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**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

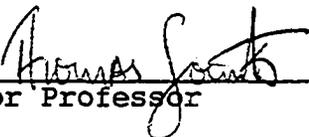
May, 1992

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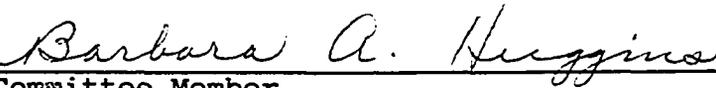
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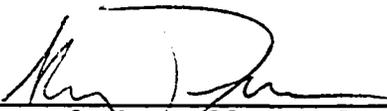
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. . . Thanks to the immortal God, provider of all good things, who established the liberal arts for the perfection and delight of men; to Him is the glory throughout the endless ages of ages. Amen.

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 Pareia¹ 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

¹Johannes 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.

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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THE *MUSICA PRACTICA* OF BARTOLOMEO RAMOS DE PAREIA

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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 counterpoint¹

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

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,³ he proposes new approaches to aspects of

¹"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.

²". . . 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.

³The 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*,

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 a 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.⁴ 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 denouncements of Ramos's character.

⁴Nicolaus 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.⁵

⁵"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.⁶ 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*.⁷

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

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

⁷Nicolaus 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 prolatational 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*.⁸ 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.⁹ 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

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

⁹Gaffurius'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.¹⁰

Gaffurius responded to the *Utile e breve regule di canto* with a published treatise entitled *De harmonia musicorum instrumentorum opus*¹¹ (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.¹²

¹⁰"Io la scilicet la Musica practica di Bartolomeo Ramis mandai a Milano a Franchino et lui dopo me la mando tuta sesquitermata 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.

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

¹²*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).¹³ 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*¹⁴ 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

¹³See 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).

¹⁴See 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),¹⁵ completing his criticism of Gaffurius in his final treatise, entitled *Tractato di musica* (1531).¹⁶

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."¹⁷ Aaron's first treatise, *Libri tres de institutione harmonica* (1516), entangled him in the on-going controversy between Gaffurius and Spataro.¹⁸ 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

¹⁵See 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).

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

¹⁷"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.

¹⁸See 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.¹⁹

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*.²⁰

¹⁹See 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).

²⁰See 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.²¹

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.²²

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

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

²²*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.²³

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

²³See 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.¹ Attempts to uncover a record of Ramos's birth in the archives of Baeza and Jaén, however, have been unsuccessful.

¹Bartolomeo 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.²

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

²"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.³

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 . . .,"⁴ and whom Ramos elevates to the status of such musical celebrities as Ockeghem, Busnois, and Dufay.⁵ 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.

³Ramos de Pareia, *Musica practica*, 1.

⁴"qui fuit primus qui me musices imbuit rudimentis . . ." Ibid., 69.

⁵"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*,⁶ 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.⁷

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

⁶"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.

⁷"In quello che tu dici lui esser homo piccolo, li fai grande honore, perche li homini piccoli sono la magior 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.⁸

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.⁹ 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

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

⁹*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."¹⁰

¹⁰Ramos 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 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."¹¹ 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.¹² Even while

¹¹Ibid., 12.

¹²"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.¹³

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.¹⁴

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.

¹³Ibid., 68.

¹⁴The 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].¹⁵

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.¹⁶

¹⁵Ramos de Pareia, *Musica practica*, 82.

¹⁶See 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.¹⁷

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

¹⁷Bartolomeo 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;¹⁸ (2) the appearance of Ramos's four-voice canon *Sive lidium in synēmmenōn* in a Florentine codex,¹⁹ 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;²⁰ 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*.²¹

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

¹⁸See Spataro, *Honesta defensio*, fol. 15v.

¹⁹Florence, 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.

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

²¹See 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;²² 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

²²Magliabecchiana XIX, 36, fol. 74. Ibid.

that he lent his copy of a Guidonian manuscript to Ramos in Bologna.²³ 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.²⁴ 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

²³"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.

²⁴The 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."²⁵ 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.²⁶

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 spaces²⁷

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

²⁵" . . . 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.

²⁶"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."

²⁷"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."²⁸

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

²⁸"Inde enigma et canonem ipsum Bartholomaeus praeceptor tuus, quem imitatis 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.²⁹

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.

²⁹"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.³⁰

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.³¹

³⁰"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.

³¹". . . da poi che lui si parti da nui senza proportione 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.³²

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

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.

³²"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.³³ Spanish historians Higinio Anglés and Enrique Sánchez Pedrote support Fétis in this assumption.³⁴ Conversely, Stevenson notes that Gaffurius, in his *Apologia* (1521), writes that Ramos has "long been dead".³⁵ 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.

³³François 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.

³⁴See 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.

³⁵". . . 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.¹

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!²

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

¹Anicius 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.

²Ibid., 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.³

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

³Ramos 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";⁴ 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.⁵

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

⁵Ramos 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.⁶

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

⁶Ibid., 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
	B	S	Parhypate Hypatōn
	c	T	Lichanos Hypatōn
Tetrachord <i>Hypatōn</i>	d	T	Hypatē Mesōn
conjunct <i>synaphē</i>	e	S	Parhypatē Mesōn
	f	T	Lichanos Mesōn
Tetrachord <i>Mesōn</i>	g	T	Mesē
	a	T	Paramesē
disjunct <i>diazeuxis</i>	b	S	Tritē Diezeugmenōn
	c ¹	T	Paranētē Diezeugmenōn
Tetrachord <i>Diezeugmenōn</i>	d ¹	T	Nētē Diezeugmenōn
conjunct <i>synaphē</i>	e ¹	S	Tritē Hyperbolaiōn
	f ¹	T	Paranētē Hyperbolaiōn
Tetrachord <i>Hyperbolaiōn</i>	g ¹	T	Nētē Hyperbolaiōn
	a ¹		

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

	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 ¹	T	Paranētē Synēmmenōn
Tetrachord <i>Synēmmenōn</i>	d ¹	T	Nētē Synēmmenōn

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.⁷

Likewise, Ramos criticizes Marchettus de Padua for the employment of an Immutabile 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.⁸

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

⁷Ibid., 12.

⁸Ramos 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*² 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 semitone of some sort (*E F F# A*), and the "enharmonic" genus of two quarter tones plus a ditone (*E E* F A*).⁹ 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.¹⁰ Theorists typically recognized six

⁹The asterisk symbol denotes the raising of a note by a quarter tone.

¹⁰Boethius, *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."¹¹ 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 5:4.¹²

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

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

¹²J.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 d¹ a¹ e² b²*), 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 INTERVALS¹³

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) ²	=	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	

¹³See 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).¹⁴

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:

¹⁴Mark 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.¹⁵

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.¹⁶

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.¹⁷ Because Ramos proposes a manual division,

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

¹⁶Adkins, "The Theory and Practice of the Monochord," 192-93.

¹⁷*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.¹⁸

Ramos's Division of the Monochord

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

¹⁸Ibid., 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.¹⁹

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.²⁰

¹⁹Ramos de Pareia, *Musica practica*, 5.

²⁰*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.²¹

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

²¹Although 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.²²

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

²²" . . . 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*.²³

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.²⁴

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.²⁵ Indeed, an examination of Ramos's diatonic arrangement of the monochord applied to a C major scale

²³"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.

²⁴Barbour, *Tuning and Temperament*, 5-6.

²⁵*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

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

TABLE 6

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

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

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).²⁶ 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 TUNING²⁷

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

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

²⁷Barbour, *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).²⁸

TABLE 9
THE CHROMATIC SCALE
ACCORDING TO RAMOS'S DIVISION OF THE MONOCHORD²⁹

C	C#	D	E \flat	E	F	F#	G	A \flat	A	B \flat	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)												

²⁸Ibid., 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.

²⁹Ibid.

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)²). 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."¹ 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.

¹See Ramos de Pareia, *Musica practica*, 13.

TABLE 10

EVALUATION OF SEMITONES IN CENTS
ACCORDING TO RAMOS'S DIVISION

	good ┌90┐		bad ┌92┐		bad ┌92┐		good ┌90┐		good ┌112┐		good ┌112┐	
C	C#	D	E ^b	E	F	F#	G	A ^b	A	B ^b	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)

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

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^b and F#-A^b. 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.² 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.

²Ibid., 79.

TABLE 12

EVALUATION OF SEMIDITONES IN CENTS
ACCORDING TO RAMOS'S DIVISION

C	E \flat	F \sharp	A	C
┌───294───┐		┌───296───┐		┌───316───┐
good		bad		good

C \sharp	E	G	B \flat	C \sharp
┌───294───┐		┌───316───┐		┌───296───┐
good		good		bad

D	F	A \flat	E	D
┌───316───┐		┌───294───┐		┌───294───┐
good		good		good

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

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

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

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

Ratios: $386\text{c} = 5:4$, $408\text{c} = 81:64$, $406\text{c} = 81:64$ - 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."³ 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

		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,

³Ibid., 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^b-C[#]* 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

		good 498		good 498		good 498	
C	C [#]	F	F [#]	B ^b	B	E ^b	E
	498		498		498		
	good		good		good		

		good 498		bad 500		
D	E ^b	G	A ^b	C	C [#]	F
	520		498			
	good		good			

E	A	D
498	498	
good	good	

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

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."⁴ 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.

⁴Lindley, "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.⁵

⁵" . . . 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."⁶

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

⁶Ramos 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"⁷ 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*

⁷Ibid.

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.⁸ 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.⁹ 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

⁸Karol 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.

⁹See 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*]¹⁰ 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.¹¹

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).¹²

¹⁰For Ramos, *h* refers to the pitch *a*.

¹¹Ramos de Pareia, *Musica practica*, 80.

¹²But 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

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].¹³

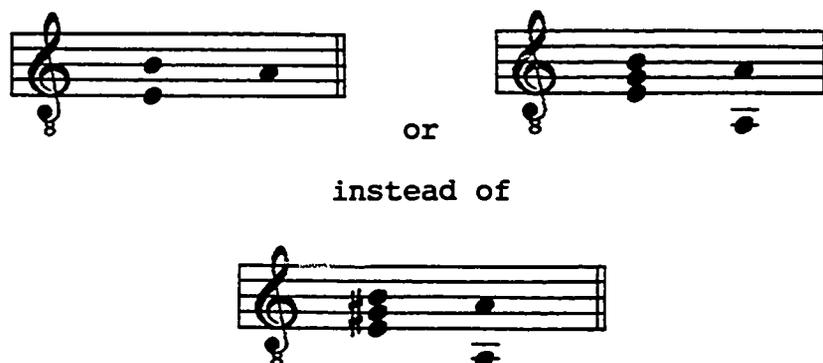


Figure 3. Ramos's Alternatives to the Traditional Burgundian Cadence

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*♯].¹⁴

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- $\frac{1}{4}$ quadro*," Lindley translates the Latin "*e*" ("from," or

¹³Ibid, 80.

¹⁴Lindley, "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.¹⁵

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,¹⁶ 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.¹⁷ Ramos assumes that the reader knows exactly

¹⁵In 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.

¹⁶See Lindley's Example 1, 47.

¹⁷This 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].¹⁸

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

¹⁸Ramos 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.¹⁹

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

¹⁹Lindley, "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^b* 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.²⁰

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

²⁰Ibid., 80-81.

the A-80 and A-81 editions.²¹ 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,²² 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.²³ Lindley's assertion that a form of meantone

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

²²See Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 51.

²³The 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.²⁴ 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,

²⁴Fétis, *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.²⁵

Barbour's description of Ramos's method as "an irregular tuning, combining features of both the Pythagorean tuning and just intonation"²⁶ 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

²⁵The 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).

