto  
 ordine provenit, cum neque  
 secundum naturalem neque  
 secundum aliquem  
 accidentalem ordinem illo  
 modo, ut isti dicunt,

[81]

But some [people],  
 wishing to satisfy both  
 parts, insert another  
 string between the third *b*  
 [*ab*] and *h*, which they  
 make distant from the  
 third *b* [*ab*] by the space  
 of a comma. Nevertheless,  
 this is not praised on  
 account of this: because  
 then it would be another  
 mixed genus rather than  
 the simple diatonic  
 [genus]. But our friend  
 Tristan de Silva used to  
 say that another string  
 should be inserted between  
*f* and the second  $\sharp$  [*f* $\sharp$ ].  
 And thus he claimed to  
 have discovered it by  
 means of the numbers  
 themselves. Indeed, we  
 believe that the error  
 will appear to him just as  
 [the error] that *gamma*--a  
 note which was added by  
 our [predecessors]--would  
 someday be treated as  
*proslambanomenos*.  
 Therefore, we do not  
 believe that the latter  
 [the string between *F* and  
*F* $\sharp$ ] nor the former [the  
 string between *Ab* and *A*]  
 should be admitted in our  
 diatonic genus. For then  
 we would fall into that  
 error which we have read  
 Timotheus of Miletus fell  
 into--according to the  
 testimony of Boethius<sup>273</sup>  
 --namely, that he  
 converted the diatonic  
 genus into the chromatic  
 (which is better). [And]  
 on account of this, the  
 Lacedaemonians of Laconia  
 cast him out of the city,  
 since he was harming the  
 souls of the young boys  
 which he had accepted for

collocetur. Sed de his hactenus. Melius tamen primi senserunt, cuius veritatem in sequenti volumine firmissimis numerorum rationibus enucleabimus. Nunc autem epilogando supradicta huic operi finem [imponamus].

the purpose of teaching; and by deviating from the moderation of virtue toward softness, he was producing effeminate [young men]. Therefore, that intermediate third does not bring usefulness to us as much as it advances discrepancy and discord in the entire order, since, as the masters say, by this means it may not be arranged according to the natural [order] nor according to another accidental order. But enough concerning these things.<sup>274</sup> Nevertheless, they will better perceive [the concepts] of the first [volume], whose truth we will explain in the following volume with the firmest numerical calculations.<sup>275</sup> But now, let us put an end to this work by continuing [with] the epilogue mentioned above.

## EPILOGUS

Aufer igitur,  
iucundissime lector, ex  
animo tuo segnes pristinae  
ignorantiae nebulas et  
opusculi nostri huius  
claro irradiante fulgore  
piceam ab oculis tuis  
expelle caliginem; intueri  
et dispice omnem hanc  
musicae nostrae  
supellectilem, circumfer  
lumina, cuncta perlustra,  
locos omnes rimare. Quo  
perspicatius animum  
intenderis, eo magis  
nobiscum senties. Et ubi  
ad huius pulcherrimae  
veritatis, quam in  
communem utilitatem  
adducere curavimus,  
ducente deo perveneris  
agnitionem, gratias deo  
ages, mei memoriam  
servabis, opusculo isti et  
labori meo favebis. Sic  
enim facias necesse est,  
si turpissimum voles  
crimen ingratitude  
evadere. Si quid tamen a  
ratione dissonum et  
veritati non consentaneum  
reppereris, correctioni  
locum relinquo, in me  
examen admitto. Sed unum  
oro, ut, priusquam  
improbes, intelligas nec  
ad iudicandum praeceps  
eas. Pugnam non timeo, si  
praesente et iudicante  
ratione pugnabitur.  
Animadvertite, oro, quanto  
cum sudore quorundam  
musicorum cantorumque  
levissimas opiniones  
refellendo, quorundam  
vero, quibus magis favebat

## EPILOGUE

Therefore dearest  
reader, remove the  
lingering clouds of former  
ignorance from your mind  
and expel the pitch-pine  
darkness from your eyes  
with the clear irradiant  
splendor of this our  
little work; open your  
eyes wide and contemplate  
all these devices of our  
music; move around [in]  
the light, examine  
everything completely,  
investigate all the topics  
thoroughly. The more  
acutely you stretch [your]  
mind, the more you will  
perceive with us. And  
when, with God directing  
[your course], you have  
arrived at the recognition  
of this most beautiful  
truth which we have  
provided for the common  
good, you will give thanks  
to God, you will remember  
me, [and] you will delight  
in this little work and in  
my labor. For thus it is  
necessary that you do  
[this] if you want to  
avoid the most shameful  
transgression of  
ingratitude.  
Nevertheless, if you find  
anything that disagrees  
with reason and does not  
agree with the truth, I  
leave a place for  
correction [and] I subject  
myself to examination.  
But one thing I ask:  
before you reject  
[anything], you  
understand [it] and not

veritas, approbando et  
 quae indigeste et  
 tumultuarie tradita  
 videbantur ab aliis ad  
 perpendiculum dirigendo  
 libellum istum  
 [composuerimus]. In quo  
 si eum, qui in Boetio est,  
 eloquentiae florem non  
 videris, veniam dabis.  
 Ego enim semper veritatis  
 quam facundiae studiosior  
 fui, et nobis ut plurimum  
 in hoc opusculo sermo est  
 ad cantores, qui maiori ex  
 parte imperiti rudesque  
 comprobantur, et non  
 numquam eorum inconcinna  
 dicta et barbaris contexta  
 vocabulis necesse fuit, ut  
 improbarentur, operi  
 interserere.

Prius igitur, ut omnium  
 dictorum breve colligam  
 epitoma, sonos successive  
 et seriatim prolatos ad  
 totum usque concentum  
 [discutiendo] qualitates  
 ipsorum modorum per  
 mundanam atque humanam

proceed to a hasty  
 judgment. I do not fear a  
 quarrel if it is fought  
 with reason presiding and  
 judging. Notice, I beg of  
 you, with what great toil  
 we have composed this  
 little book, refuting the  
 insignificant opinions of  
 some musicians and  
 singers, approving [the  
 opinions] of certain ones  
 whom truth favored more,  
 and directing [you] to a  
 plumb-line away from  
 others who seem to have  
 been taught hastily and in  
 a disorderly manner. If  
 you do not see in this  
 [work] that blossom of  
 eloquence which is [found]  
 in Boethius, you will  
 forgive me. For I have  
 always given more  
 attention to the truth  
 than to eloquence of  
 language, since the  
 discourse in this little  
 work of ours is, for the  
 most part, for the  
 singers, most of whom are  
 acknowledged to be  
 ignorant and untrained;  
 and in order that [the  
 mistaken ideas of certain  
 musicians] may be  
 rejected, sometimes it has  
 been necessary to insert  
 in the work their awkward  
 expressions that are  
 interwoven with barbarous  
 words.

Therefore, so that I may  
 conclude with a brief  
 summary of all the things  
 which have been said,  
 first--by discussing the  
 sounds extended  
 successively and in a  
 series all the way through

musicam transeuntes miras  
 et diversas esse  
 ostendimus et per alia duo  
 melorum genera subtiliter  
 et non ab re antiquis  
 pervigilata transcurrentes  
 ad ipsas antiquorum  
 neotericorumque symphonias  
 diffiniendas accessimus.  
 Deinde per numerorum  
 passiones ingressi et  
 frivolas cantorum  
 opiniones iuxta  
 proportionales evitantes ad  
 proportionalitates, quibus  
 symphoniae tamquam  
 fundamentis innituntur,  
 accessimus et monochordum  
 nostrum recte per numeros  
 esse divisum subtiliter  
 insinuavimus.

Sed qui veram et  
 perfacilem huius  
 disciplinae viam sine  
 argumentorum obscuritate,  
 sine probationum  
 improbationumque longis  
 ambagibus percipere  
 desiderat, libellum  
 nostrum musices, quem  
*Introductorium* seu  
*Isagogicon* appellavimus,  
 inquirat. Illic abunde,  
 breviter et dilucide rei  
 summan invenies. Et cum  
 ea, quae illic videbis,  
 firmare rationibus et  
 altius intueri voles, ad  
 opus hoc reverteris, quod  
 est quasi arx illius ac  
 propugnaculum. Ex isto ad  
 declarandum defendendumque  
 illud opportuna deligere  
 potes instrumenta ab aliis

the entire concertus--we  
 have shown the qualities  
 of their modes to be  
 wonderful and diverse;  
 passing over *musica*  
*mundana* and *musica humana*,  
 and subtly passing through  
 the other two genera of  
 melody, [and] not avoiding  
 the vigils of ancient  
 truth, we progressed to  
 defining those symphonies  
 of the ancients and of the  
 modern theorists. Then,  
 entering into the  
 phenomenon of the numbers  
 and avoiding the frivolous  
 opinions of the singers,  
 we progressed to the  
 proportions along with the  
 ratios, which the  
 fundamental symphonies  
 rest upon; and in great  
 detail we introduced our  
 monochord that is  
 correctly divided by means  
 of the proportions.

But whoever desires to  
 take the true and easy  
 path of this discipline  
 without the obscurity of  
 arguments [and] without  
 the long digressions of  
 demonstrations and  
 disapprobations, let him  
 seek our little music book  
 which we have entitled  
*Introductorium* or  
*Isagogicon*. There you  
 will find in abundance the  
 most vital issues of  
 theory [stated] briefly  
 and clearly. And when you  
 wish to fortify those  
 things which you will see  
 there with reasons and  
 consider them in more  
 depth, you will return to  
 this work which [acts] as  
 a refuge and a bulwark for



igitur excogitata et  
 quaedam per me nuper  
 inventa scrutare  
 diligenter. Non parum  
 enim in his legendis  
 utilitatis voluptatisque  
 percepturus es et  
 immortalī deo bonorum  
 omnium largitori, qui  
 omnes liberales artes ad  
 hominum perfectionem  
 delectationemque condidit,  
 ut praedixi, gratias ages,  
 cui est gloria per  
 infinita seculorum secula,  
 amen. Explicit musica  
 practica Bartolomei Rami  
 de Pareia Hispani ex  
 Betica provincia et  
 civitate Baeza Gienna  
 dioecesi vel suffragana  
 oriundi, almae urbis  
 Bononiae, dum eam ibidem  
 publice legeret, impressa  
 anno Domini millesimo  
 [quadringentesimo  
 [octogesimo] secundo  
 quarto idus Maii.

(Explicit feliciter  
 prima pars musicae egregii  
 et famosi musici  
 Bartholomei Pareia Hispani,  
 cum publice musicam  
 Bononiae legeret, in qua  
 tota practica cantorum  
 pertractatur, impressa  
 vero opere et industria ac  
 expensis magistri  
 Baltasarī de Hiriberia

that [other work]. From  
 this [book] you can choose  
 suitable material for the  
 purpose of explaining and  
 defending that which has  
 been contrived by others,  
 and then you can  
 diligently investigate  
 some things recently  
 discovered by me. For you  
 are not going to receive  
 too little of usefulness  
 and pleasure in these  
 readings, and as I said  
 before, you will give  
 thanks to the immortal  
 God, provider of all good  
 things, who established  
 all the liberal arts for  
 the perfection and delight  
 of men; to Him is the  
 glory throughout the  
 endless ages of ages.  
 Amen. Thus ends the  
*Musica practica* of  
 Bartolomeo Ramos de Pareia  
 of Spain [who was] born in  
 the city of Baeza, in the  
 province of Baetica,<sup>276</sup>  
 in the district or, if you  
 prefer, the jurisdiction  
 of Gienna<sup>277</sup>. [For] it  
 was published in the  
 nourishing town of Bologna  
 while he lectured publicly  
 there, on the eleventh day  
 of May in the year of our  
 Lord, 1482.<sup>278</sup>

(Thus ends the first part  
 of the music of the  
 distinguished and famous  
 musician--the Spaniard  
 Bartolomeo Pareia, in  
 which the entire practice  
 of the singers is treated.  
 And it was published while  
 he lectured publicly on  
 music in Bologna by means  
 of the labor, diligence,

anno domini 1482 die 5<sup>o</sup>  
Junii.)

and expense of Maestro  
Baltasar de Hiriberia, on  
the fifth day of June in  
the year of our Lord  
1482.)<sup>279</sup>

REGISTRUM

Primum vacat, boetii musices (1); finito (3); Manus (11);  
Rogerio (13); gravitatem (15); et quando (23); est ipse  
(25); mutationes (27); habent (29); quantitatem (39);  
paranete (41); figura (47); secunda pars (49); volumine  
(51); tenore (53); 3a pars (61); est semibrevis (63);  
ponatur (65); Capitulum (73); maximus (75); repperisse (81).

## ENDNOTES

1. Although Ramos himself assumes the authority of *auctoritas*, he calls upon Boethius to establish his credibility. The *Musica practica* is, to a large extent, an abridged and practical treatment of the theoretical concepts presented by Boethius in the *De institutione musica* (sixth century).

2. Father and son figures of Greek mythology, who invented wings of wax to flee from their imprisonment of a labyrinth in Crete. Daedalus flew successfully to Sicily, where he was welcomed by King Cocalus; but Icarus, his son, was drown in the Aegean Sea when his wings melted from flying too close to the sun.