²⁶Barbour, *Tuning and Temperament*, 4.

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

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.

²⁷Although 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.¹ 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.² Thus, in the hexachord system, the semitone is always fixed by the

¹Ramos 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.

²These 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 (Γ) 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.³ 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

³This 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*¹ is called a *la mi re* (*acutae*).⁴ 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*¹ (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*⁵ while *fa* refers to *b rotundum*. In general, *b quadratum* is assumed unless flat signature signs or principles of *musica ficta*⁶ 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-

⁴Although 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.

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

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

TABLE 16⁷

THE GAMUT OF THE GUIDONIAN HEXACHORD SYSTEM

Present-day designations	<i>Deductiones</i>				Medieval designations
e ²				la	ee la
d ²			la	sol	dd la sol
c ²			sol	fa	cc sol fa
b ¹			fa	mi	bb fa (or) bb mi
a ¹		la	mi	re	aa la mi re
g ¹		sol	re	ut	g sol re ut
f ¹		fa	ut	(D)	f fa ut
e ¹		la	mi	(M)	e la mi
d ¹	la	sol	re		d la sol re
c ¹	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)					

⁷This dissertation uses the modern designation of c¹, c², 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."⁸ Ramos discusses how the Guidonians claim to have based their division on Boethius, since Boethius

⁸Ramos 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, c¹, d¹, e¹, f¹*), and six *superacutae* (*g¹, a¹, b¹, c², d², e²*).

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.⁹

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."¹⁰ Ramos scolds Guido for his dependence upon the *senaria* as the theoretical justification for the hexachord system and,

⁹Ibid., 31.

¹⁰Ibid., 10.

in Chapter 8 of the *Musica practica*,¹¹ 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

¹¹It 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 6.¹²

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."¹³

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

¹²Gioseffo 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.

¹³Ramos de Pareia, *Musica practica*, 19.

suggests that the student first become familiar with the pitches in the octave from *c* to *c*¹ 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."¹⁴ 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*."¹⁵

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

¹⁴Ibid., 16.

¹⁵Ibid. 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.¹⁶

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.

¹⁶Ibid., 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.¹⁷

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

¹⁷"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.

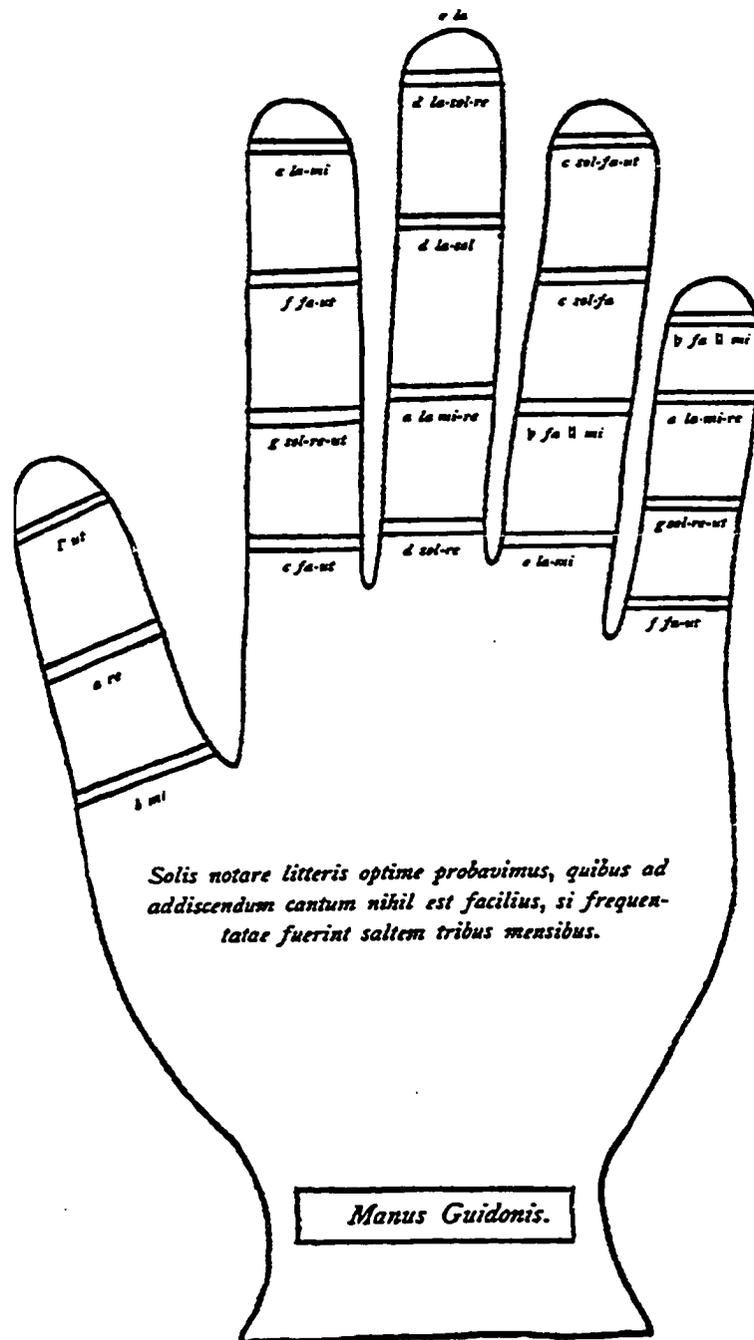


Figure 4. Figura 3 of the *Musica practica*, 11.
 Source: Johannes Wolf, ed. *Musica practica*, 13.
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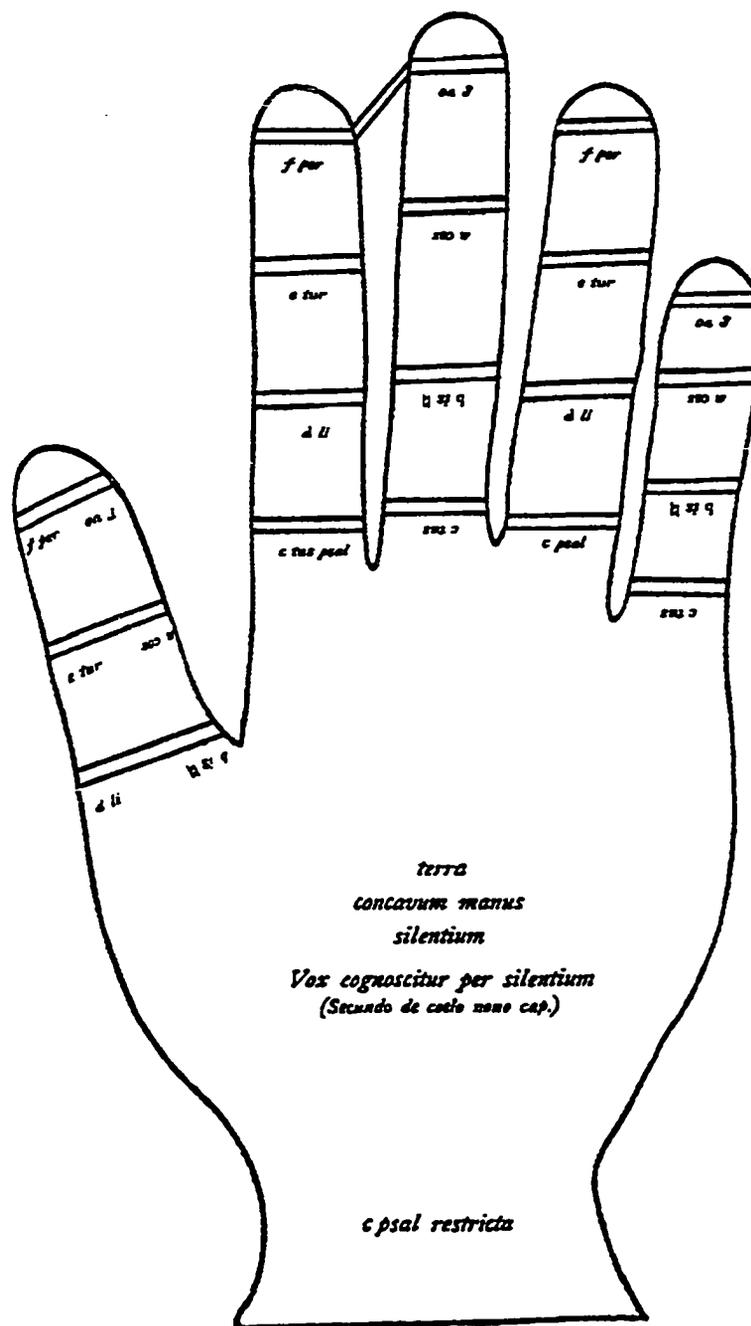


Figure 5. Figura 6 of the *Musica practica*, 36.
 Source: Johannes Wolf, ed., *Musica practica*, 47.
 © 1968, Breitkopf & Härtel, Wiesbaden. Used by permission.

provide an explanation for the raised hand that often appears in the illustrations of medieval choristers.¹⁸

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, c¹ at the base of both the middle and ring fingers, and c² 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*

¹⁸Margaret 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;¹⁹ 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.²⁰

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.²¹ 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.

¹⁹See Burtius, *Musices opusculum*, a2r-a4r.

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

²¹Other 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] ✱.¹

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

¹Ramos de Pareia, *Musica practica*, 23.

diesis (✱).² 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.³

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

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

³*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*⁴ 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.⁵

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

⁵Ramos 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.⁶

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.⁷

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

⁷Ramos 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^{#2} 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.⁸ Ramos explains that, in truth, the *manus perfecta* is "perfect" because the "entire hand has been correctly divided by means of the semitones."⁹

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

⁸Ibid.

⁹Ibid., 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/lo	Oboe eccellen- te/lo solist/ro

Figure 6. Figura 4 of the *Musica practica*, 28.
 Source: Johannes Wolf, ed., *Musica practica*, 35.
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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*, *bb¹* *eb¹*, *f¹*); 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*, *d¹*, *g¹*, *a¹*).¹⁰

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."¹¹ 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."¹² Thus, mutation is the means by which a performer can transfer from one hexachord to another by substituting a

¹⁰The 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.

¹¹*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.

¹²*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]."¹³ 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*.¹⁴ 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

¹³Ibid.

¹⁴Karol 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.¹⁵

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.¹⁶

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.

¹⁵Ramos de Pareia, *Musica practica*, 34.

¹⁶*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*.¹⁷

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

¹⁷Other 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*.¹⁸

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*."¹⁹ 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*.

¹⁸Ramos de Pareia, *Musica practica*, 23.

¹⁹*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.²⁰ 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*).²¹

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

²⁰The *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.

²¹Ramos 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*.²²

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."

²²Karol 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.²³

Ramos sees no advantage in employing the additional four notes (*D \flat* , *D \sharp* , *G \flat* , *G \sharp*) that are created by a sixteen-step gamut; for the sixteen-step gamut requires the employment of four split keys (*C \sharp /D \flat* , *D \sharp /E \flat* , *F \sharp /G \flat* , and *G \sharp /A \flat*). 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 *A \flat* , *E \flat* , and *F \sharp* (see Chapter IV of this commentary).²⁴

²³Ramos de Pareia, *Musica practica*, 31.

²⁴It 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.²⁵

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*. . . ." ²⁶ And, finally, the term *coniunctae* is used by Ramos to represent the irregular hexachords that contain *ficta* pitches, such as those that

²⁵Ibid., 23.

²⁶Ibid., 29.

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

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."²⁸ 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:

²⁷Ibid., 23.