3. Marcus Tullius Cicero (106-43 B.C.), considered to be Rome's greatest orator and writer. His eloquent style has become the standard by which other Latin prose is judged.

4. Caius Sallustius Crispus (86-34 B.C.), a Roman historian known for his persuasive rhetorical style, demonstrated in his most famous work, *Bellum Catilinarium*.

5. Ramos mentions a host of both mythological and historical figures: Orpheus (the mythic singer, who attempted to bring back Eurydice from the Lower World, but lost her after he broke his promise and turned to look at her); Amphion (whose magical ability upon the lyre moved stones and built the walls of Thebes); Arion (a celebrated kitharist from Lesbos who, after being thrown overboard by sailors, was rescued from drowning by dolphins); Mercury (messenger of the gods and conductor of departed souls to the Lower World); Linus (son of Apollo and Terpsichore and teacher of both Orpheus and Hercules; the latter killed Linus with a blow from his lyre after being reproached during his music lesson); Solomon (king of Israel, second son of King David; Proverbs, Song of Solomon, and Ecclesiastes of the Old Testament have been ascribed to him); Pythagorus (the celebrated philosopher of Samos, ca. 550 BC, who discovered the mathematical basis of musical consonance in a blacksmith's shop); Aristoxenus (philosopher, musician, and pupil of Aristotle, who marked a turning point in Greek theory by basing musical theory upon the analysis of musical practice); Ptolemy (astronomer and philosopher, ca. AD 100-70, who integrated the concepts of Pythagorus and Aristoxenus in his *Harmonica*); Chorebus

(Coroebus? Grandfather of Linus who slew the monster Poene to protect the children of Argos from being devoured); Lycaon (king of Arcadia, whom Jupiter turned into a wolf when he found that Lycaon had defiled the altar with human sacrifices); Prophrastus (Prophrastus of Pieria, often referred to as Theophrastus, who is credited with adding the ninth string to the lyre); and Timotheus (musician of Miletus who was expelled from Laconica for adding a string to the lyre that made music more capricious and steered the minds of his young pupils away from the moderation of virtue).

6. I Samuel 16:14-23.

7. Priscianus Caesariensis, a celebrated grammarian during the time of the emperor Justinian (ca. 500 A.D.); his *Institutiones grammaticae* became the standard text for teaching grammar in the medieval schools.

8. Terni notes that Ramos makes a distinction between "harmony" and "music." This definition of harmony suggests a vertical concept, as opposed to the horizontal thinking of earlier contrapuntists.

9. Ramos usually differentiates between the terms *vox* and *sonus*. Bower notes that the term *vox* can have a variety of meanings, even in a musical context--pitch, note, the human voice (either speaking or singing), or sound in general. Ramos uses the term *sonus* to refer to sound as a musical entity. The definition generally becomes clear within the context of the sentence.

10. Book II, Chapter 8 of Aristotle's *De Anima*. See Aristotle, *De Anima*, trans., intro., and notes by R.D. Hicks (Amsterdam: Adolf M. Hakkert, 1965), 420b, 4ff.

11. Terni notes the tautology of Ramos's definitions of *vox* and *sonus* to that found in Tinctoris's *Terminorum musicae diffinitorium*: "Vox est sonus naturaliter aut artificialiter prolatus" while "Sonus est quicquid proprie et per se ab auditu percipitur." Translation: "The voice is a sound produced naturally or artificially" while "sound is whatever is perceived exclusively and intrinsically by the sense of hearing." See Johannes de Tinctoris, *Terminorum musicae diffinitorium*, facsimile of the Treviso Edition (ca. 1494), vol. XXVI, *Monuments of Music and Music Literature in Facsimile* (New York: Broude Brothers Limited, 1966), s.v.

12. lit., "plainsong."

13. lit., "counterpoint."
14. lit., "figured song."
15. lit., "the song of the instrument."
16. i.e., the monochord.

17. Bower notes that the Latin verbs *intentio* and *remissio* have a duplicity of meaning. *Intentio* can imply an increase in the tension of a string (stretching), thereby resulting in a higher pitch--an elevation of the sound, whereas *remissio* implies the opposite, that is--a loosening of the tension (relaxing), thereby resulting in a lower pitch. Thus, at times these two verbs will be translated, respectively, as "to tighten" or "to loosen," and at times as "to raise" or "to lower."

18. The third declension adjective *regularis* can be defined as "regular," "well-ordered," or "that which contains rules." I have elected to translate this adjective as "regular" to remind the reader of its derivation from the noun meaning "a rule" or "ruler" (*regula* in Latin; *ῥαυών* in Greek). Musicians used the "monochord rule" to audibly demonstrate the principles of their musical propositions. For further discussion of the monochord, see Cecil Adkins, "The Theory and Practice of the Monochord" (Ph.D. diss., State University of Iowa, 1963).

19. The natural sign ( $\natural$ ) is used in this translation to represent square *b*. Ramos is inconsistent in the usage of square *b*, preceding square *b* with the modifier *quadrum* or *quadratum*, notating square *b* sign without the modifier, and even writing *b mi* with a round-shaped *b*. Ramos uses the letter *b* as well as the sign round *b* to signify the note *bb*. To avoid confusion, I have used the sign *b* to represent *b rotundum* and the sign  $\natural$  to represent *b quadrum* or *quadratum*.

20. Terni suggests that this statement is evidence that Ramos, in his practical point of view, does not consider the major/minor semitone controversy to be a problem. Without qualification, Ramos labels both *i- $\natural$*  (*bb-b $\natural$* ) and  *$\natural$ -k* (*b $\natural$ -c*) as "semitones."

21.  $h=a$ ,  $i=bb$ ,  $\natural=b\mathcal{b}$ ,  $k=c$ ,  $l=d$ ,  $m=e$ ,  $n=f$ ,  $o=g$ ,  $p=a$ .

22. Gaffurius's marginal annotation: "Si tonus non est in duo aequalia divisibilis, non datur commedietas quae ex ditono sublata ipsum in semiditonum redigat."  
Translation: "If the tone is not divisible into two equal

parts, the *commeditas* is not given, which taken from the ditone reduces it to the semiditone."

23. Boethius, *De institutione musica*, Book IV, Chapter 5. See Anicius Manlius Severinus Boethius, *De institutione musica*, ed. by Godofredus Friedlein (Lipsiae: Teubneri, 1867), 312-18.

24. lit., "conjunct."

25. lit., "disjunct."

26. Ramos notes that the *hyperbolaiōn* is the "highest" tetrachord, but it is also possible that he is referring to its designation as *excellentes* in the *Musica enchiriadis*, since he cites this treatise later on in this chapter. In the *Musica enchiriadis*, the gamut is divided into four tetrachords: *graves* (g, a, bb, c); *finales* (d, e, f, g); *superiores* (a, b $\sharp$ , c, d); and *excellentes* (e, f $\sharp$ , g, a).

27. lit., "first" or "lower."

28. lit., "of the middle."

29. lit., "middle."

30. Original text: *iuxta mediam*.

31. Original text: *prope nētēn*.

32. lit., "through the whole" or "concerning the whole."

33. The Thracian priest that Virgil describes is Orpheus, who plays the seven pitches on the seven-stringed lyre to the strains of the dancing and singing people discussed in the previous verse: *Pars pedibus plaudunt choreas et carmina dicunt* (*Aeneid*, Book VI, Verse 644). In the verse that follows Ramos's quotation, it is clear that the priest is playing a stringed instrument because Virgil describes the plucking of the strings with the fingers or an ivory quill: *iamque eadem digitis, iam pectine pulset eburno* (*Aeneid*, Book VI, Verse 647). See William R. Harper and Frank J. Miller, *Six Books of the Aeneid of Virgil* (New York: American Book Company, 1892), verses 644-47.

34. lit., "tones."

35. As opposed to a difference in sound, this refers to a difference in the amount of space between these letters on the extended string of Figura 1.

36. Possibly a reference to Odo of Cluny's *Enchiridion musices*, which some call the *Musica enchiriadis* (Guido: *Enchiridion Oddonis*; Gerbert *Musica enchiridionis*). Contemporary scholarship casts doubt upon an attribution to Odo. See Hugo Riemann, *History of Music Theory: Polyphonic Theory to the Sixteenth Century*, trans. with preface, commentary, and notes by Raymond H. Haggh (Lincoln, Nebraska: University of Nebraska Press, 1966; reprint, New York: Da Capo Press, 1974), 42-47.

37. Wolf notes that the last five pitches are not marked as the *superacutae* with the usual small doubled letters.

38. Tinctoris, *Tractatus de musica*, Chapter 2. See Charles Edmond Henri de Coussemaker, *Scriptorum de musica medii aevi*, 4 vols. (Paris: A. Durand, 1864; reprint Milan: Bollettino bibliografico musicale, 1931), IV, 4a.

39. The literal translation of this passage is rather ambiguous. Ramos explains that the number six is considered to be perfect by mathematicians due to the fact that the numbers contained within it (i.e., 1, 2 and 3) can be multiplied or added together to achieve the *senaria*. Ramos infers the mathematical operation of multiplication by the reference to *partes eius aliquotae*--an "aliquot" being the fractional part that is contained an exact number of times in something else--while the mathematical operation of addition is inferred by the use of *componunt* and *simul*. For further discussion of the *senaria*, see Gioseffo Zarlino, *The Art of Counterpoint*, Part 3 of *Le institutioni harmoniche*, 1558, trans. by Guy Marco and Claude V. Palisca, *Music Theory Translation Series* (New Haven, Conn.: Yale University Press, 1968), xix.

40. In treatises of the time, graves pitches were usually designated with capital letters, the *acutae* with lowercase letters, and the *superacutae* with doubled lowercase letters stacked vertically. Ramos generally uses lowercase letters to name the pitch, whereas the specific octave is identified via the solmization syllables. Again, we see Ramos's efforts to omit everything that is superfluous.

41. Odo, in the *Enchiridion musices*, explains the "dual nature" of the ninth step (here, Odo is counting from the *proslambanomenos* rather than from *F ut*). The melodic

movement from  $bb$  to  $b\sharp$  was never implemented chromatically. A singer could choose to sing  $bb$  or  $b\sharp$  at the ninth step of the gamut, but never both. The following excerpt demonstrates Odo's viewpoint: "Yet the first and second ninth steps,  $bb$  and  $b\sharp$ , form with respect to one another neither a tone nor a semitone, but from the first ninth step,  $bb$ , to the eighth [step],  $a$ , is a semitone, and to the tenth [step],  $c$ , is a tone; conversely, from the second ninth step,  $b\sharp$ , to the eighth [step],  $a$ , is a tone, and to the tenth [step],  $c$ , a semitone. Thus one of them is always superfluous, and in each melody you accept one and reject the other in order not to seem to be making a tone and a semitone in the same place, which would be absurd." See Oliver Strunk, *Source Readings in Music History* (New York: W.W. Norton and Company, Inc., 1950), 107.

42. The Spaniard Tristan da Silva seems to be one of the few musicians that Ramos maintained a friendship with even though they had differing points of view on various musical topics. Da Silva was active in Portugal as a poet and musician, and served at the court of Alfonso V.

43. Boethius, *De institutione musica*, Book I, Chapter 20: "But since the mese . . . ." This sentence does not appear at the beginning of the chapter, as Ramos states, but rather in the eighth paragraph. See Friedlein edition, 211, line 21.

44. *Ibid.*, Book IV, Chapter 9: "Certainly there are two tetrachords which are conjunct with each other but disjunct from mesē . . . ." See Friedlein edition, 327, line 10.

45. i.e., Marchettus of Padua.

46. Wolf notes that Marchettus does not give the tetrachord division that Ramos attributes to him. In the *Lucidarium*, Treatise XIV, Marchettus divides the gamut into *graves*, *acutae*, and *superacutae* with the added *e la*, and in the following treatise gives the usual Greek tetrachord division with *F ut*. See Martin Gerbert, *Scriptores ecclesiastici de musica sacra*, vol. III (San Elasicinis, 1784; reprint, Milan: Bollettino bibliografico musicale, 1931), 120.

47. A conservative fifteenth-century French theorist and humanist, also known as Johannes Legrense, Johannes Gallicus, or Johannes Mantuanus. Ramos, Gaffurius, Spataro, and Burtius are all believed to have studied with him.



48. lit., "He is both untrained and in need of the rod," i.e., physical punishment. Terni has misinterpreted this passage, translating this phrase as "[Marchettus] needs a cane to hold himself up." Here, Carthusiensis is referring to the veracity of Marchettus's theory, not his physical stamina. See Johannes Carthusiensis's *Ritus canendi vetustissimus et novus* (Coussemaker, *Scriptorum* IV, 324a and 349b).

49. Ramos concludes his attack with a double entendre: the word *marchetos* refers both to the theories of Marchettus and to the value of the Venetian coin (the *marchetto*). At the same time, he alludes to the four additions of Roger Caperon as the "four *marchetti*."