²⁸Johannes 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*.²⁹

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."³⁰ 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*.³¹

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

²⁹Ramos de Pareia, *Musica practica*, 23-24.

³⁰Ibid., 33.

³¹Ibid., 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 *semitonus subintellectus* (lit., "perceived semiditone") in a phrase where the singer performs the vocables *la fa sol sol*. Through the employment of the *semitonus 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 *semitonus 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.¹ 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

¹Ramos 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 RAMOS²

<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)

²Ramos 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*,³ 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.

³In 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.⁴

⁴Ramos 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-l*; 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.⁵ 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.⁶

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

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

⁶Ramos 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.

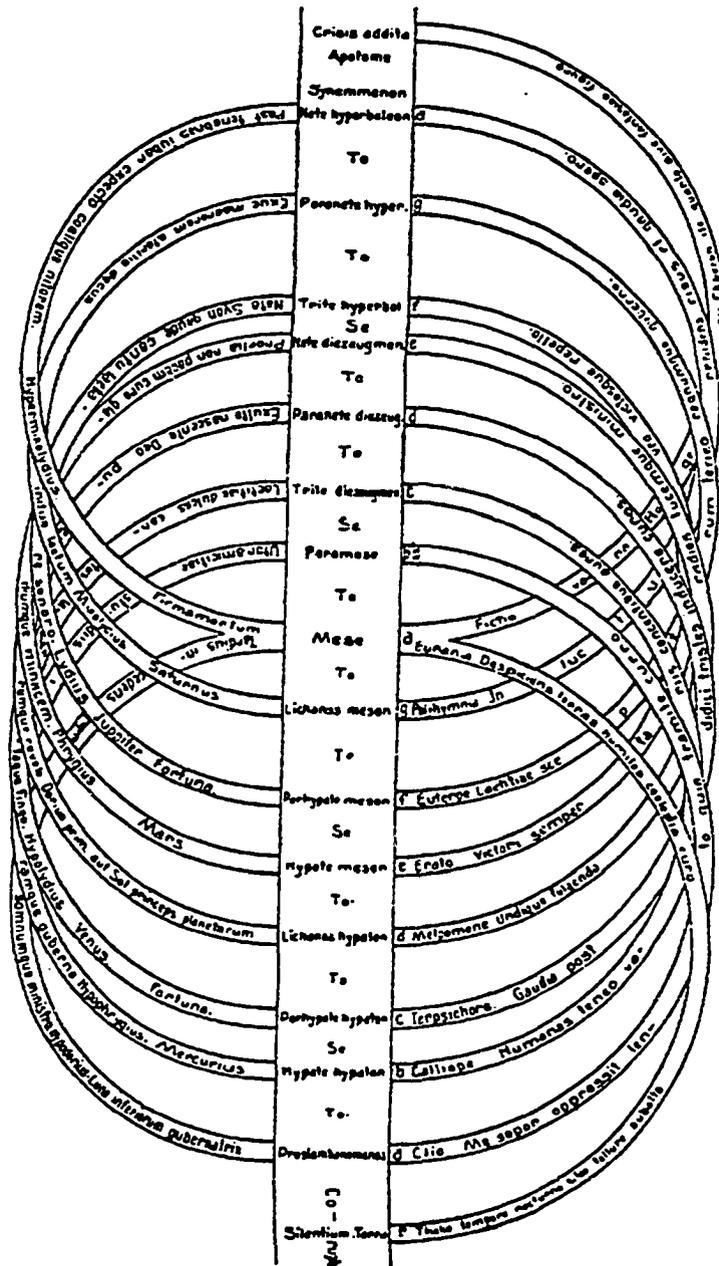


Figure 11. Figura 7 of the *Musica practica*.
 Source: Johannes Wolf, ed., *Musica practica*, 61.
 © 1968, Breitkopf & Härtel, Wiesbaden. Used by permission.

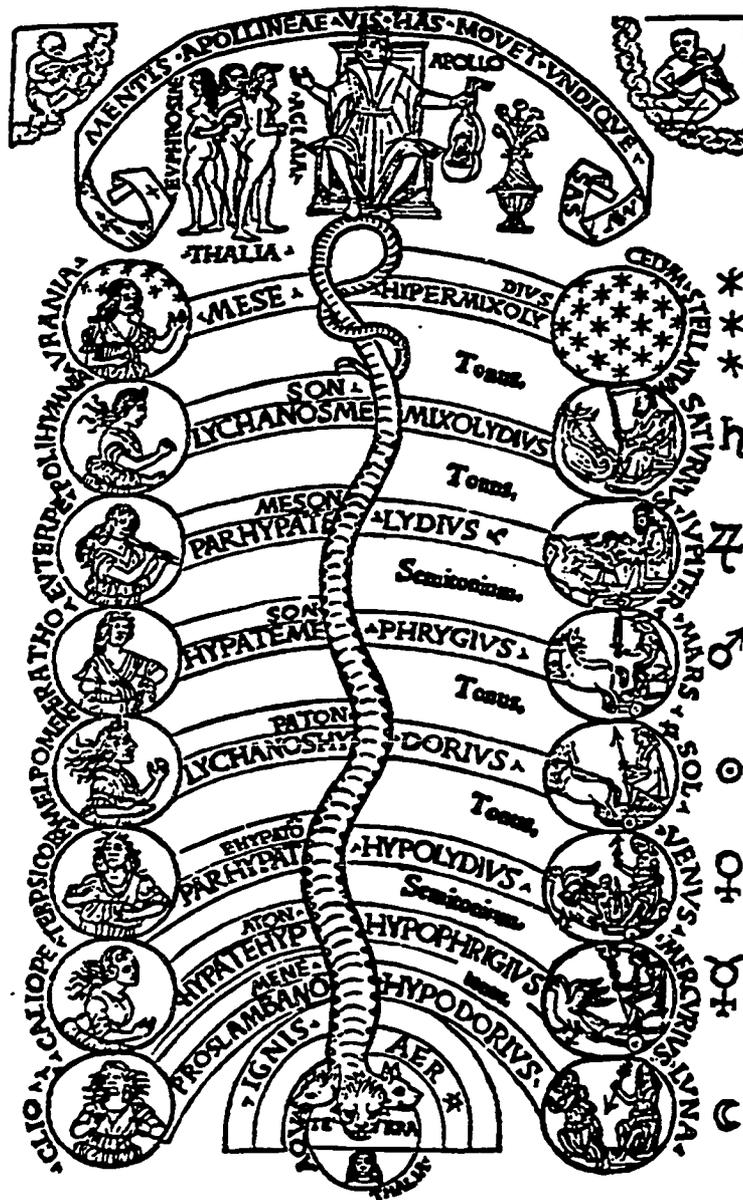


Figure 12. Frontispiece to Gaffurius's *Practica musicae*.

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.⁷

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

⁷For 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 one¹

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,

¹Ramos 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.² An amplification of each rule is provided by way of a brief discussion and by musical examples that are stated in prose.³

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).

²See 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.

³Appendix 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 GAFFURIUS⁴

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.

⁴See 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.⁵</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>

⁵Ramos 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.⁶

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."⁷

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

⁶Appendix 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.

⁷Ramos 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*.⁸

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

⁸Ibid.

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

Ramos qualifies this admission by stating that successive fifths of uneven qualities should only be allowed when writing in "diminished note values."¹⁰ 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:¹¹

⁹Ibid., 51.

¹⁰Ibid.

¹¹Other 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].¹²

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

¹²"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.¹³

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

¹³See 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 thesis¹⁴

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.¹⁵

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

¹⁴"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.

¹⁵"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

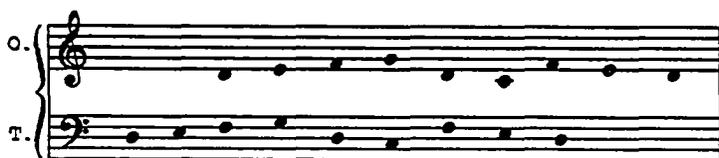


Figure 15. Imitation at the Octave Above

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 1482.¹

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

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

²See 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

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.³

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

³Brown, *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.⁴ 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.⁵ 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.⁶

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*

⁴Chapter 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.

⁵In 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.

⁶Brown, *The Florentine Chansonnier*, 17.

*cantoribus inter amicos ut numquam inducant animum cantare rogati, iniussi numquam desistant.*⁷ 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*

⁷Ibid., 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.⁸



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

⁸*Ibid.*, 18.



Figure 18. Perpetual canon, 2nd version; Hypolydian mode.
Source: Howard Mayer Brown, ed., *The Florentine Chansonnier*, 18.

Brown derives more radical solutions by means of slightly different interpretations of the canonic inscription. The first alternative of these requires that the phrase "proceed with the Lydian into *synēmmenōn*" be interpreted as "begin in the Lydian mode and lead the first segment of the melody into (and through) the *synēmmenōn*"; it also requires that the Latin term *quatuor quartas* be interpreted as "four fourths" rather than "four quarters." Consequently, Brown requires the first note of the fifth measure to be transposed by a fourth in order to allow the initial entrance to actually proceed "into" and "through" the *synēmmenōn* tetrachord of A B \flat C D. Meanwhile, the second voice enters a fourth above the initial statement

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.⁹

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).¹⁰ 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,

⁹Ibid., 19.

¹⁰Ibid.

1

5

11

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

The image displays a musical score for Figure 19, continued, across three systems of music. Each system consists of four staves. The first system begins at measure 18, the second at measure 21, and the third at measure 23. The notation is primarily in bass clef, with some treble clef staves in the second system. The music features a complex rhythmic and melodic structure, including many beamed notes and rests. The key signature is one flat (B-flat). The score concludes with the abbreviation "etc." at the end of the final system.

Figure 19. --continued--

theoretically, hexachords could be multiplied *ad infinitum*.¹¹ 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).¹²

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

¹¹Ramos de Pareia, *Musica practica*, 10.

¹²Brown, *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 (*B̄ 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.

The image displays a musical score for a perpetual canon in 3/2 time, 4th version, beginning in the Hypolydian mode. The score is organized into three systems, each containing four staves. The first system starts at measure 1, the second at measure 7, and the third at measure 13. The notation is written in bass clef with a 3/2 time signature. The music features a complex rhythmic pattern with various note values, including minims, crotchets, and quavers, often beamed together. The Hypolydian mode is indicated by the presence of a flat sign (Bb) in the lower staves of the third system. The score is presented in a clear, black-and-white format, typical of a printed musical manuscript.

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

The image displays a musical score for Figure 20, which is a continuation of a piece. It is organized into three systems, each containing four staves. The first system begins at measure 19, the second at measure 24, and the third at measure 29. The notation is written in a single clef (likely bass clef) across all staves. The music features a variety of note values, including quarter, eighth, and sixteenth notes, as well as rests. Dynamic markings, such as 'f' (forte), are used throughout. The score concludes with 'etc.' (et cetera) at the end of each system, indicating that the music continues beyond the shown measures.

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]."¹³

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"

¹³Ramos de Pareia, *Musica practica*, 45.

solution to Ramos's canonic inscription, then Ramos is far ahead of his successors;¹⁴ for Josquin's chromatic chanson, *Fortuna d'un gran tempo*, does not appear until 1501¹⁵ while Adrian Willaert's *Quid non ebrietas* does not appear until some twenty years after Josquin's master-piece.¹⁶ 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,

¹⁴See Brown, *The Florentine Chansonnier*, 22.

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

¹⁶See 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.¹⁷

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.

¹⁷See 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-7-35.¹ 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.² The folios themselves are arranged in eight layers within two

¹See 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.

²It 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.³

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.⁴ In addition to Spataro, Ercole Bottrigari and Padre Giovanni Battista Martini are also believed to

³Ghisi 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.

⁴See 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.⁵

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

⁵"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;⁶ 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."⁷ 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

⁶The 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.

⁷Ramos 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-81.⁸

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-80.⁹ 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*.¹⁰

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.

⁸Wolf, ed., *Musica practica*, ix.

⁹Ghisi 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.

¹⁰Terni, *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.¹¹

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."¹² The final sentence of Chapter 4 is the same in all three editions: "Nunc autem epilogando supradicta huic operi finem imponamus."¹³

¹¹Ramos de Pareia, *Musica practica*, 82.

¹²Ibid.

¹³Ibid.

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.¹⁴

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

¹⁴Ramos de Pareia, *Musica practica*, 82.

expensis magistri Baltasaris de Hiriberia anno domini 1482 die 5^o Junii.¹⁵

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.¹⁶ 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.¹⁷ 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 theorica*, 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

¹⁵Ibid.

¹⁶Ghisi, "Un terzo esemplare della *Musica Practica*," 224-25.

¹⁷Wolf, 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),¹⁸ 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

¹⁸Gustave 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.¹⁹

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

¹⁹In *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.²⁰ 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.

²⁰Riemann 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.²¹

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.²² Brackets within the columns of the Latin

²¹Stevenson, *Spanish Music in the Age of Columbus*, 74-75.

²²See 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*.²³ 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.

²³The 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.¹ 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.²

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 Cicero³ and
 Sallust,⁴ 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 daemone 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.⁵

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.⁶ 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.⁷ 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
videntes, 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.⁸ 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.⁹ 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."¹⁰ 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.¹¹
 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.¹² The
 second consideration is
 called *contrapunctus*,¹³ 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*,¹⁴ which is [also] commonly called *organi cantus*.¹⁵ 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 instrument¹⁶ 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],¹⁷ 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 regular¹⁸ 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.¹⁹

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].

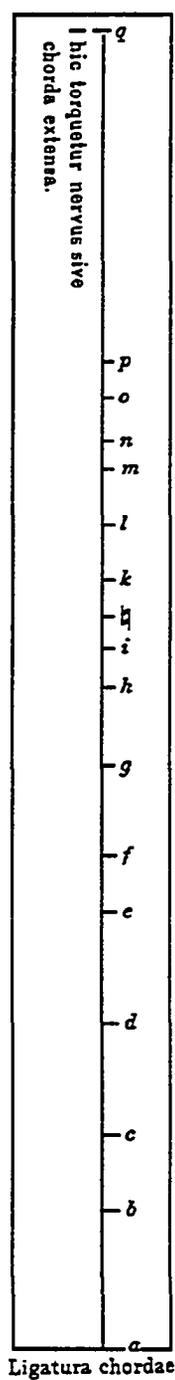


Figure 21. Figura 1 of the *Musica practica*, 5.
Source: Johannes Wolf, ed., *Musica practica*, 5.
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CAPITULUM TERTIUM

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.

Illa autem quantitas
sive intercapedo, quae
inter *c* et *d* extenditur,
tonus est et inter *d* e
similiter tonus, sed inter
e *f* semitonium, inter *f* *g*
tonus, inter *g* *h* tonus,
inter *h* *i* semitonium,
inter *i* *♯* quadrum
semitonium, inter *♯*
quadratum *k* semitonium,
inter *k* *l* tonus, inter *l* *m*
tonus, inter *m* *n*
semitonium. Fit *n* *o*
tonus, *o* *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

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.

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
♯, a semitone between
♯ and *k*, a tone between
k and *l*, a tone between
l and *m*, [and] a semitone
between *m* and *n*.²⁰ 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.²¹ 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.²² 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.²³ 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*,²⁴ 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*²⁵ 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.²⁶

The first tetrachord [is
 called] *hypatōn* in Greek,
 which is *principalium* or
*inferiorum*²⁷ in Latin; the
 second tetrachord [is
 called] *mesōn* in Greek,
 [and] *mediarum*²⁸ 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*,²⁹ because it is placed at midpoint in the heptachord. [The fifth string] is called *paramesē*--that is, next to the middle,³⁰ 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*;³¹ 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^o 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*,³² 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.*³³

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*³⁴ 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]

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*.³⁵ 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].

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 imitemur, *Enchiridion* vero disdiapason appellat. Ex his manifestatur illorum error, qui male ordiuntur--inchoant

[9]

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*³⁶ calls it *disdiapason*.

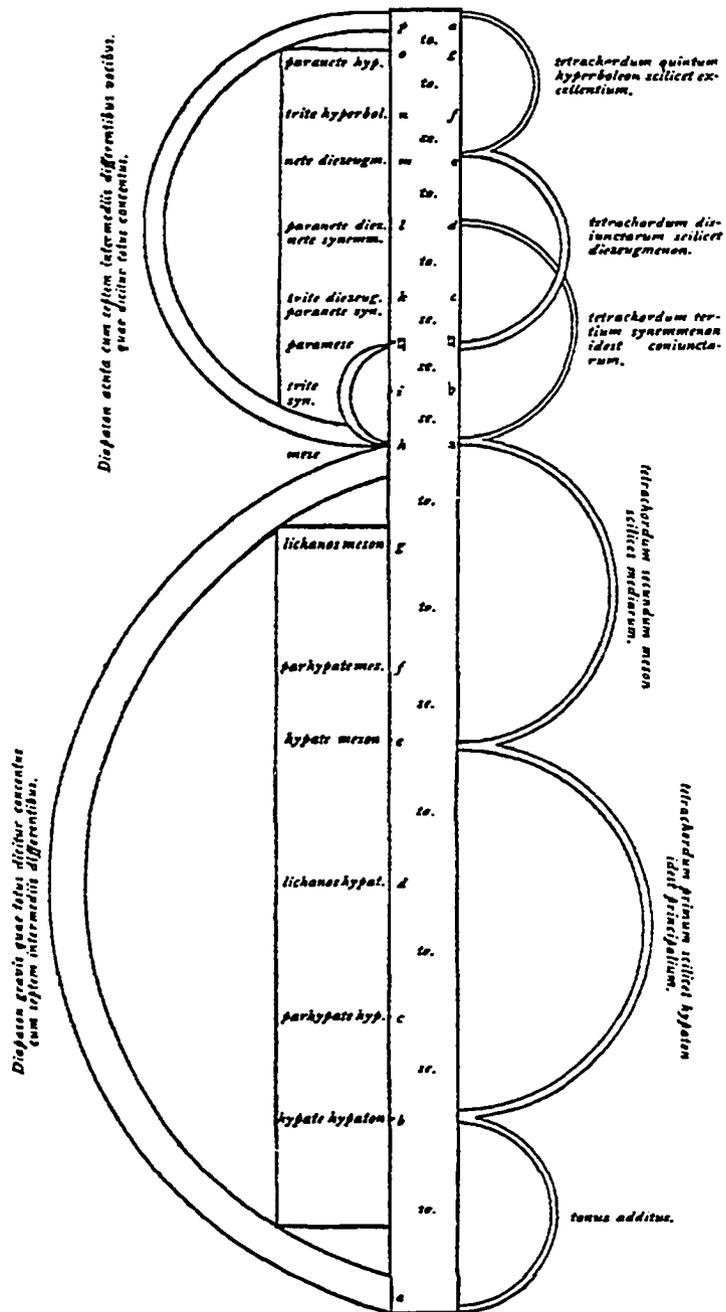


Figure 22. Figura 2 of the *Musica practica*, 8.
 Source: Johannes Wolf, ed., *Musica practica*, 10.
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namque sic: Viginti sunt
 litterae: Γ A B C D E F G
 a b c d e f g a b c d e--
 quoniam non viginti sed
 septem tantum sunt
 diversae, post quas non
 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.³⁷ 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.³⁸ 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.³⁹ 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*.⁴⁰

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.⁴¹ 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]

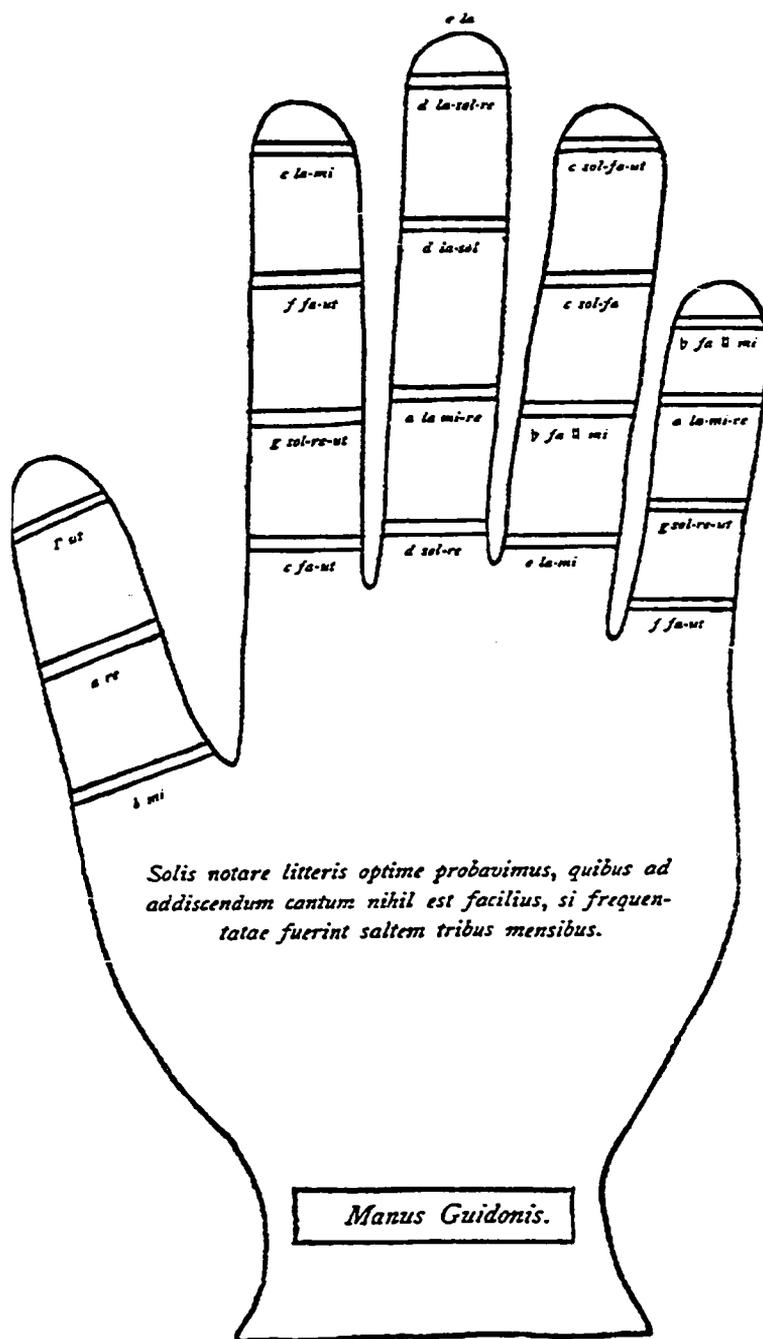


Figure 23. Figura 3 of the *Musica practica*, 11.
Source: Johannes Wolf, ed., *Musica practica*, 13.
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CAPITULUM QUINTUM

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*.⁴² 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*" ⁴³ 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" ⁴⁴

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,⁴⁵ [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.⁴⁶ 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 Carthusiensis⁴⁷--saves him by saying that he is "both untrained and deserving of chastisement."⁴⁸ However, I value this Marchettus so much that I have no doubt that four *marchetti*⁴⁹ could be swallowed down together in one gulp by the Frenchman Roger Caperon.⁵⁰

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*.⁵¹

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;⁵² 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 cognoscat.