50. Although Ramos refers to the thirteenth-century theorist Roger Caperon as "Gallus" (the Frenchman), he is usually cited in other sources as "Anglicus" (the Englishman). Caperon's treatise on the Guidonian hexachord and the ecclesiastical modes--including this passage cited by Ramos concerning the extensions above and below the Guidonian gamut--can be found in the fifteenth-century manuscript MS D39 of the Biblioteche riunite Civica e A. Ursino Recupero in Catania, Sicily. See also James Haar, "Roger Caperon and Ramos da Pareia," *Acta Musicologica* 41 (1969): 26-36.

51. Wolf notes that the terms *coruph*, *synēmmenōn*, *apotome*, and *crisis* are derived from the Greek terms *χορυφή*, *συνημμένων*, *ἀποτομή*, and *χρίσις*.

52. Philolaus of Croton (early 5th century B.C.) was one of the most revered Pythagorean philosophers. The three "means"--arithmetic, geometric, and harmonic--have been attributed to Hippias, Philolaus, and Archytas (his teacher), respectively.

53. The term "monochord" was also used to refer to multi-stringed instruments, such as those mentioned by Ramos in this chapter.

54. Terni notes that Ramos emphasizes that in high sounds, it is not so much the thickness of the string that lowers the intonation, but rather the lack of tension in the string itself.

55. lit., "perfect instruments"; Ramos uses this term to denote chromatic instruments.

56. A reference to the division  $h-i$  ( $a-b\sharp$ ), which produces the pitches  $a$ ,  $b\flat$ , and  $b\sharp$ .

57. i.e., to pass through two semitones.

58. i.e., wind instruments.

59. The *fistula* (σύριγξ) is a "shepherd's pipe," sometimes referred to as a "Pan pipe," made of several reeds that gradually decrease in length and calibre. The *sambuca* (σαμβύκη) is a triangular string instrument with a very sharp, shrill tone; it usually accompanies the *tibicina*, an early form of the flute. In this discussion of wind instruments, it is possible that Ramos confuses the *sambuca* with the *tibicina*.

60. A reference to the pitches of the overtone series that can be produced by variances in breath control. Wolf notes that this sentence makes sense only if one assumes that Ramos did not start on the fundamental, since he claims the possibility of the *bisdiapason sub aut supra*.

61. i.e., *ile*.

62. lit., "the instrument that is made by art."

63. Because Ramos's quotation here (Chapter VIII of the *Musica Enchiriadis*) is imprecise, Wolf suggests that Ramos may have been quoting from memory rather than from the treatise itself: ". . . utpote Noannoene et Noeagis, et caetera, quae putamus non tam significativa esse verba quam syllabas modulationi attributas." See Gerbert, *Scriptores* I, 158b.

64. These syllables are taken from the A-80 edition. In A-81, Ramos lists the syllables in this order with the exception that *tri* is substituted for *tu* on the first syllable, resulting in a repetition of the syllable *tri* on the first and the fifth tones. Wolf lists the syllables as *tri, pro, de, nos, te, ad, do*, based upon Georg Lange's article, "Zur Geschichte der Solmisation," *Sammelbände der Internationalen Musik-Gesellschaft* i (1899-1900): 543ff.

65. lit., "should be ridiculed."

66. In the *Excitatio quaedam musicae artis per refutationem*, Johannes Hothby has a sarcastic reaction for Ramos's use of the syllable "is" to denote both *b $\flat$*  and *b $\sharp$* : ". . . saltem de tuo nomine is feras laudem, quoniam tam pro *b* rotunda quam pro *\sharp* quadrata idem omnino sentire decrevistis." Translation: ". . . at least you may receive praise concerning your name *is*, since [in proposing] round *b* [to be] the same thing as square *\sharp*, you have lost [your] senses entirely." See Albert Seay, *Johannis Octobi tres*

*tractatuli contra Bartholomeum Ramum*, vol. X, *Corpus Scriptorum de Musica* (Rome: American Institute of Musicology, 1964), 41.

67. lit., "It is sung through these voices."

68. The meaning of this sentence becomes clearer in Part 1, Treatise 2, Chapter 5: "In Hispania vero nostra antiqua monochorda et etiam organa in *c* grave repperimus incepisse." Translation: "But in Spain we find our ancient monochords and also our organs to begin on *c* grave." Thus, for Ramos, sound begins on *c*.

69. i.e., *a* to *bb*, *bb* to *b♯*, and *b♯* to *c*.

70. *Mediate* translates lit., as "through the middle," and *immediate* as "not through the middle" (i.e., "by step" and "by leap," respectively).

71. Ramos never returns to a discussion of the metrical feet nor their relationship to the tropes. Guido, however, discusses them briefly in the *Micrologus*: "The parallel between verse and chant is no slight one, since neumes correspond to feet and phrases to lines of verse. Thus one neume proceeds like a dactyl, another like a spondee, and a third in iambic manner; and you see a phrase now like a tetrameter, now like a pentameter, and again like a hexameter, and many other such parallels." See Claude V. Palisca, ed., *Hucbald, Guido, and John on Music*, trans. by Warren Babb (New Haven, Conn.: Yale University Press, 1978), 72.

72. Although he does not explicitly state his intentions here, Ramos's recommendation of vocal exercises ascending from *c-g* (*psal-li-tur-per-vo*), and then from *g-c* (*vo-ces-is-tas*), suggests that he favors a harmonic, rather than an arithmetic, division of the octave.

73. lit., "the place for the teeth."

74. Chapters 7 and 8 are combined in the A-81 edition.

75. i.e., the number of the planets are seven: the Moon, Mercury, Venus, the Sun, Mars, Jupiter, and Saturn.

76. A reference to the six syllables of Guido's hexachord system.

77. A reference to *musica mundana*, alternatively referred to as "cosmic music" or "the music of the spheres." Ramos follows the order established by Cicero rather than that of Boethius (Boethius organizes these in the opposite order, with the highest sound--*nētē*--corresponding to the moon). See Bothieus, *De institutione musica*, Book I, Chapter 27, Friedlein edition, 219.

Cicero discusses the harmony that results from the orbit of the planets at length in *De re publica*, Book VI, Chapters 17-19. For other discussions, see: Macrobius, *De somnium Scipionis*, Book II, Treatise 1, Chapter 2 and Book VI, Chapters 1-6; Nicomachus, *Enchiridion* Book III; Plutarch, *De musica* 1147; and Ptolemy, *Harmonica* Book III, 10-16 and 104-11.

78. Terni notes that Ramos is alluding here to the two main culprits that strip music of its perfection and fullness: the Greek tetrachord--which divides or "truncates" the octave into two parts--and Guido's hexachord--which "diminishes" it to six voices.

79. Ramos takes this definition from Boethius, *De institutione musica*, Book I, Chapter 3. See Friedlein edition, 189, line 22.

80. Following Boethius, Ramos makes the distinction between *continua* (*συνεχής*)--a continuity of sound without discrete pitches and *discreta* (*διαστηματική*)--a continuity of sound with definite, discrete pitches. Boethius further defines these concepts with the Latin terms *continua* and *suspensa*, respectively. However, Boethius's use of the term *suspensa* provides a much clearer definition, because this term implies both a "sustaining" and "interruption" of the melody by means of the intervals. See Boethius, *De institutione musica*, Book I, Chapters 12 and 13, Friedlein edition, 199-200.

81. Ibid.

82. The Latin singular noun *modulus* is generally translated as "interval"; however, its plural form implies a succession of intervals, i.e., melody. The use of the gerundive here suggests the act of "making a melody."

83. The writings of Albinus on music are no longer extant. Boethius, however, cites Albinus concerning the third classification of the voice in the *De institutione musica* along with citations of his writings on geometry and logic in *In librum Aristotelis de interpretatione editio secunda, seu maiora commentaria*.

84. See Boethius, *De institutione musica*, Book I, Chapter 14, Friedlein edition, 200.

85. Period choral books demonstrate that a five-line musical staff was already being used in Spain; other countries (including Italy) were still using a four-line staff.

86. The Latin word *claves* may be translated literally as "keys"; however, it is obvious that Ramos is referring to the musical "clefs," which denote the pitches that are assigned to various lines and spaces of the musical staff. It is interesting to note that these early clef signs resemble the end of a skeleton key; this may be the reason they were referred to as *claves*.

87. "Multi volentes . . ." is a reference to Ramos's own Chapter 7 in Part 1, Treatise 1. It is here that Ramos first discusses his solmization method and introduces pedagogical exercises for sight singing.

88. Ramos describes the semitone in terms that the practicing musician could understand, i.e., in regard to its aural effects (*softer, harder*), rather than providing a speculative explanation with complicated proportions.

89. A reference to Philippotus Andreas (?), a composer and theorist of the fourteenth century who is credited with *De contrapuncto quaedam regulae utiles*. See Coussemaker, *Scriptorum*, III, 116f.

90. lit., "One is musica ficta."

91. In Treatise 8, Chapter 2 of the *Lucidarium*, Marchettus of Padua states that round *b*, square *q*, and *#* are specifically designated for different types of music: "Signa autem, quibus notis innuitur permutationem facere, sunt tria, scilicet *q* quadrum, *b* rotundum et aliud signum, quod a vulgo falsa musica nominatur; de quibus videre oportet. Prima namque duo signa, scilicet *q* et *b* sunt, vel esse possunt in quolibet cantu plano ac etiam mensurato. Tertium vero signum solum in cantu ponitur mensurato, vel in plano, qui aut colorate canatur, aut in mensuratum transit, puta in tenoribus Motetorum seu aliorum cantuum mensuratorum. De primis duobus signis ait Richardus Normandus: *ubicumque ponitur q quadrum, dicimus vocem MI, ubicumque vero b rotundum, dicimus vocem FA.*" Translation: "However, there are three signs by which one may bring about a permutation, namely, *q quadrum*, *b rotundum*, and another sign, which is commonly called *falsa musica*. For the first two signs--that is, *q* and *b*--are found or can be found in

plain song and also in measured [music]. But the third sign is only placed in measured song, although it may be placed in plain [song] if it is sung with coloration or used in a mensurable manner, as in the tenors of motets or [in the tenors] of other measured songs. Concerning the first two signs, Richard of Normandy said: *Wherever ♯ quadrum is placed, we call the note MI; wherever ♭ rotundum is placed, we call the note FA.*"

Although according to the above citation it appears that Marchettus would have been in agreement with Ramos on this matter, Marchettus believed that the whole tone consisted of five *dieses* and, therefore, the signs round ♭, square ♯, and # represent three separate entities: the enharmonic semitone a to bb (consisting of two *dieses*), the diatonic semitone bb to b♯ (consisting of three *dieses*), and the chromatic semitone c to c# (consisting of four *dieses*). For Ramos, the signs round ♭, square ♯, and # all represent the same distance--that of a semitone.

92. See Tinctoris, *Terminorum musicae diffinitorium*, s.v. "Coniuncta," 14.

93. Wolf concludes Part 1, Treatise 2, Chapter 2 here and introduces Chapter 3, which he entitles *De coniunctarum cognitione*. However, the original editions (A-80, A-81, and A-7-35) have no indication of a third chapter at this point. Part 1, Treatise 2, Chapter 2 proceeds to Chapter 4 without any mention of Chapter 3; either this is a mistake on Ramos's part, or Chapter 3 was missing upon the publication of the *Musica practica*.

94. Ramos makes no distinction between the major and the minor semitones; such a concept of equally-valued semitones would have been very difficult for his contemporaries to accept.

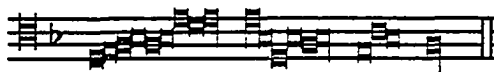
95. Ramos uses the nouns *mutatio* and *permutatio* interchangeably to denote the process of mutation, i.e., the substitution of one syllable for another in the Guidonian gamut.

96. See Tinctoris, *Terminorum musicae diffinitorium*, s.v. "Mutatio," 44.

97. i.e., *fa ut* is used for ascending through the gamut; *ut fa* is used for descending.

98. Gaffurius's marginal annotation: "In ♭ fa ♯ mi fit permutatio secundum Marchetum, quod et in *Practica* nostra declaramus, ut hoc etiam probatur exemplo:" [example]. Translation: "According to Marchettus, a

mutation is made on *b fa ♯ mi*, as it is demonstrated in this example, which we explain as well in our *Practica*:"



perspective, "its left side" is actually the right side of the diagram.

104. All three editions (A-80, A-81, and A-7-35) indicate that the figure is placed in the preceding margin-- "*praecedenti margine posita*"; the figure is actually located on the same page as this text.

105. i.e., segment.

106. i.e., the first soft *b* coniuncta.

107. Ramos most likely is alluding to the practice of creating keyboards that contain the C/E short octave by omitting certain accidentals in the lowest octave. This practice was justified by: (1) the lack of demand for certain accidentals in the low range; (2) by the substantial financial savings incurred when some of the larger bass pipes on the organ could be omitted; and (3) by the fact that the re-assignment of the pitches to other keys made the larger intervals more attainable within the player's hand span. The extant sixteenth-century keyboards with C/E short octaves demonstrate that the eight pitches below *c* grave are typically arranged in the following manner: *B♯, B♭, A* (*proslambanomenos*), *G* (*Γ ut*), *F* (*retropolis*) would have been placed at their normal positions on the keyboard, *E* would have been placed where *G♯* usually appeared, *D* would have been placed where *F♯* had been, and *C* would have been placed in the position that had formerly been occupied by the pitch *E*. This remark by Ramos regarding a keyboard instrument in Bologna with a range that includes the eight notes below *c* grave is much more important than it may initially seem on the surface. This comment suggests the existence of the bass short octave in practice much earlier than the first descriptions that appear in the musical treatises of Nicola Vicentino and Juan Bermudo of 1555. See Standley Howell, "Ramos de Pareja's Brief Discussion of Various Instruments," *Journal of the American Musical Instrument Society* XI (1985): 14-37. For a completely different perspective regarding the meaning of this passage, see Nicolas Meeùs, "Bartolomeo Ramos de Pareia et la tessiture des instruments à clavier entre 1450 et 1550," *Revue des archéologues et historiens d'art de Louvain* v (1972): 148-172.

108. i.e., these instruments only have *recta* (white keys) as opposed to *ficta* (black-key accidentals) from *Γ ut* down to the *C* below.

109. lit., "sweetness of honey."



110. lit., "the difference of music."

111. In the treatise *Excitatio quaedam musicae artis per refutationem*, Johannes Hothby refutes the statements from this chapter of the *Musica practica*. He quotes Ramos directly, citing Part 1, Treatise 2, Chapter 6. For Hothby, the difference in music is based upon quality as well as quantity.

112. Ramos is referring to Pedro de Osma (ca. 1427-80), who was a professor at the University of Salamanca from 1457-78.

113. A Spanish theologian of the fifteenth century.

114. Terni notes that this sentence demonstrates the typical viewpoint of the period: only those things that were written had any real value.

115. Ramos refers to this theorist as Johannes Ottobi, but present-day musicologists usually refer to him as Johannes Hothby.

116. In the treatise *Excitatio quaedam musicae artis per refutationem*, Hothby rejects the statement that he adopted the numbers on his monochord from Boethius. He notes that although his chromatic and enharmonic genera are identical to those of Boethius, his own division of the monochord differs from Boethius in the diatonic genus due to the addition of pitches to the higher and lower ranges of the monochord.

117. See Johannes Carthusiensis, *Ritus canendi vetustissimus et novus*, Book III, Chapter 1 (Coussemaker, *Scriptorum* IV, 328b).

118. i.e., Pedro de Osma.

119. Gaffurius's marginal annotation: "Hic se multum iactat auctor." Translation: "Here the author boasts a great deal!"

120. This division of the chromatic and enharmonic genera is the same division that Boethius presents in *De institutione musica*, Book I, Chapter 21, Friedlein edition, 212-13.

121. lit., "a perceived ditone." Ramos uses this term to demonstrate that although the pitches a-c appear to be a semiditone, this interval is actually perceived as the ditone a-c $\sharp$  by means of *musica ficta*.

122. lit., "perceived semitone."

123. If *b mi* is changed to *re*, then *mi* will be placed upon *c*, which will in turn be sung as *c#*, and *fa* will follow on *d*. Although Ramos claimed at the end of the previous chapter that a semitone does not always occur between *mi* and *fa*, in this instance he employs the syllables *mi* and *fa* to carry out his argument of the *ditonus subintellectus*.

124. Here Ramos uses the nominative form--Johannes Carthusinus. Present-day musicologists usually refer to him by the genitive form--Johannes Carthusiensis.

125. lit., "I do not proclaim it a *mutation* of note to note, but I call it a *variation* from digression to digression."

126. See Coussemaker, *Scriptorum* IV, 347b, 349b, and 374f.

127. Gaffurius's marginal annotation: "Etiam per voces Guidonis possumus cantare tetrachorda disiuncta triplici videlicet diatessaron consideratione sine mutatione." Translation: "We are also able to sing the three disjunct tetrachords by means of the syllables of Guido, namely with a consideration of the diatessaron without mutation."

128. Ramos's single mutation of *psal-tas* only effects the syllable; it does not effect the pitch.

129. See Adrien De la Fage, "Musica disciplina magistri Ugolini Urbevvetani," *Essais de Diphthérogaphie Musicale* 12 (Rome: Bibl. Casanat. c. II.3 [2151]).

130. lit., "of the medicinal [finger]," i.e., the finger next to the little finger.

131. lit., "with [the finger] of the ear," i.e., the finger used to clean the external part of the ear.

132. This annotation is directed toward the printer regarding the placement of the hand. In all three editions (A-80, A-81, and A-7-35), however, the figure was placed on the following page.

133. Gafurrius's marginal annotation: "Hic posset argui, quoniam toni non semper videntur aequales, quod aperte monstratur in divisione monochordi. Nam tonus in graviore loco maiorem quantitatem chordae comprehendit, quam qui in acutiore distenditur." Translation: " This could be

refuted, since the tones do not always appear to be equals, which is clearly shown in the division of the monochord. For the tone in the lower range comprises a greater quantity of the string than when it is divided in the higher [range]."

134. See Boethius, *De institutione musica*, Book IV, Chapter 14, Friedlein edition, 337, line 22.

135. i.e., the unison.

136. Ramos's view on the equality of the tritone and the semidiapente is quite different from his contemporaries, who justified the use of the semidiapente but refused to accept the tritone in composition.

137. Ramos demonstrates the typical inward melodic resolution of the diminished fifth.

138. See Coussemaker, *Scriptorum IV*, 372a.

139. The species of the diapente and diatessaron are based upon the position of the semitone. The four species of the diapente are based upon the rearrangement of the semitone within an octave, thus:

1st species = scale steps 1-5, semitones between 3 & 4.  
 2nd species = scale steps 2-6, semitones between 2 & 3.  
 3rd species = scale steps 3-7, semitones between 1 & 2.  
 4th species = scale steps 4-8, semitones between 4 & 5.

The three species of the diatessaron are based upon the rearrangement of the semitone within an octave, thus:

1st species = scale steps 1-4, semitones between 3 & 4.  
 2nd species = scale steps 2-5, semitones between 2 & 3.  
 3rd species = scale steps 3-6, semitones between 1 & 2.

140. Gaffurius's marginal annotation: "Imo linea et spatium in cantilenis et cantu plano differentiam probant acuminis et gravitatis distantiam diponentes." Translation: "On the contrary, in cantilenas and plain song the line and the space show the difference [of music], arranging the distance of the high and the low."

141. See Coussemaker, *Scriptorum IV*, 346a.

142. Gaffurius's marginal annotation: "Imo omnino differunt." Translation: "On the contrary, they differ altogether."

143. Gaffurius's marginal annotation: "His ignotis deductionibus confunditur, quod in manu Guidonis facilitate percipitur." Translation: "That which is easily understood with Guido's hand is obscured by these ignorant deductions."

144. See Boethius, *De institutione musica*, Book IV, Chapter 15, Friedlein edition, 341, lines 19ff.

145. *Ibid.*, Book I, Chapter 1, Friedlein edition, 180, lines 17ff.

146. Gaffurius's marginal annotation: "Facilius introducuntur ad hanc cognitionem iuvenes institutione Guidonis quam solis alphabeti litteris ibi dispositis." Translation: "The young are more easily introduced to this idea with Guido's method, which is arranged there with only the letters of the alphabet."

147. *lit.*, "first authentic."

148. *lit.*, "the plagal of the first."

149. Again, Ramos is referring to Johannes Carthusiensis. See Coussemer, *Scriptorum IV*, 324a and 349b.

150. Gaffurius's marginal annotation: "Haec opinio, licet veritati adhaereat, facile posset impugnari." Translation: "Although this opinion adheres to the truth, it could easily be attacked."

151. A reference to the fifteenth-century Spanish theorist, Luis Sánchez (?).

152. A song in Roman comedy, sung by one person and accompanied by music and dancing; a monody, solo. See Charlton T. Lewis and Charles Short, *A Latin Dictionary Founded on Andrew's Edition of Freund's Latin Dictionary* (New York: Oxford University Press, 1879; reprint, 1991), 281.

153. See Boethius, *De institutione musica*, Book I, Chapter 1, Friedlein edition, 185, lines 27-186.

154. A Thracian tribe on the Danube, bordering on the Dacians. See Lewis and Short, *A Latin Dictionary*, 814.

155. See Boethius, *De institutione musica*, Book I, Chapter 1, Friedlein edition, 181, lines 5-7.

156. A town in the eastern part of Sicily, now Taromina, also called Tauromenon. See Lewis and Short, *A Latin Dictionary*, 1844.

157. See Boethius, *De institutione musica*, Book I, Chapter 1, Friedlein edition, 184, lines 10ff.

158. i.e., Marcus Tullius Cicero.

159. Boethius provides this comparison of the strings to the disposition of the planets, which was given by Marcus Tullius Cicero in *De re publica*, Book VI, Chapter 18; however, Boethius arranges them in a different order: "The *hypatē mesōn* is assigned to Saturn, whereas the *parhypatē [mesōn]* is like the orbit of Jupiter. The *lichanos mesōn* is entrusted to Mars. The sun governs *mesē*. Venus holds the *tritē synēmmenōn*. Mercury rules the *paranētē synēmmenōn*. The *nētē* is analogous to the moon's orbit." See Boethius, *De institutione musica*, Book I, Chapter 27, Friedlein edition, 219, lines 6-9.

160. i.e., the Greek poet.

161. i.e., Mnemosyne, Jupiter's wife, mother of the Muses; often referred to as "the goddess of memory."

162. Martianus Mineus Felix Capella: a learned grammarian of Madaura, Africa who flourished during the second half of the fifth century; best known for his allegory *De nuptiis Philologiae et Mercurii*, in which he discusses the seven liberal arts.

Aurelius Macrobius Ambrosius Theodosius: a Roman grammarian who flourished at the end of the fourth century; author of a treatise entitled *Convivia Saturnalia*, and of a commentary on Cicero's *Somnium Scipionis*.

163. The attributes of the nine Muses are as follows: Thalia is the Muse of comedy, Clio of history, Calliope is the chief of the Muses and the goddess of epic poetry, Terpsichore of dancing, Melpomene of tragic and lyric poetry, Erato of lyric and amorous poetry, Euterpe of music, Polyhymnia is the Muse of many hymns, and Urania is the Muse of astronomy. See Lewis and Short, *A Latin Dictionary*, s.v.

164. Because of his association with the tropes, Wolf suggests that the "Saint John" to whom Ramos refers may be Johannes Damascenus.

165. Gaffurius's marginal annotation: "Hic declaratur quod natura ducit nulla ratione deducitur."

Translation: "Here it is declared that whatever nature produces [cannot] be deduced by reason."

166. See Boethius, *De institutione musica*, Book I, Chapter 3 and Chapter 8, Friedlein edition, 191, lines 3-4, and 195, lines 6-10.

167. See Pietro Aaron, *Lucidario in musica*, vol. LXVIII, *Monuments of Music and Music Literature in Facsimile* (New York: Broude Brothers Limited, 1978), III, fol. 18b.

168. Gaffurius's marginal annotation: "Debilis et admodum erronea ratio." Translation: "A lame and completely erroneous theory."

169. Gaffurius's marginal annotation: "Melius est, per mutationem semitonii in tonum vel e converso non mutant consonantiam; nam tertia per additionem vel subtractionem semitonii redigitur in quartam vel in secundum." Translation: It is better [to say] that they do not change [their] consonance by means of the mutation of a semitone into a tone or vice-versa; for the third is made into a fourth or a second by the addition or subtraction of a semitone."

170. For both Boethius and Ramos, *proportionones* refers to "ratios" while *proportionalitates* refers to "proportions."

171. The Latin word *lac* is generally used to refer to "milk." Ramos uses the word *lacticinia* here to refer to a type of dish that is prepared with milk and eggs.

172. i.e., a compound of a compounded thing, or from the compound.

173. In the A-80 edition of the *Musica practica*, Gaffurius has marked the following chart at the bottom of page 50 (the "figure" to which Ramos must be referring):

	Perfectissime aequisone		Perfecte		Et ad hunc modum non est statum
C O N S O N A N T I E	22a	24a	26a	27a	Superdecomposite
	15a	17a	19a	20a	Decomposite
	8a	10a	12a	12a	Composite
	unisono	3a maior minor	5a	6a maior minor	Simplices
		imperfecte		imperfecte	

Simplices dicte sunt quia sunt puerilia.

Translation: The simple [consonants] are mentioned because they are the source.

174. Gaffurius's marginal annotation: "Quinta et quarta multum differunt; nam una consonat per se et alia dissonat per se scilicet, dum simpliciter deducuntur." Translation: "The fifth and fourth differ greatly; for one is intrinsically consonant and the other is intrinsically dissonant--that is, provided that they are composed in a simple manner."

175. Gaffurius's marginal annotation: "Ego autem in tertio *Practicae* nostrae, qui contrapunctus inscribitur, consonantias huiusmodi ternaria distinxi progressionem. Alias etiam dico perfectas, alias imperfectas aliasque medias auctoritatibus quorundam veterum et multis ductus rationibus." Translation: "I, however, in the third book of our *Practica* which is entitled "counterpoint," distinguished consonants of this kind with a three-fold progression. For I call some "perfect [consonants]," some "imperfect [consonants]," and others "intermediate [consonants]," based upon the authorities of some of the ancients and the many theories that have been established."