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

monochord⁵³--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.⁵⁴

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 unaquaque 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,⁵⁵ 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.⁵⁶ 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.⁵⁷ 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 graviiores acutiioresve 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,⁵⁸ 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.⁵⁹ 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.⁶⁰

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*,⁶¹ 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 instrument⁶² 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.⁶³

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.⁶⁴ 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!⁶⁵

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*,⁶⁶ and the eighth [note] *tas*. Thus, the conclusion of the syllables will be: *psallitur per voces istas*,⁶⁷ 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 letter⁶⁸ 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.⁶⁹ 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;⁷⁰ 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.⁷¹ 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.*⁷² 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,⁷³ 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

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

EIGHTH CHAPTER⁷⁴

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.⁷⁵ [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.⁷⁶ 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 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.⁷⁷

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.⁷⁸ 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.⁷⁹ The
human voice is twofold:
one [type] is continuous,
but the other [type] is
separated.⁸⁰ 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.⁸¹ 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.⁸² 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.⁸³ 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.⁸⁴

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.⁸⁵ 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.⁸⁶

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].⁸⁷

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 ♯*.⁸⁸

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 *♯ quadratum 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 *synemmenon* or *diezeugmenon*. 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,⁸⁹
 speaking thoughtlessly,
 said: "Musica ficta [is
 made] in one way."⁹⁰
 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] *✱*.⁹¹

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 *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. 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."⁹² 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 Γ ut by a tone.
 [And] they call this
 retropolis, because when
 Γ 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 Γ 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*.⁹³

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.⁹⁴ 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 NOTES⁹⁵

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 synēmnenōn* 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."⁹⁶ 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*;⁹⁷ (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*.⁹⁸

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].⁹⁹ 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*.¹⁰⁰ 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*.¹⁰¹ 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* solque 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*,¹⁰² 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.¹⁰³ 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,¹⁰⁴ 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 quantity¹⁰⁵ 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 Γ
 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 Γ 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.¹⁰⁶ 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.¹⁰⁷

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
repperimus 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*
[*itches*],¹⁰⁸ 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 prosequuntur. 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
coniunctarum ♯ 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.¹⁰⁹ However,
recognizing the
differentia musicae,¹¹⁰
we will take care to
demonstrate with the
firmest reasons and
mathematics that this is
of no value.

		la
		t
	e la	la-sol
la	t	t
t	d la-sol	sol-fa
la-sol	t	mi
	c sol-fa	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	Obo
t	naturals	sol/s
ut		sol/s

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.¹¹¹ 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 Osma¹¹²--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 *b* *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* *b* *mollis*, ponitur *fa* coniunctae *b* *mollis*. Ergo *b* *molle* differt a *b* *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* *b* [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

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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,¹¹³ a teacher of theology, attempted to confirm. But since he did not write a book, nothing should be said about him.¹¹⁴ But Brother Johannes Hothby,¹¹⁵ 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].¹¹⁶ 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 *♯*
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 *♯* 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?"¹¹⁷ 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 Osma¹¹⁸
 already mentioned above
 says: "These three
 properties--that is, *hard*
♯, *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 ♯; 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."¹¹⁹ 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.¹²⁰ 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.¹²¹ Likewise, if the song is made in this manner *g f g* and it does not touch upon *f* again, it is a semitonus subintellectus¹²² even though it may be called *sol fa sol* or *re ut re*.

The same man [Johannes of Villanova] believes that the synemmenōn 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
semitonum 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,¹²³ which is
a note of the coniunctae.

Furthermore, Johannes
himself says that a
semitone 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
semitonus 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 Carthusiensis¹²⁴ 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].¹²⁵ It is only important to notice the tones and the semitones, and to sing according to the letters of Gregory."¹²⁶ 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 diapason¹²⁷ --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*.¹²⁸ 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

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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.

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

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*."¹²⁹ 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

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

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.

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

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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 medii *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.¹³⁰ And let the same be done in respect to the other diapason--[that is], the third [diapason]--with the little finger¹³¹ 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].¹³²

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.

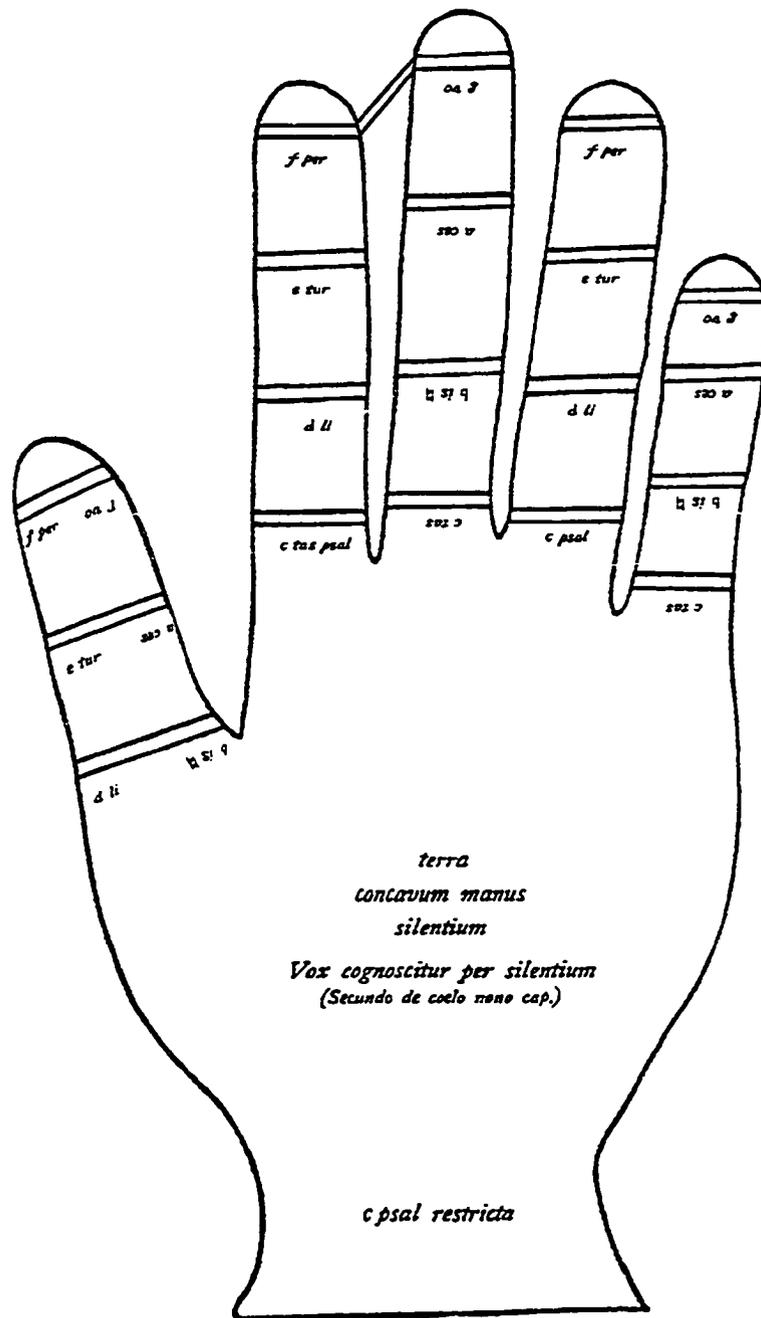


Figure 27. Figura 6 of the *Musica practica*, 36.
 Source: Johannes Wolf, ed., *Musica practica*, 47.
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CAPITULUM OCTAVUM

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.¹³³

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.

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.

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

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.

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.

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."¹³⁴
 Naturally, they are made
 by the addition of the
 semitone, starting from
 equality¹³⁵ [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 summam 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 practicorum
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.¹³⁶
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.¹³⁷ As Brother
 Johannes Carthusiensis
 says, "To make a tritone
 is not a mortal sin as
 many believe."¹³⁸ 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.¹³⁹ 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,¹⁴⁰ 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."¹⁴¹ 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,¹⁴² 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.¹⁴³
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.¹⁴⁴ 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,"¹⁴⁵ 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.¹⁴⁶ 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*,¹⁴⁷ --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*,¹⁴⁸ --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 Johannes¹⁴⁹) 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.¹⁵⁰ 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,¹⁵¹ "is quick and suitable for all affections,"--that is, it is desirable [for such music] as in the canticums.¹⁵² 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."¹⁵³ 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,¹⁵⁴ are delighted by the rougher modes; but those who are gentle [are delighted] by the moderate [modes]."¹⁵⁵ Boethius relates that a young man of Tauromenium¹⁵⁶ 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].¹⁵⁷ 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
Tullius¹⁵⁸ 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*.¹⁵⁹

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
 Hesiod¹⁶⁰ prefers to do--
 we will arrange the nine
 Muses, daughters of
 Jupiter and the goddess of
 memory,¹⁶¹ 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.¹⁶²
 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.¹⁶³ 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.¹⁶⁴
 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.

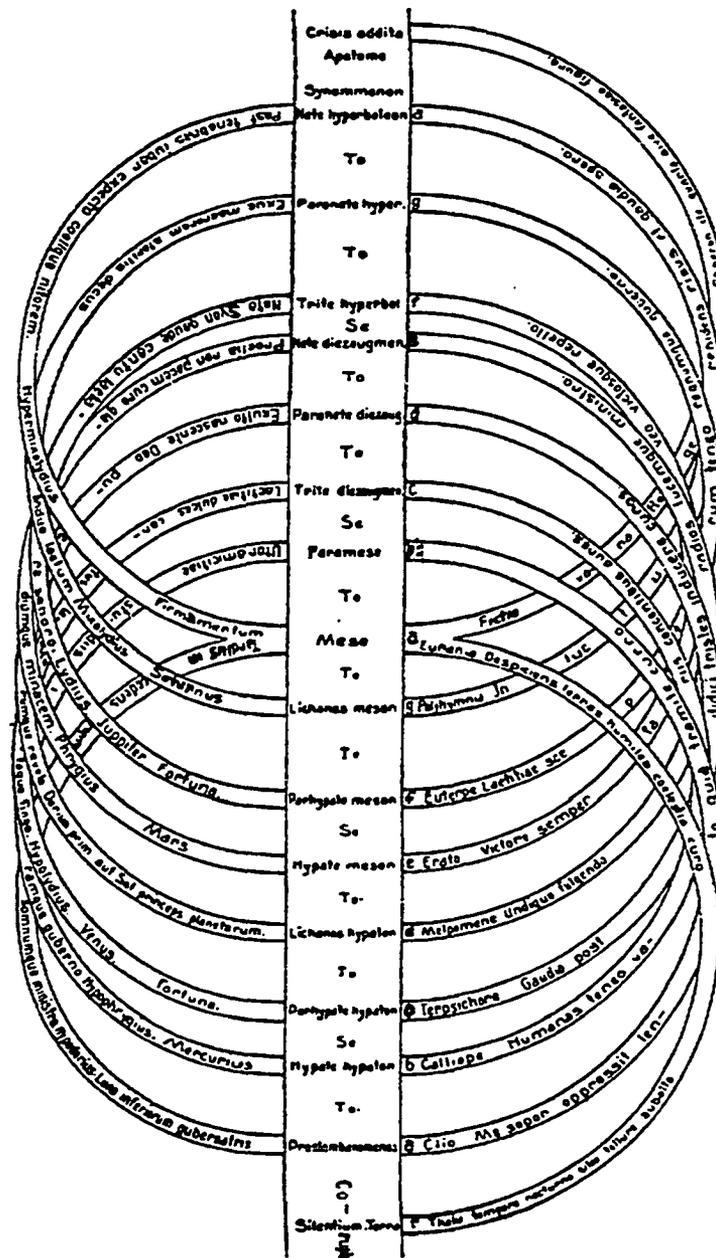


Figure 28. Figura 7 of the *Musica practica*, 47.
 Source: Johannes Wolf, ed., *Musica practica*, 61.
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SECUNDA PARS
IDEST CONTRAPUNCTUS

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.¹⁶⁵ 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 Boetius, 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,"¹⁶⁶ 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.¹⁶⁷

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,¹⁶⁸ 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.¹⁶⁹ 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.¹⁷⁰

Therefore, let them agree to the reasons mentioned, since they deal exclusively with practice, and thus while consuming lactations,¹⁷¹ 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*,¹⁷² as it appears in the figure.¹⁷³

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,¹⁷⁴ and therefore, the third and the sixth are of the same nature since they are imperfect.¹⁷⁵ But the fourth and the fifth correspond the most,¹⁷⁶ 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;¹⁷⁷ 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.¹⁷⁸ 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 prohibendum 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

utroque 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

[53]

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: . 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;¹⁷⁹ 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.