176. Gaffurius's marginal annotation: "Hic pulcherrima et longa subtilisque disputatio nascitur." Translation: "Here the most beautiful, lengthy, and subtle dispute is born."

177. Gaffurius's marginal annotation: "Incontrarium saepius servatur supra illud carmen: *Debile principium melior fortuna sequetur*. Nam finis est perfectio rei, non autem principium, ut Aristoteli placet." Translation: "On the contrary, it is observed more frequently than just that song *Debile principium melior fortuna sequetur*. For the end, not the beginning, is the perfection of a thing, as it is pleasing to Aristotle."

178. Appendix A and B provide examples in modern notation of counterpoint and fugue as discussed by Ramos in this chapter.

179. Gaffurius's marginal annotation: "Sententia est Aristotelis in problematibus praeauditum cantum magis delectare." Translation: "It is the opinion of Aristotle, that one delights more in the enigmas of the song that has been heard before."

180. Gaffurius's marginal annotation: "Hoc non semper servandum est, sed locis et temporibus congruis atque semper disponendum est locis necessariis arte et natura disponente." Translation: "It should not always be observed in this way, rather it should always be distributed in the necessary places at suitable locations and times, by arranging it according to art and nature."

181. Appendix C provides examples in modern notation of counterpoint as discussed by Ramos in this chapter.

182. In Book II, Chapter 26 of his *Declaratio musicae disciplinae*, Ugolino of Orvieto offered rules of counterpoint that are virtually repeated by Ramos in this passage. Ugolino included musical examples to illustrate these rules --rules with which Ramos later takes issue in his discussion of counterpoint. See Appendix D of this dissertation in order to compare Ugolino's rules and musical examples with those given by Ramos in this chapter.

183. Ramos has replaced the word *cantum* here with *tantum*.

184. Ugolino uses the accusative form *tertiam* at the beginning of the sentence rather than the ablative form *tertia* that Ramos employs. Because the form of this word changes the meaning of the sentence, I have chosen to use Ugolino's accusative form in order to give the reader a better understanding of the actual meaning of this rule.

185. Ugolino: "Quinta tibi fiat, si terna solam remittat"; the sense remains the same.



186. Ugolino: "Quinta sexta fiet, si cum octava iungatur."

187. Ugolino: "Unisonum dicas, si ternam vel quartam intendas"; his musical examples illustrate the tenor moving by either a third or a fourth, rather than by a third or a fifth as Ramos states.

188. Ugolino: "Vult decimam sexta tertiam remittens ad infra"; his statement suggests that the tenor descends by a third, rather than by a third or more as Ramos states.

189. Gaffurius's marginal annotation: "Hic se excusat auctor non probasse propositas concordantias contrapuncti." Translation: "Here the author excuses himself for not having proven the concordant propositions of counterpoint."

190. Gaffurius's marginal annotation: "Hic litterarum processus consonantiarum potius cantores confundit quam instruit. Sanior quidem et perceptu facilior est progressio guidonicis institutionibus deducta et numerositatis consonae vocabulis denominata." Translation: "Here the progression of the consonant letters confuses rather than instructs the singers. Certainly the progression deduced from Guidonian principles and named with the appellations of consonant harmony is more reasonable and more easily understood."

191. i.e.,  $\sharp mi$ .

192. Ramos did not discuss these matters in Part 1, Treatise 3 of the *Musica practica*. Perhaps he is referring to a section in one of his other works, such as his *Introductorium* or *Isagogue*.

193. i.e., from neither *modulari* ("modulating") nor *move* ("moving"), but from *modificatio* ("modification").


194. See Coussemaker, *Scriptorum* I, 118b.


195. lit., "uttering."

196. Gaffurius's marginal annotation: "Quod potest scribi, potest et pronuntiari; non autem e contrario ut sibila, quae proferuntur et scribi non possunt. Non est absurdum scribi non posse quod potest pronuntiari, quia soni pronuntiantur in praeteritum tempus praeterfluentes. Hinc mandantur memoriae, ne pereant, quia scribi non possunt. Et est sententia Rhabani Mauri et Isidori." Translation: "Whatever can be written can also be sung; however, the

opposite is not [true], such as whistlings which can be produced but cannot be written. It is not absurd that what can be sung is not able to be written, because sounds are sung passing beyond into past time. These [sounds] are committed to the charge of memory lest they be lost, since they are not able to be written. [This] is also the opinion of Rhabanus the Moor and of Isidore."

197. Gaffurius's marginal annotation: "Inaudita et intolerabilis, iudicio meo, duplicis prolationis demonstratio." Translation: "In my opinion, the representation of a duple prolation is unheard of and intolerable!"

198. Gaffurius's marginal annotation: "Imo rectius maxima quam duplex longa dicitur, cum, perfectione moduli computata, tres longas possidere iudicetur. A nonnullis item antiquorum sic figurabatur  ."

Translation: "On the contrary, it is more correctly called *maxima* rather than *duplex longa*, since, with the perfection of the measure having been calculated, it will be considered to possess three longs. It was also represented by some of the ancients in this way:  ."

199. Psalms 90:4. Ramos quotes from scripture to make a pun here: Time is brief, and thus the *tempus* is a breve.

200. Gaffurius's marginal annotation: "Semibrevis minoris prolationis tam in tempore perfecto quam imperfecto semper est aequalis; nam semper duas minimas aequales comprehendit." Translation: "The semibreve of the minor prolation is equal as much in *tempus perfectum* as in [*tempus*] *imperfectum*; for it always contains two equal minims."

201. See Johannes de Muris's *Quaestiones super partes musicae* (Gerbert, *Scriptores* III, 301 and Coussemaker *Scriptorum* III, 103).

202. See Johannes de Muris's *Musica practica* (Gerbert, *Scriptores* III, 292b ff.).

203. Gaffurius's marginal annotation: "Ego firmiter contrarium teneo evidentioribus procedens rationibus." Translation: "I strongly hold to the contrary, proceeding with much clearer reasons."

204. Gaffurius's marginal annotation: "Hic prolationem conducit per punctum in centro, superius autem per punctum divisionis reducibilis." Translation: "Here he assembles the *prolatio* by means of a point in the center; however, [he assembles it] above by means of a point of the reducible division."

205. Terni notes that Ramos is in complete disagreement with both Gaffurius and Tinctoris in his support for the principle of dividing the *tempus*. He is also in disagreement by his affirmation (as Spataro will also later emphasize) that it is not possible to derive the breve or the semibreve from the sum of the minims.





206. This paragraph is paraphrased in Book I, Chapter 38 of Pietro Aaron's *Thoscanello*. See Pietro Aaron, *Thoscanello*, facsimile of the Venice 1523 Edition, vol. LXIX, *Monuments of Music and Music Literature in Facsimile* (New York: Broude Brothers Limited, 1969), fol. e2v.

207. Gaffurius's marginal annotation: "Errant perfecto, qui notularum proprietatem quantitativam viciant et corrumpunt sine canone vel proportione." Translation: "Those who change and corrupt the quantitative property of the signs without rule or measurement err with respect to the perfect."

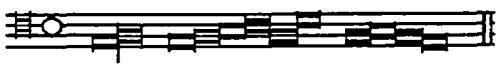
208. Gaffurius's marginal annotation: "Ego quidem Tinctoris doctrinam quam horum deductorum saniozem ipsa experientia didici, quamquam multas eius sententias iuridice impugnavi." Translation: "Although I have justly opposed many of his opinions; indeed, I have applied the teaching of Tinctoris which is more sound than the very practices of these teachers."

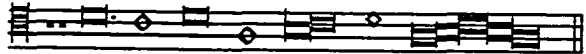
209. A section of this paragraph from "Et istud servat Ockeghem, Busnois, Dufay . . ." to "aliquando in minima" is quoted nearly verbatim in Book I, Chapter 38 of Pietro Aaron's *Thoscanello*. See Aaron, *Thoscanello*, fol. e3r.

210. Wolf notes that Spataro, in Chapters 17 and 31 of the *Tractato di musica*, refers to Urreda as "Zoani (Giovanni) di Ubrede." The tenor of Urreda's three-part composition *Nunca fue pena mayor* has been employed as a cantus firmus by many musicians; it may be found in Perugia, Bibl. Comunale, MS G.20. A *Kyrie* and *Gloria* by Urreda are preserved in the archives of the Sistine Chapel of Rome, MS. 14.

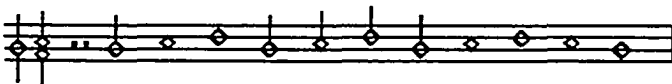
211. Gaffurius's marginal annotation: "Nos autem ponimus pausam seminimae sic  , ut omnes sentiunt, semiminimae vero sic  ." Translation: "However, we establish the rest of the seminim in this way  , as everyone understands, but of the semiminim in this way  ."

212. i.e., by means of art. A term used in Franconian and Italian notation to denote that the rhythm is interpreted in an "artificial manner" rather than according to its natural grouping (*via naturae*). Departures from the established patterns are usually brought about by modifying the notes by means of a downward stem. In *via naturae*, the longer values appear at the end of a grouping; in *via artis*, the longer values are found at the beginning or in the middle of a grouping.

213. Gaffurius's marginal annotation: "Quid dicendum de notula longa, si nec trium spatiorum nec duorum apposita fuerit pausa ut hic: [example]." Translation: "This should be said concerning the long note if the rests neither of three nor of two spaces are placed nearby as [it is demonstrated] here:  ?"

214. Gaffurius's marginal annotation: "Nos aliter sentimus. Non enim semper signum perfectionis totam continet perfectionem, ut hoc et similibus exemplis constat: [example] vel sic [example]." Translation: "We believe otherwise. For the sign of perfection does not always contain the entire perfection, as it is ascertained in this and similar examples: 

or in this way:



215. Gaffurius's marginal annotation: "Haec conclusio est falsissima; nam minima nunquam ternaria partitione non distinguitur, perfect scilicet quantitate computata, quia circa ipsam perfectum accidens quantitativum operari non potest, ut omnes imo sentiunt musici iudicio, quo fit, ut semper dividatur in duas semiminimas."

Translation: "This conclusion is entirely false; for the minim is never distinguished by a third division--that is, calculated by a perfect quantity--since the non-essential quantitative perfect cannot be effectual among itself. Indeed, all musicians with discernment understand that this is done in order that it may always be divided into two semiminims."

216. Wolf notes that this sentence is restated from "Si enim integra temporis" to "aequales dividi posse" in Chapter 33 of Spataro's *Tractato di musica*. See Giovanni Spataro, *Tractato di musica* (Venice 1531), facsimile edition ed. Giuseppe Vecchi (Bologna: Forni Editore, 1970), fol. i3r, lines 11-14.

217. Gaffurius's marginal annotation: "Circulus ad comparationem semicirculi augmentum indicat, sed ziphra 3 ad relationem ziphrae 2 diminutionem ducit, quo fit, ut circulus et ziphra ternarii  $\bigcirc 3$  diversimodis conducantur, quoniam augmentatione et diminutione ad invicem differre noscuntur. Ergo non idem significant, quod verum est." Translation: "The circle in comparison to that of the semicircle indicates augmentation, but a ziphra of 3 in relation to a ziphra of 2 forms a diminution. This is done so that the circle and the ziphra of the ternary  $\bigcirc 3$  are assembled in different ways, since they are known to differ from one another by augmentation and diminution. Therefore, it is true that the [two signs] do not signify the same thing."

218. Gaffurius's marginal annotation: "Imo aliud est ziphra numeri et aliud est circulus et consequenter diversimodis conducuntur et considerantur. Nam circulus et semicirculus tempus demonstrant perfectum et imperfectum et ziphra ternarii vel binarii 3 2 numerum proportionabilem idest aptum ad alterum referri." Translation: "On the contrary, one is a ziphra of the number and the other is a circle, and consequently they are assembled and considered in different ways. For the circle and the semicircle demonstrate the perfect and the imperfect tempo; and the ziphra of the ternary or of the binary--that is, the appropriate proportional number 3 [or] 2--are of importance to each other."

219. Gaffurius's marginal annotation: "Hic recte sentit de signo prolationis." Translation: "Here he properly understands about the sign of the prolatio."

220. Wolf suggests that Ramos is referring to the theorist, E. de Murino. See Coussemaker's *Scriptorum*, III, 124.

221. Wolf notes that of the compositions by Ugolino that are preserved in Rome at the Bibl. Casanatense, Ugolino's work *Chi solo a si senza misura crede* in MS. c.II.3 (2151) displays the entire composition; however, only the top voice is legible due to water damage.

222. Wolf disagrees with Ramos, asserting that this practice may be observed in Italy at the turn of the fourteenth century, and cites its use by several musicians: Zacharias, Filipoctus de Caserta, Conradus de Pistoia, and Bartholomeus de Bononia.

223. This postulate does not appear in Franconian theory; one of the earliest examples may be found in Marchettus de Padua's *Pomerium musicae mensuratae*. See Gerbert, *Scriptores* III, 186b ff.