[54] 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;¹⁸⁰ 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*.¹⁸¹

Ugolino, with some barbarous measures, established common rules concerning all the species,¹⁸² 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.¹⁸³

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.¹⁸⁴

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.¹⁸⁵

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.¹⁸⁶

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.¹⁸⁷

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.¹⁸⁸

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.¹⁸⁹ 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,¹⁹⁰ 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 coniunctorum. 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.¹⁹¹ 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 $\frac{1}{4}$ *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 $\frac{1}{4}$ *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 Γ *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
 Γ *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
lectorī relinquimus
indagandum.

Animadvertēte 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.

e la	20 19 17 re mi sol	17 15 13 12 ut mi sol la	20 19 17 15 ut re fa la	15 13 12 re fa sol	19 17 15 ut mi sol	17 13 re la	13 10 re sol	15 13 12 ut mi sol la	17 15 13 re fa la	19 17 15 ut mi sol	17 13 re fa sol	15 13 12 ut mi sol	13 10 re la
d la-sol	20 19 17 15 ut re fa la	15 13 12 re fa sol	19 17 15 ut mi sol	15 13 12 10 ut mi fa la	17 15 13 re fa la	17 15 13 12 ut mi sol la	13 10 re sol	15 13 12 10 ut mi fa la	17 15 13 re fa la	19 17 15 ut mi sol	17 15 13 re fa la	15 13 12 ut mi sol la	13 12 10 re mi sol
c sol-fa	19 17 15 ut mi sol	15 13 12 10 ut mi fa la	17 15 13 re fa la	13 10 re sol	17 13 re la	13 12 10 re mi sol	13 10 re sol	15 13 12 ut mi sol la	17 15 13 re fa la	19 17 15 ut mi sol	17 13 re fa sol	15 13 12 ut mi sol	13 12 10 8 ut re fa la
mi	17 15 13 re fa la	13 12 10 re mi sol	17 15 13 12 ut mi sol la	13 10 re sol	17 13 ut sol	13 10 re sol	13 10 ut fa	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	13 10 re mi
fa	17 15 13 12 ut mi sol la	13 12 10 8 ut re fa la	15 13 12 re fa sol	12 10 8 ut mi sol	15 13 12 10 ut mi fa la	13 10 re sol	12 10 8 ut mi sol	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	12 10 8 ut mi sol
a la-mi-re	17 15 13 12 ut mi sol la	13 12 10 8 ut re fa la	15 13 12 re fa sol	12 10 8 ut mi sol	15 13 12 10 ut mi fa la	13 10 re sol	12 10 8 ut mi sol	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la
g sol-re-ut	15 13 12 re fa sol	12 10 8 ut mi sol	15 13 12 10 ut mi fa la	10 8 6 re fa la	15 13 12 10 ut mi fa la	13 10 re sol	10 8 6 re fa la	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la
f fa-ut	15 13 12 10 ut mi fa la	10 8 6 re fa la	13 10 re sol	10 6 ut sol	13 10 ut fa	13 10 re sol	10 6 ut sol	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la
e la-mi	13 12 10 re mi sol	10 8 6 5 ut mi sol la	13 12 10 8 ut re fa la	8 6 5 re fa sol	12 10 8 ut mi sol	13 10 re sol	8 6 5 re fa sol	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la
d la-sol-re	13 12 10 8 ut re fa la	8 6 5 re fa sol	12 10 8 ut mi sol	8 6 5 3 ut mi fa la	10 8 6 re fa la	13 10 re sol	8 6 5 re fa sol	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la
c sol-fa-ut	12 10 8 ut mi sol	8 6 5 3 ut mi fa la	10 8 6 re fa la	6 3 re sol	10 8 6 re fa la	13 10 re sol	6 3 re sol	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la
mi	10 6 re la	6 5 3 re mi sol	10 8 6 5 ut mi sol la	6 5 3 1 ut re fa la	10 8 6 5 ut mi sol la	10 6 ut sol	6 5 3 1 ut re fa la	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la
fa	10 8 6 re fa la	6 3 re sol	10 6 ut sol	6 3 ut fa	10 6 ut sol	10 6 ut sol	6 3 ut fa	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la
a la-mi-re	10 8 6 5 ut mi sol la	6 5 3 1 ut re fa la	8 6 5 re fa sol	5 3 1 ut mi sol	8 6 5 re fa sol	8 6 5 ut mi fa la	5 3 1 ut mi sol	15 13 12 10 ut mi fa la	17 15 13 re fa sol	19 17 15 ut mi sol	17 13 ut sol	15 13 12 10 ut mi sol	10 8 6 5 ut mi sol la

Figure 29. Figura 8 of the Musica practica, 60.

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.¹⁹² 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.¹⁹³ 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.¹⁹⁴

For the *prolatio* [is
taken] from
proferendo,¹⁹⁵ 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."¹⁹⁶

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.

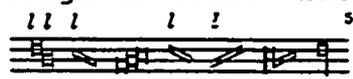
Certainly the simple
sign called *tempus* was
touched upon above.
Therefore, the *modus minor*
will have a long, but the
[*modus*] *maior* will have a
maxima which is called a
duplex long by many
[people]; the *prolatio
minor* will have a
semibreve,¹⁹⁷ which is
also called *minor*, but the
[*prolatio*] *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 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 $\blacklozenge \uparrow$,
 semiminima; quae, si ad
 caput si retorta $\blacklozenge \uparrow$,
 curseae sive cursutae aut
 croceae, quae, si fiat sic
 $\blacklozenge \uparrow$, [minarea], quae, si
 hoc modo $\blacklozenge \uparrow$, 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.

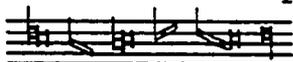
represented. But here,
 superficially and by means
 of a corollary, we will
 briefly show a notion of
 those [signs] whose
 recognition proceeds from
 the breve. The sign [of
 the breve] is square in
 this way H , but if it has
 a line above or below on
 [its] right side in this
 way $\text{H} \text{H}$, 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 long by the
 ancients.¹⁹⁸ For this
 occurs in an augmentation
 to the breve itself. But
 if it is divided
 diametrically from angle
 to angle in this way 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 $\blacklozenge \uparrow$, a *semiminim* [is
 made]; on the chance that
 it is twisted at the top
 [like this] $\blacklozenge \uparrow$, it is
 called a *cursea* or, if you
 prefer, a *cursuta*, or a
crocea; if it is made in
 this way $\blacklozenge \uparrow$, [it is
 called] a *minarea*; if [it
 is made] in this way $\blacklozenge \uparrow$,
 [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:

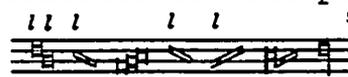


Ligatura vero duarum pluriumve notarum in arsi aut thesi quadratarum sive non, aut primae quadratae et aliarum non, habens tractum ascendens ex parte sinistra, duae semper primae, etsi fuerint solae, semibreves dicuntur. Exemplum:

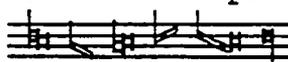


Signabimus igitur longas littera l, semibreves vero signo s consignabimus, ut, cum postea in cantibus similes ligaturas reperimus, quae sint

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."¹⁹⁹ 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].²⁰⁰ 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.²⁰¹

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 notularum 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."²⁰² 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*.²⁰³ 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*;²⁰⁴ 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.²⁰⁵

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 ○²
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.²⁰⁶

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] ○² is placed in
the other [voices], it is
[worth] as much as the
breve.²⁰⁷ 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,²⁰⁸ 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.²⁰⁹ 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 \equiv .
Quae si duo vel
[tria] spatia occupet sic
 \equiv , pausa longa dicitur;
si vero quatuor spatia
amplectitur hoc modo \equiv ,
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 C

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: \equiv .
If this occupies two or
three spaces in this way
 \equiv , it is called a *long*
rest; but if it
encompasses four spaces in
this way \equiv , [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,²¹⁰ 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.²¹¹ 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,²¹²
 and thus the maxima is
 worth three longs. But if
 two [rests] are
 established and then two
 more, we conclude that it
 is imperfect.²¹³
 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.²¹⁴ 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?²¹⁵ 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;²¹⁶ 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 ○○ ◡ ○ ○◡ ◡◡. Hic autem modus ab illo non differt; nam id, quod denotatur per 3, patefacit ○, et quod intelligimus per 2, per ◡ 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: ○○ ◡ ○ ○◡ ◡◡. Moreover, this method does not differ from that [which we have already discussed]; for what is indicated by [the number] 3 reveals a ○, and what we understand by [the number] 2, we recognize by means of ◡.²¹⁷ 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.²¹⁸ 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 $\circ \subset$ 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, $\circ \subset$ --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.²¹⁹

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.²²⁰ 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.²²¹ 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].²²²

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.²²³ 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 \bigcirc_2 adiungunt,
 sic et, si [pausae binae]
 semibrevis hoc modo \equiv
 reperiantur, superflue
 ponitur istud \bigcirc , 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].²²⁴ 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.²²⁵ 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.²²⁶ 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*.²²⁷ 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.²²⁸ 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.*²²⁹ 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*,²³⁰ 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.*²³¹ 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*²³² 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*²³³ (which we composed while we were lecturing publicly in Bologna),²³⁴ 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.²³⁵ 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*.²³⁶ The abyss in music is any voice's lower octave. But [it should be done] to the contrary when one sings *Suspendimus organa nostra*.²³⁷ We also have established as many canons as possible by attributing [them] to sacred scripture as in *Requiem aeternam*.²³⁸ [where] we insinuate [in] the canon *Ut requiescant a laboribus suis*²³⁹ that *ut* and *re* are silent, but that they may sing the rest [of them].²⁴⁰ 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*²⁴¹ 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*,²⁴² 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*²⁴³ 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*²⁴⁴ 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*²⁴⁵ 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*;²⁴⁶ 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*,²⁴⁷ 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 practicis 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.²⁴⁸ 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
third²⁴⁹ 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.²⁵⁰
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 mediæ contra differentiam mediæ atque minimi comparatur, ut in his terminis 3. 4. 6.