224. Gaffurius's marginal annotation: "Hic recte sentit et sanius quam supra, ubi tres trium temporum pausas ponit pro signo modi minoris perfecti." Translation: "Here he properly understands [the concept], and more rationally than before, where he establishes three rests of the three *tempi* in place of the sign of the minor perfect mode."

225. Gaffurius's marginal annotation: "Pluribus tamen cantilenis rumpitur [regula]; circulus et etiam duae ipsae semibreuium pausae pro signo temporis perfecti et rationabiliter fieri possunt sicque etiam duae pausae minimarum contiguae et punctus in circulo vel semicirculo ponuntur simul in prolatione perfecta disposita." Translation: "Nevertheless, in many songs [this rule] is broken--the circle and even two rests of the semibreves are able to be made in place of the sign of the *tempus perfectum* and more reasonably; and thus also two contiguous rests of the minims and a point within a circle or a semicircle are established at the same time, arranged within the *prolatio perfecta*."

226. Translation: *It grows both in triple and in duple as it lies down.*

227. Translation: *Where alpha is, there is omega, and where omega is, there will be the end.*

228. Translation: *In the voice which is called "contra," thus the opposite is sung.*

229. Translation: *Do not sound c a c e with the tone fa; take the lichanos hypatōn.*

230. Translation: *There the thesis may be taken where the arsis [was] and vice-versa.*

231. Translation: *The unison fugue of two [voices] is when the perfect number has been preserved.*

232. Translation: *Let the middle [voices] perform in harmony, and let any voice that comes along preserve its own melody.*

233. Translation: *It is sung in the perfection of the minims by means of the three genera of the melodies.*

234. Gaffurius's marginal annotation: "Obscurus canon et admodum sententiae dissonus." Translation: "A dark and very dissonant canon of [this] maxim."

235. Part 1 of Ramos's *Musica practica* lacks a fourth treatise; Ramos discusses the three genera of melody in Part 1, Treatise 2, Chapter 6.

236. Translation: *Let them descend as a stone into the abyss.*

237. Translation: *We raise our organa.*

238. Translation: *Eternal rest.*

239. lit., *So that they may rest from their labors; however, in the character of a riddle canon, this passage may be also be interpreted as "Ut" [and] "re" may rest from their labors.*

240. Gaffurius's marginal annotation: "Clarus et sententiae competens canon." Translation: "A famous canon [that] also corresponds to a maxim."

241. Translation: *If you hold with the master Agamemnon, you will lose no hairs from the head on paranētē and nētē synēmmenōn--that is, let their works follow all of them.*

242. Translation: *Let "ut" be quiet until it arrives at the desired place.*

243. Translation: *And just as his days are to be recompensed.*

244. Translation: *In the manner of the mercenary.*

245. lit., *Lest you remember; however, in the character of a riddle canon, the word recorderis may be divided, resulting in the following interpretation: No "re" will be on the string.*

246. lit., *Lest you reminisce*; however, in the character of a riddle canon, the word *reminiscaris* may be divided, resulting in the following interpretation: *Do not recall "re mi."*

247. lit., *May they rest in peace*; however, in the character of a riddle canon, this passage may also be interpreted as *May "re" rest in peace.*

248. The term *proportionalitas* refers to a "proportion" whereas *proportio* refers to a "ratio."

249. i.e., *the harmonic.*

250. Ramos uses the word *proportio* here, but it is obvious within the context of the sentence that he is referring to the "proportion" (*proportionalitas*) rather than the "ratio."

251. The term *habitus* refers to any relation between two numbers. Boethius employs this term in *De institutione musica* as an equivalent for the word *proportio* (ratio). See Boethius, *De institutione musica*, Book II, Chapter 1, Friedlein edition, 227, line 13.

252. i.e., *the government by the few--the aristocracy.*

253. lit., *"of the people."*

254. The word *epitrita* is taken from the Greek *ἐπίτριτος*, meaning one and a third (4:3--or the sesquitercian ratio).

255. i.e., *the twelfth.*

256. Boethius discusses these ratios in Book I, Chapter 16 of *De institutione musica*, Friedlein edition, 202, lines 17ff.

257. lit., *"of twenty-four fingers"--an early means of measurement.*

258. Boethius, *De institutione musica*, Book V, Chapter 9, Friedlein edition, 358, lines 19ff.

259. Wolf quotes Gaffurius's comment appearing on folio 62v of his *De harmonia musicorum instrumentorum opus* (Milan, 1518): "Duae itaque sesquioctavae sesquiquartam excedunt ea proportione, quae fit a numero 81 ad 80 . . . Hinc falso arbitratus est Bartholomeus Ramis Hispanus tertio



tertii tractatus suae practicae circa finem, qui integrum ditoni intervallum in chordo tono sesquiquartae indifferenter ascribit dimensioni. Nam ut Jacobus Faber inquit, ditonus evenit inter sesquitertiam et sesquiquartam intermedius." Translation: "Therefore, the two sesquioctaves [9:8] go beyond the sesquiquartan [5:4] by that ratio which is produced by the number 81:80 . . . Bartholomeus Ramis the Spaniard judged in error on this account near the end of the third [chapter] of the third treatise of his [*Musica*] *practica*, which indiscriminately ascribes the entire interval of the ditone by a measuring of the sesquiquartan [ratio 5:4] with a tone [produced] on the string. For as Jacobus Faber said, the ditone falls in between the sesquitertian and the sesquiquartan [ratios]." Note: Since in Part 3 of the *Musica practica*, Ramos incorrectly labels Part 3, Treatise 2 as Treatise 3 (or possibly Part 3, Treatise 2 is missing in the printing of the original manuscript), Gaffurius is actually referring to this passage of the *Musica practica* when he speaks of the "third chapter of the third treatise." See Franchinus Gaffurius, *De harmonia musicorum instrumentorum opus*, (1518), intro. and trans. by Clement A. Miller (Neuhausen-Stuttgart, Germany: American Institute of Musicology, 1977), fol. 62v.

260. On folio 63r of *De harmonia musicorum instrumentorum opus*, Gaffurius addresses yet another disagreement with Ramos; however, this time it concerns Ramos's view of the semitone: "Modo numerus 162 ad 160 sesquioctogesimam perficit proportionem, qua sesquiquinta proportio tonum excedit cum semitonio, quod repugnat positioni Ramis Hispani indifferenter concludentis semiditonum sesquiquinto intervallo proportione convenire." Translation: "Only the number 162 to 160 perfects the sesquioctoginta ratio [81:80], by which the sesquiquintan ratio [6:5] exceeds the tone [combined] with the semitone. This is contrary to the position of Ramis the Spaniard [who] indiscriminately argues that the semitone consists in the interval with the sesquiquintan ratio [6:5]." In other words, the ratio 6:5 of the pure minor third exceeds the semitone [32:27] by the ratio of 162:160, i.e., by 81:80. See Gaffurius, *De harmonia musicorum instrumentorum opus*, fol. 63r.

261. In Part 1, Treatise 1, Chapter 3, Ramos states that the semitone is not really a semitone at all, and refers to it as an "imperfect tone."

262. Strunk suggests that the reader work out the entire scale for himself by adopting 288 as the length of the whole string in order to restrict the measurement

entirely to integers. He notes that the scale of Ramos anticipates the "pure scale" later proposed by Fogliano and Zarlino; it is identical to the scale with the octave *F* to *f* that includes *Bb*.

263. Strunk notes that Guido divides the monochord by two, four, and nine--never eight. Ramos is probably thinking of Boethius's justification to obtain the 9:8 ratio of the tone by working from the higher pitches toward the lower ones (i.e., adding eighths rather than subtracting ninths).

264. According to Ramos, the major semitone holds the ratio 16:15; the minor semitone holds the ratio 135:128.

265. Gaffurius's marginal annotation: "Subtilis materia et digna ingenio liberali, nostris cantoribus odiosa, sed musicis gratissima et utilis atque necessaria." Translation: "A subtle matter and suitable for a noble man of genius; annoying to our singers, but very pleasing and useful and necessary for musicians."

266. Ramos considers the first division of the monochord to be "incomplete" because it encompasses only the diatonic pitches; the "complete" monochord includes the chromatic pitches as well.

267. i.e., played harmonically.

268. i.e., played melodically.

269. Gaffurius's marginal annotation: "Haec sit brevis conclusio: Omnis tonus in chorda dispositus, cuius extremi soni sesquioctava proportione adducti incipiunt sonum distinguentem duo scilicet aequalia semitonia quovis modo, bonus est et rectus, etiamsi extremi soni coniuncti sint sive ficti." Translation: "Let this be a brief conclusion: Every tone that is placed on the string, whose outermost sounds have been drawn together by the sesquioctave ratio [and] that begin by distinguishing the sound with two [notes]--that is, equal semitones anywhere in anyway--is good and correct, even if the outermost sounds are conjunctae or ficta."

270. Gaffurius's marginal annotation: "Si mala semitonia malis in suis octavis recte correspondent, diapason optimam consonantiarum perficiunt, ergo bona. Sunt enim illa semitonia maiora, quorum intervalla consonantiis incipiuntur, sicut et minor semitonia bona. Aliter omnes consonantiae essent imperfectae vel superfluae et dissonae atque indimensibiles." Translation: "If the bad semitones

properly correspond at their bad octaves, they complete the best of the consonants--the diapason; therefore, they are good. For those major semitones whose intervals are begun with consonants are good just like the minor semitones. Otherwise, all the consonants would be imperfect or, if you prefer, superfluous and dissonant, and consequently immeasurable."

271. lit., "fingerboards."

272. Both Barbour and Lindley translate this paragraph incorrectly. See Chapter IV of the commentary for a detailed discussion of this matter.

273. See Boethius, *De institutione musica*, Book I, Chapter 1, Friedlein edition, 183, lines 11ff.

274. The section from *Credimus enim error illi sic . . .* through *Sed de his hactenus* is omitted in the A-80 edition.

275. This sentence is found only in the A-80 edition.

276. The province of Baetica lies on the Baetis [river] in Southern Spain; now "Andalusia," and part of Granada.

277. *Explicit* is an abbreviation of the phrase *Explicitus (est liber)*, which may be translated as "The book is ended."

278. This concludes the A-80 and A-7-35 editions dated 11 May 1482.

279. This concludes the A-81 edition dated 5 June 1482.

APPENDIX A  
MUSICAL EXAMPLES OF RAMOS'S COUNTERPOINT  
PART 2, TREATISE 1, CHAPTER 1

APPENDIX A  
MUSICAL EXAMPLES OF RAMOS'S COUNTERPOINT  
PART 2, TREATISE 1, CHAPTER 1

Musical example 1: O. and T. staves. The O. staff contains notes G4, A4, B4, C5, D5, E5, F5, G5. The T. staff contains notes G3, A3, B3, C4, D4, E4, F4, G4. Labels: Bad, Bad, Bad, Good.

Musical example 2: O. and T. staves. The O. staff contains notes G4, A4, B4, C5, D5, E5, F5, G5. The T. staff contains notes G3, A3, B3, C4, D4, E4, F4, G4. Labels: Good, Good, Good, Good.

Musical example 3: O. and T. staves. The O. staff contains notes G4, A4, B4, C5, D5, E5, F5, G5. The T. staff contains notes G3, A3, B3, C4, D4, E4, F4, G4. Labels: Bad, Good, Good, Bad.

Musical example 4: O. and T. staves. The O. staff contains notes G4, A4, B4, C5, D5, E5, F5, G5. The T. staff contains notes G3, A3, B3, C4, D4, E4, F4, G4. Labels: Good, Good, Good, Bad.

O.   
 T.   
 Good Good Bad Good

O.   
 T.   
 Good Bad Good Good

O.   
 T.   
 Good Good Bad Bad

O.   
 T.   
 Bad Good Good Good

O.   
 T.   
 Good Good Good

APPENDIX B  
MUSICAL EXAMPLES OF FUGUE ACCORDING TO RAMOS  
PART 2, TREATISE 1, CHAPTER 1

APPENDIX B

MUSICAL EXAMPLES OF FUGUE ACCORDING TO RAMOS

PART 2, TREATISE 1, CHAPTER 1

The first musical example consists of two staves, labeled 'O.' (Organ) and 'T.' (Trombone). The 'O.' staff is in treble clef and contains a sequence of notes: a dotted half note on G4, followed by quarter notes on A4, B4, C5, B4, A4, and G4. The 'T.' staff is in treble clef and contains a sequence of notes: quarter notes on G4, A4, B4, C5, B4, A4, and G4.

The second musical example consists of two staves, labeled 'O.' and 'T.'. The 'O.' staff is in treble clef and contains a sequence of notes: quarter notes on G4, A4, B4, C5, B4, A4, and G4. The 'T.' staff is in treble clef and contains a sequence of notes: quarter notes on G4, A4, B4, C5, B4, A4, and G4.

The third musical example consists of two staves, labeled 'O.' and 'T.'. The 'O.' staff is in treble clef and contains a sequence of notes: quarter notes on G4, A4, B4, C5, B4, A4, and G4. The 'T.' staff is in bass clef and contains a sequence of notes: quarter notes on G3, A3, B3, C4, B3, A3, and G3.