Senarius enim quaternarius sua tertia parte superat idest binarius, 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 mediæ ad differentiam mediæ atque postremi. Patet hoc, quoniam differentia inter medium et minimum unitas est et mediæ 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 relation²⁵¹ is
 found in the smaller
 numbers. And therefore,
 the arithmetic mean is
 compared to that state
 which is governed by the
 few.²⁵² On that account,
 since a greater ratio is
 kept in its smaller terms,
 the geometric proportion
 is in a certain way
 "democratic,"²⁵³ 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,²⁵⁴ 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.²⁵⁵ 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
 says²⁵⁶--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
inches²⁵⁷ 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,²⁵⁸ 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, supertriptiens quintas reperitur habitudo. Excedit enim 24 numerus numerum quindenarium in tres quintas minimi partes. Ex hac enim collatione diapente cum semitono 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,²⁵⁹ and from that the semiditone or, if you prefer, the trihemitone species is produced,²⁶⁰ which, it is clear, consists of a perfect and an imperfect tone.²⁶¹ But if a comparison is made of the same [q]-f to [q]-a, a relationship of the supertriptient 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.²⁶²

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.²⁶³ 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.²⁶⁴

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.²⁶⁵ 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.²⁶⁶ 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,²⁶⁷ nor in concords [that are played] successively.²⁶⁸ 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
 tones²⁶⁹--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.²⁷⁰ 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*,²⁷¹ [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].²⁷²

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 repperisse
 testabatur. Credimus enim
 error illi sic emerit,
 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 incideremus 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 Boethius²⁷³
 --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.²⁷⁴ 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.²⁷⁵ 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,²⁷⁶
 in the district or, if you
 prefer, the jurisdiction
 of Gienna²⁷⁷. [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, 1482.²⁷⁸

(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^o
Junii.)

and expense of Maestro
Baltasar de Hiriberia, on
the fifth day of June in
the year of our Lord
1482.)²⁷⁹

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. $h=a$, $i=bb$, $\natural=b\natural$, $k=c$, $l=d$, $m=e$, $n=f$, $o=g$, $p=a$.

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♯* was never implemented chromatically. A singer could choose to sing *bb* or *b♯* 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♯*, 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♯*, 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♯*), which produces the pitches *a*, *b♭*, and *b♯*.

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 \natural* : ". . . saltem de tuo nomine is feras laudem, quoniam tam pro *b* rotunda quam pro *♯* 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 *♯*, 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 \sharp* , and *b \sharp* 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 b♭ (consisting of two *dieses*), the diatonic semitone b♭ 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 (Coussemer, *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 Coussemaker, *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, *proportiones* 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."

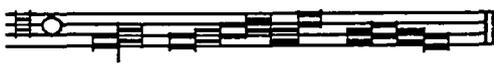
208. Gaffurius's marginal annotation: "Ego quidem Tinctoris doctrinam quam horum deductorum saniozem ipsa experientia didici, quamquam multas eius sententias iuridice impugnavi." Translation: "Although I have justly opposed many of his opinions; indeed, I have applied the teaching of Tinctoris which is more sound than the very practices of these teachers."

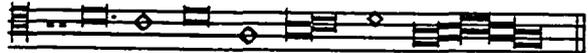
209. A section of this paragraph from "Et istud servat Ockeghem, Busnois, Dufay . . ." to "aliquando in minima" is quoted nearly verbatim in Book I, Chapter 38 of Pietro Aaron's *Thoscanello*. See Aaron, *Thoscanello*, fol. e3r.

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 semitono, quod repugnat positioni Ramis Hispani indifferenter concludentis semiditonus 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 quarter note on G4, an eighth rest, a dotted quarter note on A4, an eighth rest, a dotted quarter note on B4, an eighth rest, a dotted quarter note on C5, an eighth rest, a dotted quarter note on D5, an eighth rest, a dotted quarter note on E5, and an eighth rest. The 'T.' staff is in treble clef and contains a sequence of notes: a dotted quarter note on G3, an eighth rest, a dotted quarter note on A3, an eighth rest, a dotted quarter note on B3, an eighth rest, a dotted quarter note on C4, an eighth rest, a dotted quarter note on D4, an eighth rest, a dotted quarter note on E4, an eighth rest, a dotted quarter note on F4, an eighth rest, a dotted quarter note on G4, and an eighth rest.

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: a dotted quarter note on G4, an eighth rest, a dotted quarter note on A4, an eighth rest, a dotted quarter note on B4, an eighth rest, a dotted quarter note on C5, an eighth rest, a dotted quarter note on D5, an eighth rest, a dotted quarter note on E5, an eighth rest, a dotted quarter note on F5, an eighth rest, a dotted quarter note on G5, and an eighth rest. The 'T.' staff is in treble clef and contains a sequence of notes: a dotted quarter note on G3, an eighth rest, a dotted quarter note on A3, an eighth rest, a dotted quarter note on B3, an eighth rest, a dotted quarter note on C4, an eighth rest, a dotted quarter note on D4, an eighth rest, a dotted quarter note on E4, an eighth rest, a dotted quarter note on F4, an eighth rest, a dotted quarter note on G4, and an eighth rest.

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: a dotted quarter note on G4, an eighth rest, a dotted quarter note on A4, an eighth rest, a dotted quarter note on B4, an eighth rest, a dotted quarter note on C5, an eighth rest, a dotted quarter note on D5, an eighth rest, a dotted quarter note on E5, an eighth rest, a dotted quarter note on F5, an eighth rest, a dotted quarter note on G5, and an eighth rest. The 'T.' staff is in bass clef and contains a sequence of notes: a dotted quarter note on G2, an eighth rest, a dotted quarter note on A2, an eighth rest, a dotted quarter note on B2, an eighth rest, a dotted quarter note on C3, an eighth rest, a dotted quarter note on D3, an eighth rest, a dotted quarter note on E3, an eighth rest, a dotted quarter note on F3, an eighth rest, a dotted quarter note on G3, and an eighth rest.

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 contains a sequence of notes: G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4. The T staff contains a sequence of notes: C3, D3, E3, F3, G3, A3, B3, C4, D4, E4, F4. The word "Good" is written in the O staff, centered under each of the four measures.

The second musical example consists of two staves, O (Organ) and T (Trombone). The O staff contains a sequence of notes: G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4. The T staff contains a sequence of notes: C3, D3, E3, F3, G3, A3, B3, C4, D4, E4, F4. The word "Good" is written in the O staff, centered under each of the four measures.

The third musical example consists of two staves, O (Organ) and T (Trombone). The O staff contains a sequence of notes: G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4. The T staff contains a sequence of notes: C3, D3, E3, F3, G3, A3, B3, C4, D4, E4, F4. The word "Good" is written in the O staff, centered under each of the four measures.

The fourth musical example consists of two staves, O (Organ) and T (Trombone). The O staff contains a sequence of notes: G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4. The T staff contains a sequence of notes: C3, D3, E3, F3, G3, A3, B3, C4, D4, E4, F4. The word "Good" is written in the O staff, centered under each of the four measures.

O. *Better Better Ok Good*

T. *Better Better Ok Good*

O. *Good Rare Good Good*

T. *Good Rare Good Good*

O. *Good Good Good Good*

T. *Good Good Good Good*

O. *Good Good Good Good*

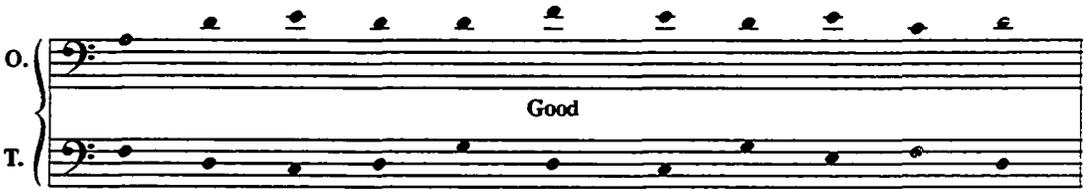
T. *Good Good Good Good*

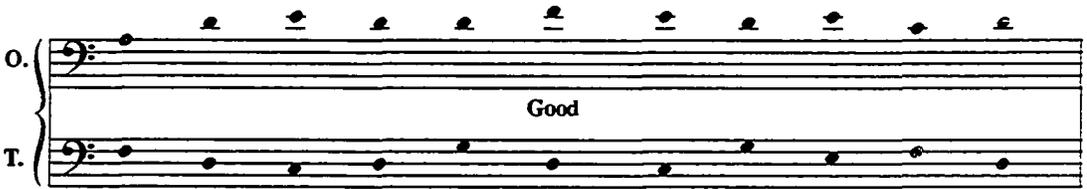
O. *Better Ok Better Ok*

T. *Better Ok Better Ok*

O. 

T. 

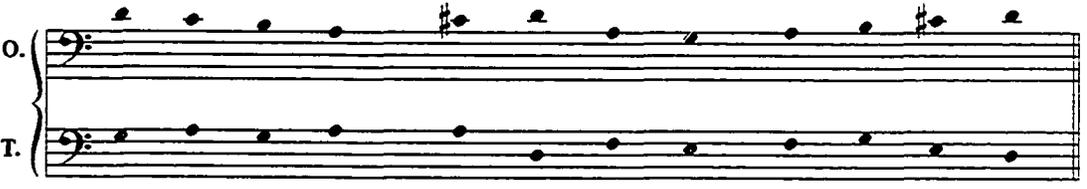
O. 

T. 

O. 

T. 

O. 

T. 

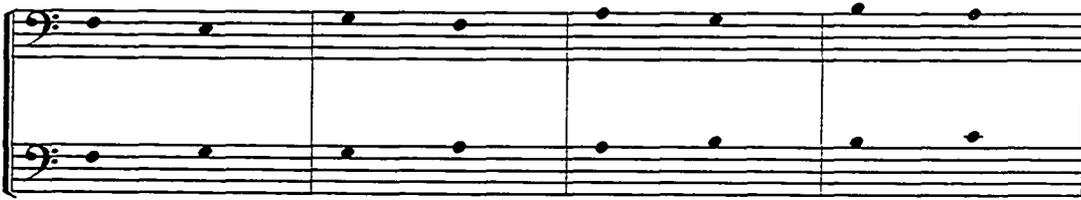
APPENDIX D
UGOLINO'S RULES OF COUNTERPOINT
WITH MUSICAL EXAMPLES

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:¹

Tertia sit infra, unisonus si intenditur una.



Si tertia vel quarta tendit, infra diapente tenebit.



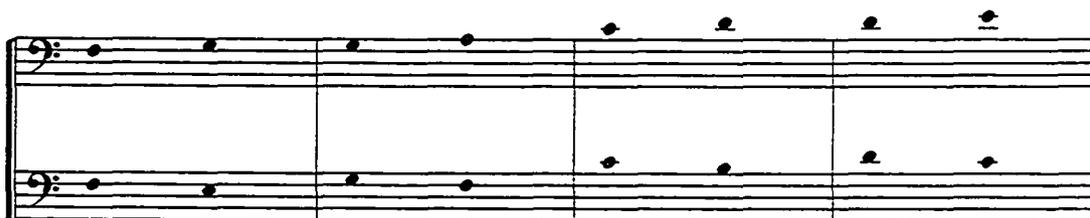
¹Ugolino d'Orvieto, *Declaratio musicae disciplinae*, 32-34.

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.

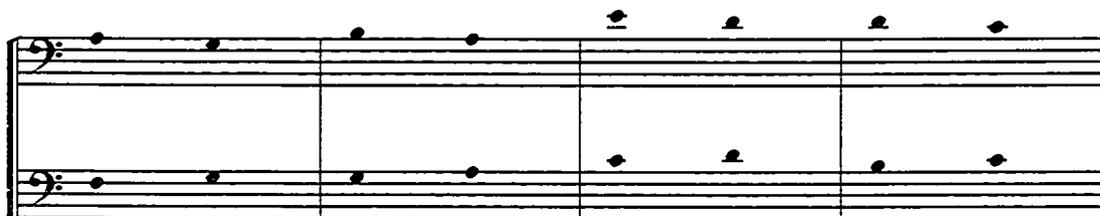


Octavam petit, si quintam vel ultra deponit.
Si plura pertransit, rationis ordo docebit.