APPENDIX C  
MUSICAL EXAMPLES OF RAMOS'S COUNTERPOINT  
PART 2, TREATISE 1, CHAPTER 2

APPENDIX C  
MUSICAL EXAMPLES OF RAMOS'S COUNTERPOINT  
PART 2, TREATISE 1, CHAPTER 2

The first musical example consists of two staves, O (Organ) and T (Trombone). The O staff begins with a treble clef and a key signature of one sharp (F#). It contains four measures of music, each with a single note on the second line of the staff. Above each measure is the word "Good". The T staff begins with a bass clef and contains four measures of music, each with a single note on the second space of the staff.

The second musical example consists of two staves, O and T. The O staff begins with a treble clef and contains four measures of music, each with a single note on the second line of the staff. Above each measure is the word "Good". The T staff begins with a bass clef and contains four measures of music, each with a single note on the second space of the staff.

The third musical example consists of two staves, O and T. The O staff begins with a treble clef and contains four measures of music, each with a single note on the second line of the staff. Above each measure is the word "Good". The T staff begins with a bass clef and contains four measures of music, each with a single note on the second space of the staff.

The fourth musical example consists of two staves, O and T. The O staff begins with a treble clef and a key signature of one sharp (F#). It contains four measures of music, each with a single note on the second line of the staff. Above each measure is the word "Good". The T staff begins with a bass clef and contains four measures of music, each with a single note on the second space of the staff.

O.   
 T.   
 Better Better Ok Good

O.   
 T.   
 Good Rare Good Good

O.   
 T.   
 Good Good Good Good

O.   
 T.   
 Good Good Good Good

O.   
 T.   
 Better Ok Better Ok

O.   
 T.   
 Good Good Good Bad

The first system of the musical score features two staves, Soprano (O.) and Tenor (T.), both in bass clef. The Soprano staff contains a melodic line with notes and rests, and the Tenor staff contains a corresponding line. The lyrics "Good Good Good Bad" are written below the Tenor staff, aligned with the notes. The Soprano staff has a fermata over the final note.

O.   
 T.   
 Good

The second system continues the musical score. The Soprano staff has a fermata over the final note. The Tenor staff continues the melodic line. The lyrics "Good" are written below the Tenor staff.

O.   
 T.   
 Good

The third system continues the musical score. The Soprano staff has a fermata over the final note. The Tenor staff continues the melodic line. The lyrics "Good" are written below the Tenor staff.

O.   
 T.

The fourth system concludes the musical score. The Soprano staff has a fermata over the final note. The Tenor staff continues the melodic line. There are no lyrics in this system.

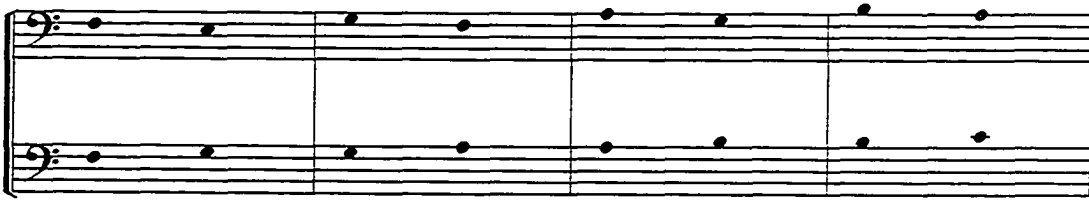
APPENDIX D  
UGOLINO'S RULES OF COUNTERPOINT  
WITH MUSICAL EXAMPLES

APPENDIX D

UGOLINO'S RULES OF COUNTERPOINT WITH MUSICAL EXAMPLES

"Regulae generales contrapuncti universalis quarum prima est de unisono ascendendo unde datur versus sequens cum sui contrapuncti demonstratione:<sup>1</sup>

Tertia sit infra, unisonus si intenditur una.



Si tertia vel quarta tendit, infra diapente tenebit.



---

<sup>1</sup>Ugolino d'Orvieto, *Declaratio musicae disciplinae*, 32-34.

Si quintam ascendit, diapason cantum terminabit.



Secunda regula de unisono descendendo:

Tertia sit supra, unisonus si remittitur una.



Ad quintam tendit, si ternam quartamve remittit.

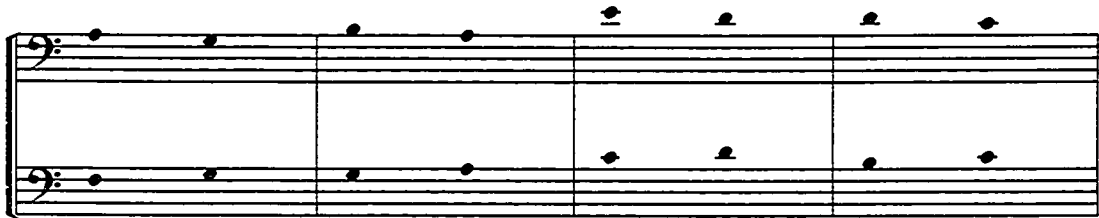


Octavam petit, si quintam vel ultra deponit.  
 Si plura pertransit, rationis ordo docebit.



Tertia regula de tertia ascendendo:

Unisonus fiat, unam si tertia tendat.



Si plures intendat, tandem unisonus fiat.





Tertiam remittit, si ter vel quater ascendit.

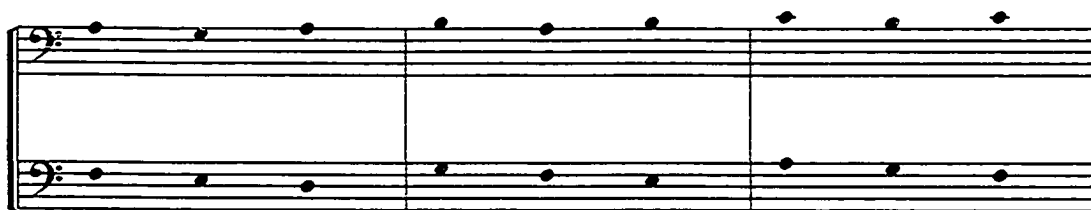


Quarta regula de tertia descendendo:

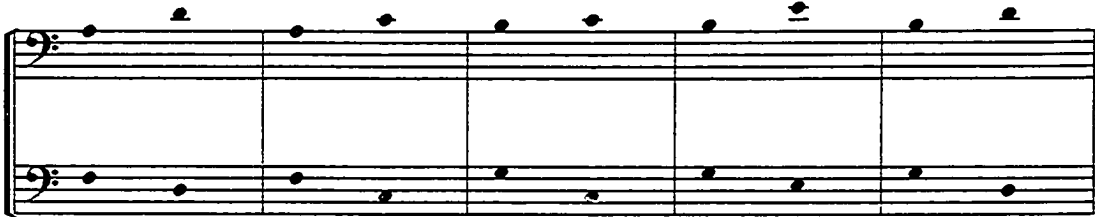
Quinta tibi fiat, si terna solam remittat.



Si plures fuerint, eas quinta terminabit.



Si ternam vel quartam, octavam superintendas.



Quinta sexta fiet, si cum octava iungatur.

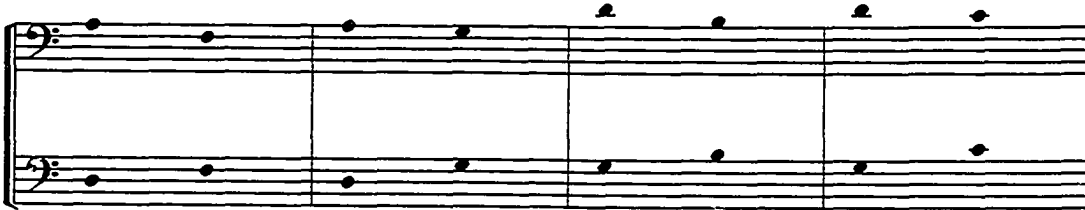


Quinta regula de quinta ascendendo:

Quinta quaerit ternam, si fit ascensus in unam.

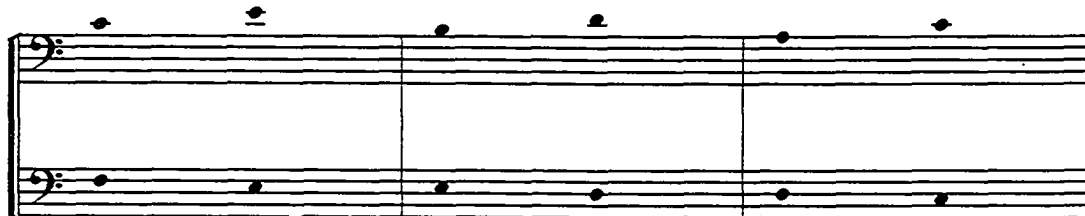


Unisonum dicas, si ternam vel quartam intendas.

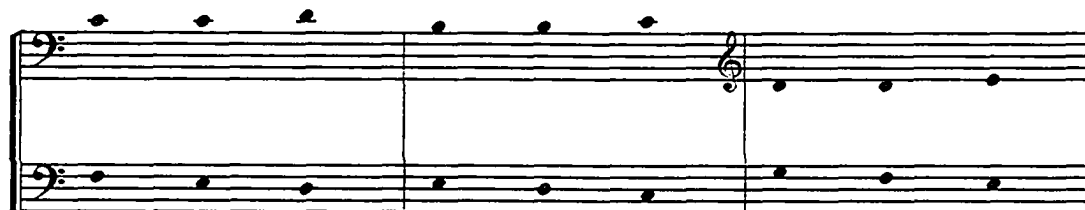


Sexta regula de quinta descendendo:

Octavam quinta petit, si solam unam descendit.



Erit octava, sexta, si alteri sit sociata.



Post quintam octava fiat, si ternam infra remittat.



Si quartam vel quintam, decimam intendere sinit.



Septima regula de sexta ascendendo:

Sexta ternam cupit, si supra notam intendit.

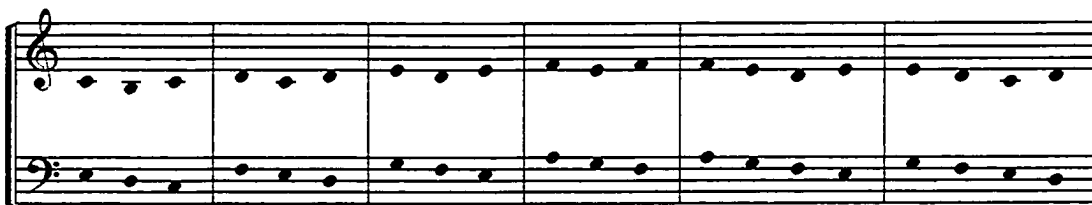


Octava regula de sexta descendendo:

Sexta vult octavam, infra si tendit ad unam.



Et plures fiant, si antecedunt octavam.

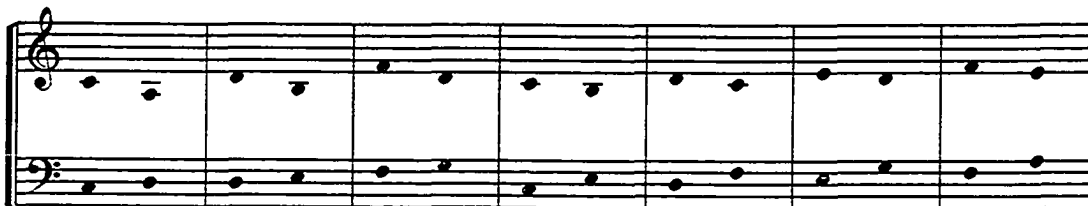


Vult decimam sexta tertiam remittens ad infra.



Nona regula de octava ascendendo:

Post octavam quinta, si cantus tenditur una.



Si quarta vel quinta salit, tertiam iure poscit.



Decima regula de octava descendendo:

Octava decimam, si solum deponit unam.



Tertia si fuerit, tunc duodecima fiat.



Undecima regula de decima ascendendo:

Decima vult octavam, unam duntaxat intensam.



Plura si transcendit, tunc quinta locum habebit.



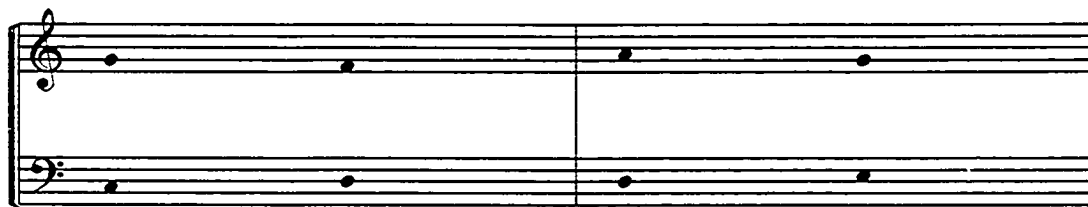
Duodecima regula de decima descendendo:

Decima descendens duodecimam cupit habere.



Tertiadecima regula de duodecima ascendendo:

Unam intendens duodecima decimam quaerit.



Octavam terna quartaque, quinta quintamque sequentem.