Tertia regula de tertia ascendendo:

Unisonus fiat, unam si tertia tendat.



Si plures intendat, tandem unisonus fiat.



Tertiam remittit, si ter vel quater ascendit.

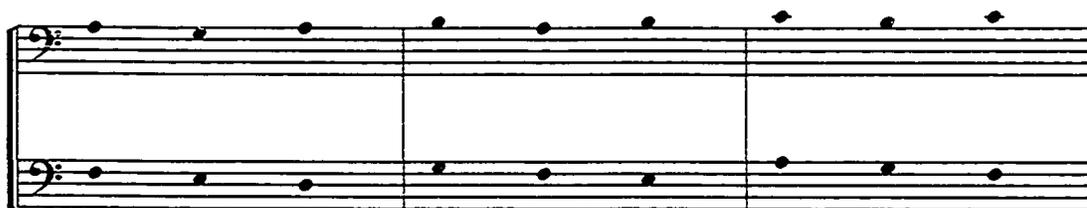


Quarta regula de tertia descendendo:

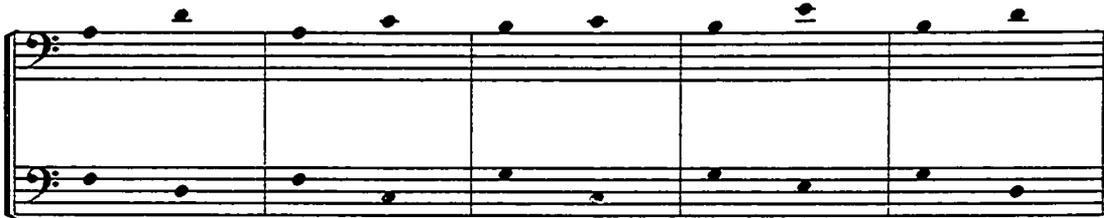
Quinta tibi fiat, si terna solam remittat.



Si plures fuerint, eas quinta terminabit.



Si ternam vel quartam, octavam superintendas.



Quinta sexta fiet, si cum octava iungatur.

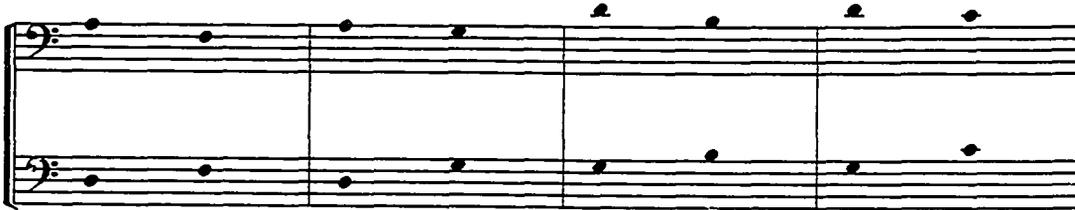


Quinta regula de quinta ascendendo:

Quinta quaerit ternam, si fit ascensus in unam.

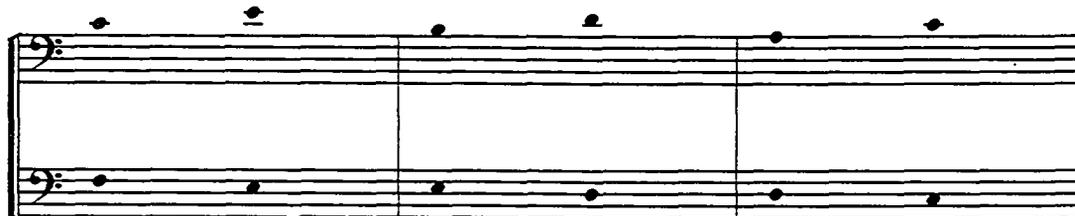


Unisonum dicas, si ternam vel quartam intendas.

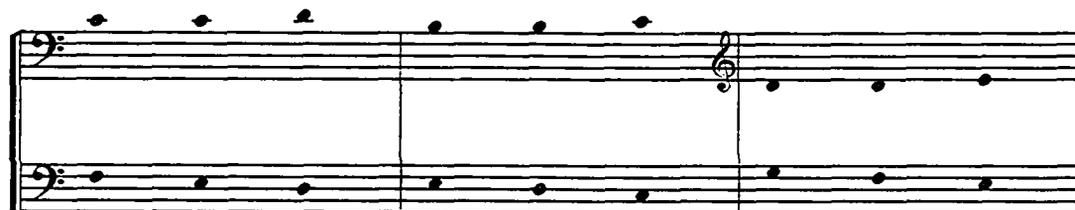


Sexta regula de quinta descendendo:

Octavam quinta petit, si solam unam descendit.



Erit octava, sexta, si alteri sit sociata.



Post quintam octava fiat, si ternam infra remittat.

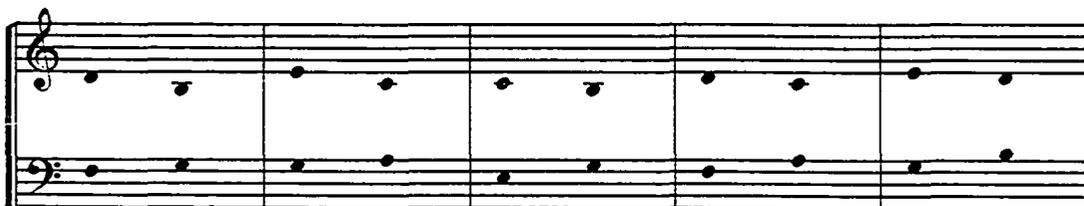


Si quartam vel quintam, decimam intendere sinit.



Septima regula de sexta ascendendo:

Sexta ternam cupit, si supra notam intendit.

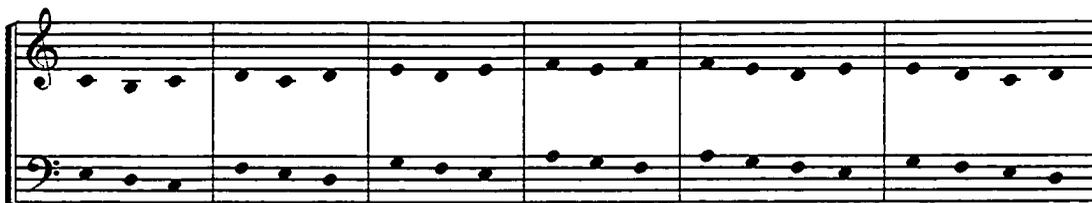


Octava regula de sexta descendendo:

Sexta vult octavam, infra si tendit ad unam.



Et plures fiant, si antecedunt octavam.

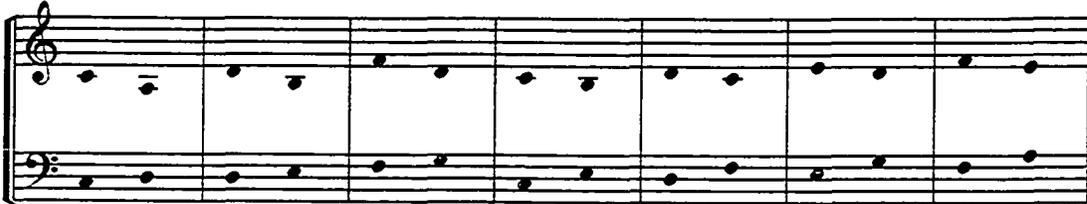


Vult decimam sexta tertiam remittens ad infra.

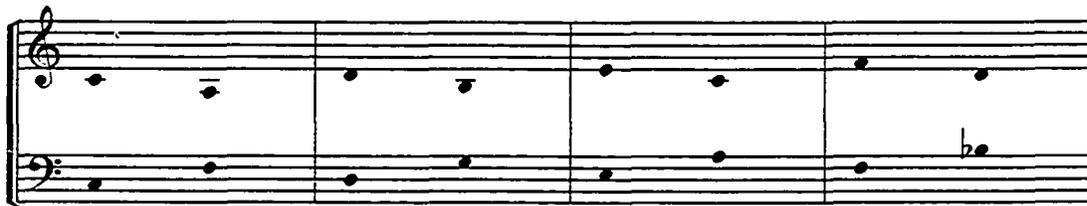


Nona regula de octava ascendendo:

Post octavam quinta, si cantus tenditur una.



Si quarta vel quinta salit, tertiam iure poscit.

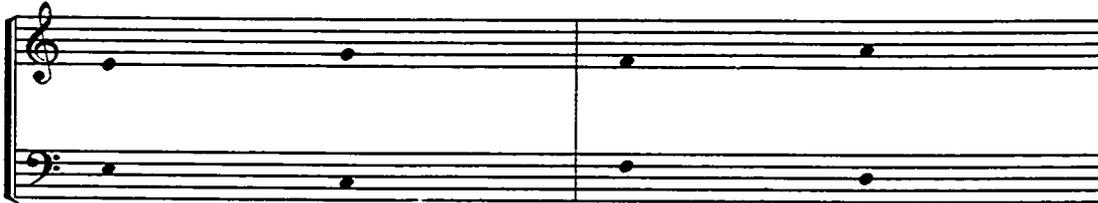


Decima regula de octava descendendo:

Octava decimam, si solum deponit unam.



Tertia si fuerit, tunc duodecima fiat.

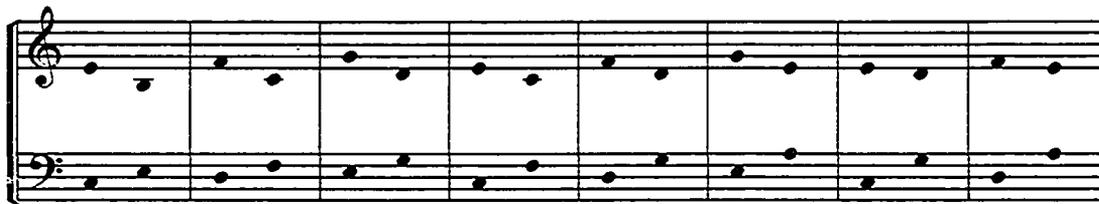


Undecima regula de decima ascendendo:

Decima vult octavam, unam duntaxat intensam.



Plura si transcendit, tunc quinta locum habebit.



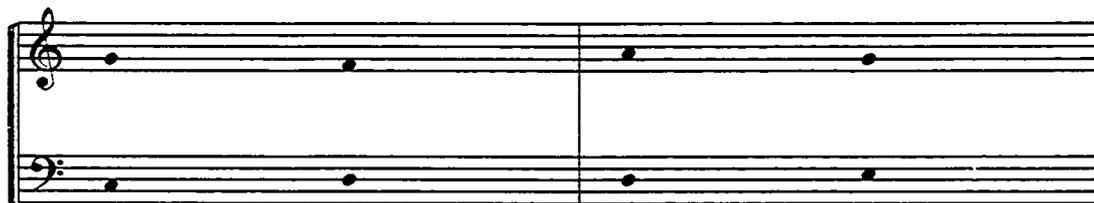
Duodecima regula de decima descendendo:

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: ¹	RAMOS: ²	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 ³ 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

¹Corrected words are bracketed in the translation.

²Denotes all editions, unless otherwise noted.

³Denotes 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	minariaea	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	lachonica 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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