Quartadecima regula de duodecima descendendo:

Quinta cum decima post duodecimam fiat.



Si societur, tertia cum decima detur.  
Sed tertia cum decima quintam cum decima poscit."



APPENDIX E  
CORRECTIONS TO THE *MUSICA PRACTICA*

APPENDIX E  
CORRECTIONS TO THE *MUSICA PRACTICA*

LOCATION: <sup>1</sup>	RAMOS: <sup>2</sup>	THIS EDITION:
Prologue p. 194, line 32	Licet	Liceat
Prologue p. 195, line 46	Heliseum	Eliseum
Prologue p. 195, line 47	Heliae	Eliae
Prologue p. 196, line 10	artus	artubus
P1 T1 C1 <sup>3</sup> p. 200, line 20	sersim A-81 & A-7-35	arsim
P1 T1 C3 p. 209, line 2	cum termina	contermina
P1 T1 C3 p. 209, line 4	copulentur	copulantur
P1 T1 C3 p. 210, line 2	principale	principalem

<sup>1</sup>Corrected words are bracketed in the translation.

<sup>2</sup>Denotes all editions, unless otherwise noted.

<sup>3</sup>Denotes Part 1, Treatise 1, Chapter 1.

LOCATION:	RAMOS:	THIS EDITION:
P1 T1 C3 p. 211, line 35	semitonio	semiditono
P1 T1 C3 p. 212, line 14	prima	primae
P1 T1 C3 p. 213, line 30	dicit	dicimus
P1 T1 C3 p. 215, line 27	gravitatem	gravitate
P1 T1 C4 p. 217, line 2	Praedicte	Praecedentis
P1 T1 C4 p. 219, line 17	tertium	secundum
P1 T1 C5 p. 222, line 16	indigesteque	indigestaque
P1 T1 C5 p. 223, line 3	nete	neten
P1 T1 C5 p. 224, line 7	nete	neten
P1 T1 C6 p. 226, line 23	obtundant	obtundunt
P1 T1 C6 p. 229, line 39	lichanos	hypate
P1 T1 C6 p. 231, line 5	ista	istae

LOCATION:	RAMOS:	THIS EDITION:
P1 T1 C6 p. 232, line 13	conclusisemus	conclusissemus
P1 T1 C7 p. 233, line 15	ista A-80 only	illa
P1 T1 C7 p. 234, line 27	scilicet A-80 only	sed
P1 T1 C7 p. 236, line 38	aequisonantes	aequisonantibus
P1 T1 C7 p. 237, line 19	cantus A-81 & A-7-35	cantans
P1 T1 C7 p. 239, line 10	ut volumus A-80	volumus, ut
P1 T1 C7 p. 240, line 39	est acutior A-81 & A-7-35	acutior est
P1 T1 C8 p. 242, line 36	sint A-80	sunt
P1 T1 C8 p. 243, line 7	spera	sphaera
P1 T1 C8 p. 243, line 16	celum stellatum	coeli stellati
P1 T1 C8 p. 243, line 21	hanc	hac
P1 T1 C8 p. 243, line 22	sententiam	sententia

LOCATION:	RAMOS:	THIS EDITION:
P1 T1 C8 p. 245, line 10	librum	libro
P1 T2 C1 p. 247, line 8	percutimus	percurrimus
P1 T2 C1 p. 247, line 15	continuo	continuae
P1 T2 C1 p. 248, line 8	similis	similiter
P1 T2 C1 p. 250, line 24	prima secunda	secunda
P1 T2 C1 p. 251, line 23	c A-80 e A-81 & A-7-35 C	
P1 T2 C1 p. 252, line 4	scandat	descendat
P1 T2 C1 p. 252, line 12	sciet	scient
P1 T2 C4 p. 264, line 16	positis	positae
P1 T2 C4 p. 264, line 28	possit	potest
P1 T2 C4 p. 266, line 4	ascendendo	descendendo
P1 T2 C5 p. 268, line 30	provenit	proveniunt

LOCATION:	RAMOS:	THIS EDITION:
P1 T2 C5 p. 268, line 39	altera	altero
P1 T2 C5 p. 270, line 6	praecedenti	in hoc
P1 T2 C5 p. 270, line 32	quarta	quartam
P1 T2 C5 p. 270, line 36	tertia	tertiam
P1 T2 C5 p. 271, line 1	b	h
P1 T2 C5 p. 271, line 6	quarta	quartam
P1 T2 C5 p. 271, line 8	secunda h quadrata	secundam h quadratam
P1 T2 C5 p. 271, line 11	b	h
P1 T2 C5 p. 274, line 16	cogatur	cogantur
P1 T2 C5 p. 274, line 31	c	f
P1 T2 C5 p. 274, line 33	existentes	existente
P1 T2 C5 p. 274, line 34	descendant	descendat

LOCATION:	RAMOS:	THIS EDITION:
P1 T2 C5 p. 274, line 45	li	illud
P1 T2 C5 p. 277, line 2	quoniam	quod
P1 T2 C5 p. 279, line 13	semitonii	semiditoni
P1 T2 C5 p. 280, line 2	servet	servetur
P1 T2 C5 p. 281, line 29	quia	quod
P1 T2 C5 p. 281, line 32	meliciem	mellitiem
P1 T2 C6 p. 285, line 14	differre	differentes
P1 T2 C6 p. 286, line 3	differunt	different
P1 T2 C6 p. 289, line 30	diatonum	ditonum
P1 T2 C7 p. 293, line 8	anotare	annotare
P1 T2 C7 p. 296, line 32	tertium	tertiam
P1 T2 C7 p. 296, line 38	quinta	quintam



LOCATION:	RAMOS:	THIS EDITION:
P1 T2 C7 p. 296, line 39	convenientia	convenientiam
P1 T2 C7 p. 298, line 16	colocetur	collocetur
P1 T2 C7 p. 298, line 26	negamus	negemus
P1 T2 C8 p. 302, line 30	h b A-81 & A-7-35	h k
P1 T2 C8 p. 302, line 35	c e A-81 & A-7-35	e g
P1 T2 C8 p. 302, line 35	h b A-81 & A-7-35	h k
P1 T2 C8 p. 303, line 7	g b A-81 & A-7-35	g k
P1 T2 C8 p. 303, line 46	g k A-81 & A-7-35	g l
P1 T2 C8 p. 304, line 6	sic sic	sic
P1 T3 C1 p. 310, line 16	arato	quarto
P1 T3 C1 p. 310, line 50	differentia	differentiam
P1 T3 C1 p. 312, line 1	per chordam	chordam

LOCATION:	RAMOS:	THIS EDITION:
P1 T3 C1 p. 312, line 17	diapente	diapason
P1 T3 C1 p. 312, line 28	iam	in
P1 T3 C2 p. 315, line 28	g c A-81 & A-7-35	g d
P1 T3 C2 p. 316, line 16	tetrartus	tetrardus
P1 T3 C2 p. 318, line 17	lectitiam	laetitiam
P1 T3 C3 p. 321, line 20	tauronomitanum A-80	Tauromenitanum
P1 T3 C3 p. 323, line 10	lectificando A-80	laetificando
P1 T3 C3 p. 327, line 29	euterpees	Euterpen
P1 T3 C3 p. 328, line 6	eretico	haeretico
P1 T3 C3 p. 329, line 11	atenuet	attenuet
P1 T3 C3 p. 329, line 32	dicetur	dicemus
P2 T1 C1 p. 337, line 30	quia	quod

LOCATION:	RAMOS:	THIS EDITION:
P2 T1 C1 p. 341, line 8	facere	fieri
P2 T1 C1 p. 341, line 18	quoniam	quod
P2 T1 C1 p. 342, line 20	faciet	faciat
P2 T1 C2 p. 348, line 34	prius	primo
P2 T1 C2 p. 348, line 35	ascendenti	ascendendo
P2 T1 C2 p. 350, line 26	remittet	remittat
P2 T1 C2 p. 350, line 30	ascendente	ascendendo
P2 T1 C2 p. 351, line 4	descendente	descendendo
P2 T1 C2 p. 351, line 9	decima	decimam
P2 T1 C2 p. 360, line 3	quia	quod
P2 T1 C2 p. 360, line 24	fa	sol
P2 T1 C2 p. 365, line 40	3a	tertiam

LOCATION:	RAMOS:	THIS EDITION:
P2 T1 C2 p. 365, line 41	unisonus	unisonum
P2 T1 C2 p. 365, line 42	4a	quarta
P2 T1 C2 p. 366, line 1	5a	quintam
P2 T1 C2 p. 366, line 8	4a	quarta
P2 T1 C2 p. 366, line 43	quinto	quarto
P2 T1 C2 p. 369, Figura 8 Row 5, Column 3	fa	sol
P2 T1 C2 p. 370, Figura 8 Row 5, Column 7	sol	la
P2 T1 C2 p. 370, Figura 8 Row 6, Column 8	ut	re
P3 T1 C1 p. 372, line 19	dividit	dividitur
P3 T1 C1 p. 373, line 21	semitonia	semiminima
P3 T1 C1 p. 373, line 21	cursee A-81 & A-7-35	cursea

LOCATION:	RAMOS:	THIS EDITION:
P3 T1 C1 p. 373, line 22	minaria	minarea
P3 T1 C1 p. 374, line 26	minaria	minarea
P3 T1 C1 p. 375, line 3	sequentis	sequente
P3 T1 C1 p. 375, line 4	tractum	tractu
P3 T1 C1 p. 377, line 6	çursua	cursea
P3 T1 C1 p. 377, line 8	minariea	minarea
P3 T1 C1 p. 377, line 16	circumvolentes	circumvolventes
P3 T1 C1 p. 378, line 2	Ia	Ista
P3 T1 C1 p. 378, line 5	sic	sed
P3 T1 C1 p. 378, line 13	rationem	ratio
P3 T1 C1 p. 378, line 16	quia	quod
P3 T1 C2 p. 381, line 3	numeros	numeri

LOCATION:	RAMOS:	THIS EDITION:
P3 T1 C2 p. 383, line 3	reperimus	repperimus
P3 T1 C2 p. 383, line 9	qui	quod
P3 T1 C2 p. 384, line 6	videmus	videtur
P3 T1 C2 p. 386, line 35	Olregam	Ockeghem
P3 T1 C3 p. 388, line 23	tres	tria
P3 T1 C3 p. 389, line 3	frautionum	fractionum
P3 T1 C3 p. 389, line 7	krissimus	carissimus
P3 T1 C3 p. 391, line 29	denotans	denotas
P3 T1 C3 p. 392, line 40	Olregam	Ockeghem
P3 T1 C3 p. 392, line 41	alome armet	L'homme arme
P3 T1 C3 p. 393, line 26	Olregam	Ockeghem
P3 T1 C3 p. 395, line 10	fundatus	fundati

LOCATION:	RAMOS:	THIS EDITION:
P3 T1 C3 p. 395, line 12	2 3 3 2 3 3 2 2	3 3 2 2 3 2 3 2
P3 T1 C3 p. 398, line 20	divisionem	divisione
P3 T1 C3 p. 399, line 4	pausas binas	pausae binae
P3 T1 C4 p. 400, line 42	summe	sume
P3 T1 C4 p. 401, line 7	deprimitur	deprimatur
P3 T1 C4 p. 401, line 32	salmansie	Salmantiae
P3 T1 C4 p. 402, line 2	aliqua	alia
P3 T1 C4 p. 402, line 18	noculam A-80	voculam
P3 T1 C4 p. 403, line 34	computando	computamus
P3 T1 C4 p. 403, line 38	agamenon	Agamemnon
P3 T1 C4 p. 404, line 4	secuntur	sequuntur
P3 T1 C4 p. 405, line 5	est	de

LOCATION:	RAMOS:	THIS EDITION:
P3 T1 C4 p. 405, line 10	diximus	dicimus
P3 T2 C1 p. 407, line 1	tertius	secundus
P3 T2 C2 p. 413, line 23	aequivum	aequum
P3 T2 C3 p. 418, line 17	superponentes	superponens
P3 T2 C3 p. 420, line 9	h:k:d	q d
P3 T2 C4 p. 423, line 1	nonum	quartum
P3 T2 C4 p. 423, line 5	tonus	tonum
P3 T2 C4 p. 427, line 4	tecle	taedae
P3 T2 C4 p. 427, line 9	procedunt	procedant
P3 T2 C4 p. 427, line 12	tecle	taedae
P3 T2 C4 p. 430, line 12	varo	vero
P3 T2 C4 p. 430, line 35	lathonica A-81 & A-7-35	Laconica



LOCATION:	RAMOS:	THIS EDITION:
P3 T2 C4 p. 430, line 38	efficit A-81 & A-7-35	officiebat
P3 T2 C4 p. 430, line 40	moliciem A-81 & A-7-35	mollitiem
P3 T2 C4 p. 431, line 9	imponemus A-81 & A-7-35	imponamus
Epilogue p. 433, line 7	composuimus A-81 & A-7-35	composuerimus
Epilogue p. 433, line 28	discedendo A-81 & A-7-35	discutiendo
Epilogue p. 435, line 26	quatringentesimo octuagesimo A-80	quadringentesimo octogesimo

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